Wealth effect in the US: evidence from the combination of two surveys

Salotti, Simone

Department of Economics, National University of Ireland Galway

November 2010

Wealth effect in the US: evidence from the combination of two surveys

Simone Salotti[÷]

This draft: November 2010

Abstract

This article investigates how wealth affected household consumption in the USA in the period 1989-2007. Previous empirical results are mixed, mostly because of the low quality of the data more readily available. We combine information from the Consumer Expenditure Survey and the Survey of Consumer Finances to perform a detailed analysis on the effects of several types of wealth on consumption. Our estimates indicate that there is a significant tangible wealth effect, while financial wealth seems to affect consumption mainly for the richer part of the population. Both effects are larger during periods of prices booms. Older households experience a higher wealth effect out of the house of residence with respect to the younger ones. Finally, a sort of myopic behavior emerges, since households seem to disregard net wealth and decide about consumption looking at gross wealth only.

JEL: D12, E21

Keywords: Consumption, Household Wealth, Wealth Effect, Sample combination.

[÷] simone.salotti@nuigalway.ie Department of Economics – National University of Ireland, Galway – University Rd, Galway – Ireland

1. Introduction

During the Nineties and up to the 2007 subprime mortgages crisis, a period of growing stock and housing prices, the US aggregate savings rate fell considerably, leading to a renewed interest in the understanding of its determinants. In particular, the recent literature concentrated on the effects of household wealth on consumption and savings, through the so called 'wealth effect' channel (Paiella 2007a). F.i. Greenspan (2003) credited housing wealth, realized capital gains, and home equity borrowing with shoring up the economy in the aftermath of the stock market collapse of 2000 and the recession of 2001, primarily through their effects on consumer spending. Some authors claim that the decline in the personal saving rate is due to the significant capital gains in corporate equities experienced over this period (Juster et al., 2005). Others conclude that there is at best a weak evidence of a stock market wealth effect, and underline the importance of housing wealth in determining the households' decisions on consumption and savings (Case et al., 2005). However, the mechanism through which wealth affects consumption is not yet clearly understood: while the arguments supporting a direct wealth effect are clear (changes in wealth directly cause changes in consumption through their effect on households' contemporaneous budget sets), the empirical evidence brought so far by a large literature that investigates the role of wealth shocks on consumption is unclear. Moreover, wealth can affect consumption through the indirect channel of providing collateral for obtaining access to credit (Cynamon and Fazzari, 2008). In light of that, the aim of our article is to explore deeply the role of household wealth on consumption and, consequently, on savings.

We investigate the role of wealth on household consumption in the period 1989-2007 using a household-level dataset specifically built for this purpose, since no single existing survey contains detailed data on both variables. We combine information from the Consumer Expenditure Survey (CES) and the Survey of Consumer Finances (SCF). Essentially, we impute the SCF wealth variables to the CES households (i.e. we use the SCF as a donor to enrich the variables set of the CES) in order to estimate a consumption equation with wealth, in its various components, as one of the main explanatory variables. To the best of our knowledge, a similar procedure has been exploited only once previously for similar purposes, by Bostic et al. (2009). However, following closely the guidelines on data matching laid out by Ridder and Moffitt (2007), we adopt a sample combination procedure which differs considerably from the one implemented by Bostic et al. (2009). First, we obtain a much larger dataset both in terms of observations and of number of variables. Second, we do not constrain the analysis to home owners only. Third, our analysis includes the years 2004 and 2007, while Bostic et al. (2009) have data up to 2001 only. Finally, we

provide all the codes that we used in order to perform the analysis (see the Web Appendix) in order to ensure its repeatability.

In our analysis we differentiate between financial and tangible wealth, the latter further disaggregated into the value of the house of residence and the other tangible assets (mainly, other real estate properties). In addition, we investigate the role of debt on consumption decisions by studying both gross and net wealth. We also examine the consumption determinants of the older households (while Bostic et al. 2009 leave them out of the analysis), and we finally look at the differences between households pertaining to different income quartiles.

The main result of our study is that tangible wealth is the main type of household wealth to positively affect consumption. In particular, the house of residence is the component of tangible wealth responsible for the highest direct wealth effect. The estimated elasticity of consumption spending with respect to tangible wealth is between two and four cents per dollar, which is not far from previous estimates. Also, we view these estimates as a lower bound for the actual effects, since we study the effects of three-years changes in wealth on one year consumption only (due to the triennial nature of the SCF). Among the additional results, older households experience a higher wealth effect (that is, extract more liquidity from their assets, as predicted by theory), while they have lower elasticity of consumption with respect to income. The estimation by income quartiles shows that the importance of tangible wealth decreases as income increases, as it is to a certain extent substituted by financial wealth.

It would be tempting to use our results to comment on the economic and financial crisis that originated from the subprime mortgage market in 2007. However, we believe it to be impossible to extend our results to the interpretation of the consumption and saving dynamics from 2007 onwards, not only because we employ data up to 2007 only, but also because it would be implausible to assume that wealth effects of the same magnitude are at work both during booms and during recessions. Indeed, some studies investigated the asymmetry of consumption responses to increases and decreases in wealth (f.i. Shirvani and Wilbratte, 2000; Bertaut, 2002; Disney et al. 2003). The rationale behind the unequal wealth effects relates to the assumption of diminishing marginal utility of wealth, where preferences are represented by convex utility functions (reflecting risk aversion) such that consumers would value increases in wealth less highly than equivalent decreases. In addition, whereas consumers can readily reduce consumption in response to a wealth reduction, some consumers may find it difficult to borrow to increase consumption. Thus, our analysis is unable to shed light on the mechanisms at work during the recent financial crisis.

The rest of this paper is organized as follows. Section 2 provides a review of the previous literature. Section 3 describes the data used and how they were combined. Also, the econometric models are presented. Section 4 illustrates the results. Section 5 concludes briefly.

2. The wealth effect in the literature

There is a large literature devoted to the study of the wealth effect. Most of it is based on the life-cycle model originally proposed by Ando and Modigliani (1963). According to this theory, an increase in wealth leads the individuals to gradually increase consumption, thus lowering their savings. Also, the propensity to consume out of wealth, whatever its form, should be the same small number (Paiella, 2007b). In practice, this is likely to be violated, "if assets are not fungible and households develop 'mental accounts' that dictate that certain assets are more appropriate to use for current expenditure and others for long-term saving" (Paiella, 2007b, 191). Thus, the appraisal of the wealth effect is something that must be quantified empirically, and it has been done in a fair number of articles. Consequently, a wide range of estimates have been produced. For the U.S economy, they usually lie between 2 and 7 cents of additional consumption per year per 1 dollar increase in household wealth. This is consistent with the magnitude of the effect estimated by the research staff of the Board of Governors of the Federal Reserve System, that maintains the longest and most regularly updated wealth effect estimates for the USA.

Aggregate data analysis typically find positive effects of wealth increases on private consumption (Davis and Palumbo, 2001; Mehra, 2001). Also, the real estate wealth effect seems to be higher than the stock market wealth effect. This arises from studies that concentrate either on the former (Girouard and Blondal, 2001; Belski and Prakken, 2004; Catte et al. 2004), the latter (Ludvigson and Steindel, 1999; Poterba 2000; Edison and Sløk, 2002; Sousa, 2003; Case and Quigley 2008), or both (Ludwig & Sløk, 2002; Benjamin et al., 2004; Case et al., 2005). As it is common in the empirical literature, some authors find opposite results on the relative importance of the two types of wealth effects (f.i. Dvornak and Kohler, 2007). There is no widespread agreement on the econometric techniques to adopt, either. In particular, some studies try to disentangle the short run effects of wealth changes from the long run ones, due to the concern that wealth shocks must be perceived as permanent in order to affect consumption. While most of them adopt cointegration methods to disentangle between the short run and the long run (Tuttle and Gauger, 2003; Lettau and Ludvigson, 2004), some authors choose alternative ways (f.i. Carroll et al., 2006; Morris, 2006).

However, the use of aggregate data has been criticized because of its inability to solve the well-known problem of endogeneity, which is present due to the fact that wealth is the result of both past savings/consumption decisions and movements of asset prices. Attanasio and Banks (2001) advise

not to use aggregate data also because of aggregation issues and difficulties in decomposing age, cohort and time effects. Also, household-level data may permit to distinguish between durables and non-durables consumption (f.i., see Fernandez-Villaverde and Krueger, 2007), and, on the wealth side, among different components of both tangible and intangible wealth (f.i., see Juster et al., 2005). Accordingly, a whole strand of literature uses household-level data to investigate the magnitude of the wealth effect. While there are few studies on economies outside the US (Campbell and Cocco, 2007 on the UK; Paiella, 2007b on Italy), most of them concentrate on the US economy (Engelhardt, 1996; Skinner, 1996; Parker, 1999; Dynan and Maki, 2001; Lehnert, 2004; Juster et al., 2005). This is due to the availability of many US survey and panel data, such as the Consumer Expenditure Survey (CES), the Panel Study of Income Dynamics (PSID), or the Survey of Consumer Finances (SCF). However, each one of them, taken singularly, has some drawbacks for the type of analysis considered here. The PSID contains data on food consumption only, and data on household wealth have been collected since 1984 every five year only. The CES has highly detailed consumption data, but the quality of its wealth data is low due to limitations both in scope and precision. On the other hand, the SCF does not contain detailed consumption variables, while information on wealth is collected very accurately. Some authors (f.i Maki and Palumbo 2001) tried to overcome these problems by using cohort-level analysis based on the original ideas by Browning et al. (1985) and Deaton (1985) by combining aggregate and household level data. An interesting alternative is the one adopted in the paper more closely related to ours (Bostic et al., 2009), where a sample combination technique has been used to obtain a dataset suitable for an analysis of the wealth effect.

Generally, household-level data studies tend to confirm the results of the studies that use aggregate data (Levin, 1998, is a notable conflicting example, since he concludes that wealth does not affect consumption), but have a higher ability to distinguish between different channels through which wealth changes affect consumption. Also, depending on the data used, some of them have been able to shed light on the role of liquidity constraints and precautionary savings (f.i. Egelhardt, 1996, and Campbell and Cocco, 2007, respectively).

The strategy followed in our paper is to build a new household-level dataset combining information from existing US sources. A sample combination procedure is used to impute missing values of wealth variables to households for which detailed consumption data have been collected. The procedure generates a dataset which contains a large amount of information, which helps dealing with the problem of omitted variables, and therefore moderates the issue of endogeneity. Methods of integrating different sources of information similar to the one that we utilized here have been recently used by some national institutes of statistics as a convenient way to obtain detailed datasets

without having to bear the costs of producing brand new surveys (f.i., see Rosati, 1998; Del Boca et al., 2005). We follow closely the guidelines established in the literature (D'Orazio et al., 2006; Ridder and Moffitt, 2007) and we are provide the codes that we used to perform the sample combination, as well as the subsequent analysis (see Web Appendix). Next section deals with the various steps of the sample combination procedure.

3. Data and model

3.1 CES and SCF data

In our analysis we use the wealth data from the SCF to enrich the information contained on the CES, that contains detailed consumption data, for the period 1989-2007.[1] Then, we exploit this "augmented" CES to perform the econometric analysis on the wealth effect. The dataset arising from the combination of these two surveys contains data on both consumption and wealth, making it the appropriate source for the analysis of wealth effect. Also, there is a rich set of additional socio-economic variables that helps attenuating the problem of endogeneity related to omitted variables.

The CES is collected by the Bureau of Labor Statistics (BLS) to compute the Consumer Price Index, and contains data on a high percentage of total household expenditures (see Garner et al., 2006). It is a rotating panel in which each household is interviewed four consecutive times over a one year period. Each quarter 25% of the sample is replaced by new households. The survey contains quarterly data, thus we had to extrapolate data on yearly consumption to perform the combination with the SCF. Also, the interviews are conducted monthly about the expenditures of the previous three months: for example, a unit interviewed in January will appear in the same quarter of a unit interviewed in February or March, even if the reported information will cover a slightly different period of time. This overlapping structure of the sample complicates the operation of estimating annual consumption in many dimensions. First, the year over which we have information for each household is different depending on the month in which the household completes its cycle of interviews. Second, and even more important, not all households complete the cycle of four interviews, thus they don't report all the expenditures made in one year. Bostic et al. (2009) do not disclose the passages used to calculate the consumption-related expenses for a calendar year, thus we cannot use them as a guide in our analysis. What follows is a detailed explanation of the procedure that we followed to obtain annual data from the CES, so to be able to combine it with the SCF.

[1] The CES contains both the Diary Survey and the quarterly Interview Survey. We used the latter, which constitutes the bulk of the survey, containing all kinds of expenditure, while the Diary Survey only serves as a supplement for different details.

In order not to waste a vast amount of information, we have chosen to use the data of the households present for the whole year of reference, as well as the data of the households that were interviewed three periods or less. First, we harmonized the expenditure variables using the Consumer Price Index (CPI), differentiated for food, energy and other goods, in order to have all expenditures expressed with the prices of June of the reference year. Second, we seasonally adjusted the quarterly measures of consumption using the ratio to moving average method. Finally, we used a simple technique to extend these corrected quarterly expenditures to the whole year of interest: we multiplied by four the expenditure of the households present for one quarter only, by two the expenditure of two quarters and by four thirds the expenditure of the households interviewed for three quarters. For the households that were present for four quarters in a row, we just computed the sum across quarters. We believe that this procedure does not produce distorted measures according to the number of quarters for which there are data in the CES, due both to the CPI harmonization and, even more important, the seasonal adjustment. We also checked whether this operation led to a dataset differing from the original (quarterly) one in terms of distributions of the variables that we used in our analysis, finding no significant differences. For each household, in addition to the consumption variables, both for total and non-durables expenditure, we kept socio-demographic variables and annual income.[2]

The household wealth data that we imputed to the CES households come from the SCF, which is triennial and is produced by the Federal Reserve Board. This survey contains socio-demographic information that proved valuable for the statistical matching procedure. In particular, we used data on marital status, race, age, education and occupation of the household head, home ownership status and family size. The period covered by the analysis starts in 1989, mainly because the SCF question frame was different in earlier periods, and ends in 2007, with 7 periods in total. In addition, we used the information contained in all the five implications of the SCF (five different versions of the dataset that derive from the multiple imputation procedure used to approximate the distribution of missing data, as explained by Kennickell, 1998), by performing the sample combination with the CES separately for each implication. To correctly take into account multiple imputation, the estimation of the consumption models has been carried out using Repeated Imputation Inference (RII, see Rubin 1987, Montalto and Sung 1996). In a few words, this method exploits all the five implications of the SCF dataset and combines the resulting estimates in order to produce the best point estimates ad estimates of variance for the parameters of interest in case of imputed missing

[2] We had to decide how to proceed with the households for which socio-demographic variables changed from one quarter to another. For example, when the educational status changed from one quarter to another, we used the educational status of the quarter closer to the central quarter of the year (details in the Web Appendix).

values. Again, this is something new with respect to the analysis of Bostic et al. (2009), that do not mention the multiple imputation feature of the SCF.

3.2 The matching procedure

The aim of the procedure is to look for similar households across the two surveys and then to attach the wealth variables observed for the SCF households to the most similar ones in the CES, so to get an "augmented" CES that contains detailed information on wealth in addition to the consumption and socio-demographic variables originally collected by the BLS. In constructing and applying the matching procedure we followed the principles and suggestions given by Ridder and Moffitt (2007) so to make sure to produce a high quality new dataset. The details of the procedure are the following. Again, they differ considerably from the ones described (and used) by Bostic et al. (2009). We ensure the repeatability of our results by making available the codes used (see the Web Appendix).

We first partitioned both samples into cells based on six categorical variables in order to avoid matching individuals that differ in important characteristics. For the year 2007, and similarly for the other years, more than 700 cells were created using:

* Race - white, black or other;
* Marital status - married or not;
* Education - twelfth grade or less, high school, some college or more;
* Tenure - home owner or not;
* Occupation - not working, managers and professionals, technicians, services, operators, other;
* Family size - one, two, three or four or more people in the household.

Thanks to this detailed partition that makes use of many different variables, we were able to avoid the risk of matching pairs of households differing in fundamental characteristics. Almost every cell contained individuals from both surveys, and the imputation of the wealth variables to the CES households has been done only using SCF households pertaining to the same cell. Thus, within every cell, we looked for the most similar households across the two surveys according to the values of income and age, building a unique distance function able to measure the differences in these two variables.[3] The wealth values of the SCF households were assigned to the most similar

[3] We did it performing a bivariate (income and age) propensity score matching based on Mahalanobis distance. In order to perform a very precise matching, we deliberately decided to treat age as a non-categorical variable (building 5 or 10 year groups, as it has been done in some previous works such as Bostic et al., 2009), something that would have left income as the only variable to be used in the within-cell matching. In particular, suppose we used 10 year age groups, dividing between individuals that are 21-30 years old, 31-40 years old and so on. In this case it would have been possible to match a 30 years old household with a 21 years old control, even if a 31 years old control (with equal income) would have been a better choice. By using age together with income for the propensity score matching, we

CES households within the cell. We also refined the matching by dropping the individuals for which the distance function displayed too high value, that is, the matched individuals had non-deniable differences in age and/or income to be paired together.[4] The matching process yielded a dataset with more than 14000 observations in 2007.

We checked the result of the matching procedure in two different ways. We verified the similarity among the correlations between income (which is observed in both surveys) and the wealth variables both in the SCF and in our augmented CES (after-matching). Table 1 shows that the similarity is very high, suggesting that the procedure did not alter the distribution of the imputed variables, a signal of good quality of the overall sample combination. Furthermore, we produced the graphs of the probability density functions of the matched variables obtained with a kernel density estimation, finding comfortingly similar curves.

insert Table 1 about here

insert Figures 1-7 about here

Figures 1-7 report the graphs for household net wealth: we have chosen this variable because it comprehends both assets and debt, therefore it summarizes more than other variables the results of the matching procedure. Although the two distributions do not completely overlap because not all the SCF individuals are used as donors in the matching procedure, the curves do show very similar patterns, again making sure that the matching procedure maintained the distributional properties of the variables of interest.

We used these precautions because sample combination methods must be applied with care, as there are some conditions that have to be met in order not to commit errors. First, the two different surveys must be two samples drawn from the same population. Second, there must be a set of common variables on which to condition the matching procedure, as it is clear from the above description of the procedure. As for the first condition, both the CES and the SCF are samples representing the US population. Their sample designs are different, since the SCF oversamples households that are likely to be wealthier, while the CES does not. However, we decided to proceed with the sample combination procedure without correcting for this difference, since any correction (that is, dropping a certain percentage of the wealthier SCF households) would have involved a high degree of subjectivity. Despite this fact, the resulting dataset is robust to the alternative modus

---

avoid such possibility and we minimize the distance between potential controls of the SCF and "treated" individuals of the CES (treated in the sense that we imputed to them the wealth variables).

[4] In particular, we dropped the households that fell into the top 15% of the distribution of the distance variable. We also had to build a different distance function for the groups with one or two individuals only from either one or the other survey, using the normalized logarithmic income and age, and we dropped the top 20% of households matched according to this second, and rougher, algorithm (because with few households in a cell, there was a higher probability to match pairs of households that differ significantly in their values of income and age).

operandi where the wealthiest SCF households are dropped before the sample combination.[5] About the second condition, there are many socio-demographic variables that are collected in both surveys, and the only problem here is to recode the variables in order to have them expressed in the same way. This has been carried out making a large use of the documentation that accompanies the public releases of the two surveys. Most recoding operations turned out to be straightforward. The most interesting exception has been the recoding of the occupational sector variable for the 1989 and 1992 waves of the CES, where there is an additional category, "self-employed", that in the SCF is not taken into account. In this case we performed a multinomial logit estimation to impute the occupational sector to the CES individuals labeled as "self-employed" in order to proceed with the matching with the SCF. The estimation results were in line with the distributions of the occupational variable both in the SCF and in the subsequent editions of the CES.

3.3 The model

Most of the past empirical literature is devoted to the estimation of models similar to the following:

$$\log(C_{i,t}) = \beta_1 \log(Y_{i,t}) + \beta_2 \log(wealth_{i,t}) + \alpha' Z_{i,t} + \varepsilon_{i,t}, \qquad (1)$$

where C is total consumption, Y is current income, *wealth* is the chosen measure of wealth, Z is a vector of additional controls. A surprisingly low fraction of studies included in the model the various components of wealth separately. Notable examples are works by Mehra (2001), using aggregate data, and Juster et al. (2005), Paiella (2007b) and Bostic et al. (2009) using household-level data. Following the hints coming from their analysis, we specify our benchmark econometric model as follows:

$$\log(C_{i,t}) = \beta_1 \log(Y_{i,t}) + \beta_2 \log(fin_{i,t}) + \beta_3 \log(house_{i,t}) + \beta_3 \log(ore_{i,t}) + \alpha' Z_{i,t} + \varepsilon_{i,t}, \quad (2)$$

where C is consumption (either non-durables or total consumption), Y is current income, *fin* is gross financial assets, *house* is the value of the house of residence (if any), *ore* is the value of the rest of tangible assets (mainly, other real estate). Finally, Z is a vector of socio-demographic controls: age, educational level, a dummy for the marital status (married or with a partner/single), two dummies for the race (one for African Americans, the other for non-Whites) and a dummy for the occupational status (working/not working) of the household head; the number of persons in the household; a dummy for the homeownership status; and three different dummies for the US geographical area (Northeast, Midwest and South, with West being the reference region). While the

[5] We also performed the combination procedure after having got rid of the wealthiest households present in the SCF in order to get comparable income distributions between the two surveys (in particular, dropping a percentage between 20 and 30% of the sample households with the highest income depending on the survey year). The resulting dataset did not differ noticeably from the one that we used. This is not surprising, because the Mahalanobis procedure discards the SCF households that differ considerably from the CES households in terms of income (and age), so that most of the preliminarily dropped SCF individuals would have been discarded anyway by the matching algorithm.

regional dummies are supposed to capture macroeconomic factors, the other variables capture life cycle effects that are likely to affect consumption. We also include a few interaction variables in order to better grasp the wealth and consumption dynamics of the old people. In particular, a dummy that takes the value of 1 if the household head is over 65 years old is multiplied by income and by the relevant (according to the various model specifications, see below) wealth variables.

In order to investigate the importance of net compared to gross wealth we also estimate the following two models:

$$\log(C_{i,t}) = \beta_1 \log(Y_{i,t}) + \beta_2 \log(netfin_{i,t}) + \beta_3 \log(house_{i,t}) + \beta_3 \log(ore_{i,t}) + \alpha' Z_{i,t} + \varepsilon_{i,t}, \qquad (3)$$

where *netfin* is financial wealth diminished by total household debt (for the home-owners, this is mainly constituted by mortgages), and:

$$\log(C_{i,t}) = \beta_1 \log(Y_{i,t}) + \beta_2 \log(fin_{i,t}) + \beta_3 \log(nettng_{i,t}) + \alpha' Z_{i,t} + \varepsilon_{i,t}, \qquad (4)$$

where *nettng* is the sum of the value of the household tangible assets (*house* + *ore*) diminished by total household debt. Table 2 presents some descriptive statistics of the consumption, income and wealth variables expressed in thousands of dollars to give an idea of the ranges and average values of these important variables.

insert Table 2 about here

We estimate equations (2-4) using two alternative dependent variables: the logarithm of total consumption and the logarithm of non-durable goods expenditure. We disregard the expenditure on durable goods because its timing does not match the flow of services coming from the goods. In particular, the relationship between consumption, income and wealth applies to the flow of consumption, but durable goods expenditure "represents replacements and additions to a stock, rather than the service flow from the existing stock" (Paiella 2007b, 198). This is why we mainly concentrate on the results for total and, above all, non durable goods consumption.[6]

The models are estimated cross-sectionally (using data on 1989, 1992, 1995, 1998, 2001, 2004 and 2007) and by pooling data over the seven surveys. In the latter case, year dummies are added as additional controls. Finally, we estimated model (2) dividing the pooled cross-sections dataset by income quartiles, to better understand the effects of distribution. Again, for all the regressions the two alternative dependent variables described above have been used.

4. Results

[6] Additionally, the issue of endogeneity is likely to heavily affect the results in the case of durable goods expenditure, more than when non-durable goods expenditure is used as the dependent variable. Suppose a household buys a car in 2004: we will observe an increase both in tangible wealth and in durables consumption, a fact that will pose some problems in the estimation of the wealth effect (spurious relationship). Using non-durables consumption as the dependent variable mitigates this problem.

The results of the estimation of equation (2) are reported in tables 3 and 4 (with total and non durables consumption as the dependent variable, respectively).

insert Tables 3 and 4 about here

Current income plays a very important role in determining current consumption. Its estimated elasticity ranges between .32 and.53 (in the pooled cross sections estimates the elasticity is .41 and .40 for total and non durables consumption respectively), and it is always highly statistically significant. Turning to the estimated wealth coefficients, results show that different components have different effects on consumption. In particular, gross financial wealth -*fin*- positively affected both types of consumption during the Nineties only, while its estimated coefficients are not significantly different from zero for the rest of the sample period. We hypothesize that the importance of financial wealth was higher due to the stock market boom that ended in 2001. However, when significantly different from zero, the estimated elasticity of consumption to financial wealth is very low, being it close to .01. On the contrary, tangible wealth positively affected consumption during the whole period of interest. In particular, the estimated house of residence -*house*- elasticity is higher than the one related to the rest of tangible assets -*ore*- (in the pooled cross sections estimates the former is .015 and .019 for total and non durables consumption respectively; the latter is .005 and .004). Notice that the estimated house elasticity is considerably larger for the last two periods of the sample (2004 and 2007). As in the case of the financial wealth coefficients of the Nineties, this does not come as a complete surprise, because of the well known housing prices bubble that started in 2000 and abruptly ended with the start of the recent financial crisis in the second half of 2007. This suggests that tangible wealth accounted for at least part of the continued rise in consumption after the end of the financial wealth bubble in 2001, which in fact did not bring a fall in consumption levels despite its importance. It is worth noticing that these estimated elasticities may be viewed as a lower bound for the actual wealth effects, since the model cannot take into account the increases in consumption of the two years for which wealth has not been measured (since the SCF is a triennial survey).

The rest of the explanatory variables show meaningful and significant coefficients. This is not surprising, since a satisfactory R squared is reached in all estimations. Some results are particularly interesting and confirm previous literature findings. For instance, the coefficients of the dummies that indicate that the household head belongs to an ethnic minority (either Afro-American or a different one) are always negative and quantitatively important. Higher education is associated to higher consumption. The non trivial relationship between age and consumption is confirmed by the high statistical significance of the coefficients of age and age squared (the first positive, the second smaller and negative). Finally, the regional dummies are mostly associated to significant and

negative coefficients (keep in mind that the region of reference is West, i.e. the West dummy is not included) when the dependent variable is total consumption (Table 3), while they show unclear patterns when the dependent variable is non durables expenditure.[7] Another interesting fact is the coefficient associated to the dummy that indicates that the household head does not work, which shows that such a condition is associated with lower consumption, even controlling for income and wealth.

The behavior of older households is investigated through the interaction terms between the "old" dummy and the income and wealth variables. We see the inclusion of this set of controls as crucial, since both theory and previous empirical evidence suggest that older households behave differently from younger ones (f.i. see Miniaci et al. 2010). The estimations show that older households experience a higher wealth effect from the value of the house of residence, reaching four cents per dollar of housing wealth with non-durables consumption as the dependent variable. About the pooled cross sections estimates only, the year dummies must be read keeping in mind that the reference year is 1989 (i.e. the only missing dummy is the one associated with 1989). All year dummies present highly significant positive coefficients, confirming that consumption patterns are sensitive to macroeconomic conditions and that consumption levels have increased through the sample period.

Let us introduce net wealth and debt considerations into the picture. Tables 5-8 report the estimates of equations (3) and (4), again for both dependent variables of interest.

insert Tables 5-8 about here

The results of model (3) (Tables 5 and 6) confirm the above findings for tangible wealth, while the results for the financial wealth effects are less clear-cut. The estimated coefficients for this variable, *netfin*, are lower than the coefficients associated to gross financial wealth *fin* (see Tables 3 and 4). However, they are statistically significant at the end of the sample period when the dependent variable is non-durables consumption (see Table 6). Similarly, when net tangible wealth -*nettng*- is considered (Tables 7 and 8), the estimated coefficients are again lower than the ones associated to the gross measure of it (both *house* and *ore*), even if a non-negligible wealth effect is estimated for the older households, as shown by the coefficients of the interaction term -*old*nettng*- in Table 8. These results suggest the possibility of some myopia on the part of households, since consumption seems more sensitive to gross wealth than to net wealth (irrespectively of the fact that we calculate it out of financial or tangible wealth). In other words, US households seemed to underestimate the danger of high indebtedness when deciding about their consumption levels.

[7] Notice that for some households the Region is missing, due to the CES blurring and privacy procedure. Therefore, the number of observations that we can use for the regressions is lower with respect to dimension of the whole dataset.

We deepen the pooled cross-sections analysis by dividing the sample by income quartiles, to better understand the effects of distribution on the variables investigated. Table 9 presents the coefficients of the income and wealth variables for the estimation of equation (2) with both dependent variables, dividing the pooled cross-sections sample by income quartiles.

insert Table 9 about here

The consumption elasticity to income rises as we move from the lowest to the highest income quartile. At the same time, both the magnitude and the importance of the tangible wealth effects decrease. This suggests that changes of the value of the assets matter for consumption only when income is low, while when it is high, its effects dominate the ones of wealth. Also, the estimation with non durables expenditure as the dependent variable seems to suggest that financial wealth matters more than tangible wealth for the highest income quartile, since the estimated *fin* coefficient is significantly different from zero (.003), while the estimated elasticities of both types of tangible wealth are not statistically different from zero.

We investigated the robustness of our findings in a few ways. Results hold when we restrict our sample to urban households only (they are almost 90% of the sample). The same is true when we get rid of the 1% of household that are at the top and at the bottom both of the income and of the consumption distributions. Results are also robust to variations of the sample combining procedure. This robustness is not surprising, since our sample is very large, and it is unlikely that our results are driven by outliers or by small subsamples of households.

5. Conclusions

This paper analyses the strength of the wealth effect on consumption in the USA with a dataset specifically built for this scope. We combine data from the CES and the SCF for the years 1989-2007. In particular, the SCF was used as the "donor" survey: its wealth data were given to CES households in order to perform an analysis capable to link consumption and wealth using household-level data. This sample combination produced a large dataset (more than 70,000 observations) capable to respect the properties of the distributions of the variables of interest present in each of the two original surveys. The dataset was then used to estimate three different specifications of a simple consumption model to investigate both gross and net wealth effects, using two different dependent variables: total and non durables consumption. In addition to the estimation of the models on the seven cross-sections, we also deepened the analysis using the dataset resulting from the pooling of the cross-sections. In all the specifications, a few interaction terms were used to better grasp the consumption dynamics of the older households. The results show that tangible wealth positively affected consumption of US households in the period 1989-2007. The estimated

elasticity (between .01 and .04) lies in the low range of what constitutes the consensus on how asset market gains affect consumer spending in the USA. However, we read this quantitative result as a lower bound for the actual wealth effect, since we link three-years changes in wealth to consumption measured in one year only (due to the triennial nature of the SCF). It seems that households tend to consume both out of their house of residence and out of their other tangible assets, even if the former is more important of the latter. Financial wealth seems to exert a somewhat minor role in determining consumption, even if its importance is high during the Nineties, a period of growing stock prices. Similarly, tangible wealth effect is larger in 2004 and 2007, possibly due to the housing market boom. An additional result (found thanks to a few interaction terms) is that the wealth effect related to the house of residence is larger for older households.

The second part of the analysis suggests that households do not consider net wealth when deciding their consumption level. This holds irrespectively of the fact that we calculate net wealth out of financial (model (3)) or out of tangible wealth (model (4)). On the contrary, gross wealth does affect consumption, suggesting a sort of myopia on the part of households. Additional interesting results come from the estimation by income quartiles. Consumption elasticity to income rises as we go from the lowest to the highest income quartiles; at the same time, the importance of the tangible wealth effect decreases, since richer households tend to be affected more by financial wealth changes.

It would be tempting to use our results to comment on the economic and financial crisis that originated from the subprime mortgage market in 2007. However, it would be implausible to assume that wealth effects of the same magnitude are at work both during booms and during recessions. As some studies pointed out (f.i. Shirvani and Wilbratte, 2000; Bertaut, 2002; Disney et al. 2003), consumption responses to increases and decreases in wealth are unlikely to be symmetric. On the other hand, our results show that wealth seems to play an important role in determining the consumption dynamics of the households. In this respect, it would be interesting to investigate which other factors contributed to the impressive decline of saving rates observed in the USA (and in other industrialized countries as well) from the Eighties to the beginning of the crisis. Policy makers should concentrate on these other determinants if willing to manipulate the private (and household in particular) consumption and savings patterns of the economy.

References

Ando, Albert , Modigliani, F., 1963. The "Life Cycle" Hypothesis of Saving: Aggregate Implications and Tests. The American Economic Review, Vol. 53, No. 1, 55-84.

Attanasio, O., Banks, J., 2001. The Assessment: Household Saving - Issues in Theory and Policy. Oxford Review of Economic Policy, Vol. 17, No. 1, 1-19.

Belski, E., Prakken, J., 2004. Housing Wealth Effects: Housing's Impact on Wealth Accumulation, Wealth Distribution and Consumer Spending. Harvard University, Joint Center for Housing Studies, W04-13, 2004.

Benjamin, J.D., Chinloy, P., Jud, G.D. (2004). Real Estate Versus Financial Wealth in Consumption. Journal of Real Estate Finance and Economics, 29:3, pp. 341-354.

Bertaut, C.C. (2002). Equity Prices, Household Wealth, and Consumption Growth in Foreign Industrial Countries: Wealth Effects in the 1990s. International Finance Discussion Papers 724, Board of Governors of the Federal Reserve System.

Bostic, R., Gabriel, S., Painter, G., 2009. Housing Wealth, Financial Wealth, and Consumption: New Evidence from Micro Data. Regional Science and Urban Economics, Vol. 39, 79-89.

Browning, M.J., Deaton, A.S., Irish, M. (1985). A Profitable Approach to Labor Supply and Commodity Demands over the Life-Cycle. Econometrica, 53, pp. 503-544.

Campbell, J.Y., Cocco, J.F. (2006). How Do House Prices Affect Consumption? Evidence from Micro Data. Journal of Monetary Economics, 54, pp. 591-621.

Carroll, C., Otsuka, M., Slacalek, J., 2006. How Large is the Houseing Wealth Effect? A New Approach. NBER Working Paper 12476.

Case, K., Quigley, J., 2008. How Housing Booms Unwind: Income Effects, Wealth Effects, and Feedbacks through Financial Markets. Journal of Housing Policy, Vol. 8, Issue 2, 161-180.

Case, K., Quigley, J., Shiller, R., 2005. Comparing Wealth Effects: the Stock Market versus the Housing Market. Advances in Macroeconomics, Vol. 5(1).

Catte, P., Girouard, N., Price, R., André, C. (2004). Housing Markets, Wealth and the Business Cycle, OECD Economics Department Working Papers, No. 394.

Cynamon, B., Fazzari, S., 2008. Household Debt in the Consumer Age: Source of Growth—Risk of Collapse. Capitalism and Society, Vol. 3 : Iss. 2, Article 3.

Davis, M., Palumbo, M., 2001. A Primer on the Economics and Time Series Econometrics of Wealth Effects. Board of Governors of the Federal Reserve System, Finance and Economics Discussion Paper Series No. 2001-09, Washington, DC.

Deaton, A.S. (1985). Panel Data from Times Series of Cross-Sections. Journal of Econometrics, 30, pp. 109-126.

D'Orazio, M., Di Zio, M., Scanu, M., 2006. Statistical Matching: Theory and Practice. Chichester, England: Wiley.

Del Boca, D., Locatelli, M., Vuri, D., 2005. Child Care Choices of Italian Households. Review of the Economics of the Household, No. 3, 453-477.

Disney, R., Henley, A., Jevons, D. (2002). House Price Shocks, Negative Equity and Household Consumption in the UK in the 1990s. Mimeo.

Dvornak, N., Kohler, M. (2007). Housing Wealth, Stock Market Wealth and Consumption: A Panel Analysis for Australia. Economic Record, 83:261, pp. 117-130.

Dynan, K., Maki, D., 2001. Does Stock Market Wealth Matter for Consumption? Finance and Economics Discussion Series, No. 2001.23, Washington: Board of Governors of the Federal Reserve System.

Edison, H., Sløk, T., 2002. Stock Market Wealth Effects and the New Economy: a Cross-country Study. International Finance 5:1, 1-22.

Engelhardt, G.V. (1996). Consumption, Down Payments, and Liquidity Constraints. Journal of Money, Credit and Banking, 28:2, pp. 255-271.

Fernandez-Villaverde, J., Krueger, D. (2007). Consumption over the Life-Cycle: Facts from Consumer Expenditure Survey. The Review of Economics and Statistics, 89:3, pp. 552-565.

Garner, T., Janini, G., Passero, W., Paszkiewicz, L., Vendemia, M. (2006). The CE and the PCE: A Comparison. Monthly Labor Review, September, pp. 20-46.

Girouard, N., Blöndal, S. (2001). House Prices and Economic Activity. OECD Economics Department Working Papers, No. 279.

Greenspan, A., 2003. Remarks at the annual convention of the Independent Community Bankers of America, Orlando, Florida," March 4th.

Juster, T., Lupton, J., Smith, J., Stafford, F., 2005. The Decline in Household Saving and the Wealth Effect. The Review of Economics and Statistics, 87(4), 20-27.

Kennickell, A., 1998. Multiple Imputation in the Survey of Consumer Finances. http://www.federalreserve.gov/pubs/oss/oss2/method.html.

Lehnert, A. (2004). Housing, Consumption and Credit Constraints. Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System.

Lettau, M., Ludvigson, S., 2004. Understanding Trend and Cycle in Asset Values: Reevaluating the Wealth Effect on Consumption. American Economic Review, 94(1), 279-299.

Levin, L. (1998). Are Assets Fungible? Testing the Behavioral Theory of Life-Cycle Savings. Journal of Economic Behavior and Organization, 36, pp. 59-83.

Ludvigson, S., Steindel, C. (1999). How Important Is the Stock Market Effect on Consumption? Federal Reserve Bank of New York Economic Policy Review, July.

Ludwig, A., Sløk, T. (2002). The Impact of Stock Prices and House Prices on Consumption in OECD Countries. IMF working paper, no. 01.

Maki, D.M., Palumbo, M.G. (2001). Disentangling the Wealth Effect: a Cohort Analysis of Household Saving in the 1990s. Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System.

Mehra, Y.P. (2001). The Wealth Effect in Empirical Life-Cycle Aggregate Consumption Equations. Federal Reserve Bank of Richmond Economic Quarterly, Vol. 87/2.

Montalto, C., Sung, J., 1996. Multiple Imputation in the 1992 Survey of Consumer Finances. Financial Counseling and Planning, Vol. 7.

Morris, E.D. (2006). Examining the Wealth Effect from Home Price Appreciation. University of Michigan, mimeo.

Paiella, M., 2007a. The Stock Market, Housing and Consumer Spending: a Survey of the Evidence on Wealth Effect. Bank of Italy conference: Household Wealth in Italy, Perugia, October.

Paiella, M., 2007b. Does Wealth Affect Consumption? Evidence for Italy. Journal of Macroeconomics, 29, pp. 189-205.

Parker, J.A. (1999). Spendthrift in America? On Two Decades of Decline in the US Saving Rate. NBER Macroeconomics Annual, 14, pp. 317-370.

Poterba, J.M. (2000). Stock Market Wealth and Consumption, The Journal of Economic Perspectives, Vol. 14:2, pp. 99-118.

Ridder, G., Moffitt, R., 2007. The Econometrics of Data Combination. Handbook of Econometrics, Vol. 6, 5469-5547.

Rosati, N., 1998. Matching statistico tra dati ISTAT sui consumi e dati Bankitalia sui redditi per il 1995. Padova Economics Department Discussion Paper, Vol. 7.

Shirvani, H., Wilbratte, B. (2000). Does Consumption Respond More Strongly to Stock Market Declines than to Increases? International Economic Journal, 14:3, pp. 41-49.

Skinner, J.S. (1996). Is Housing Wealth a Sideshow? in Advances in the Economics of Aging, University of Chicago Press.

Sousa, R.M. (2003). Property of Stocks and Wealth Effects on Consumption. NIPE – University of Minho working paper.

Tuttle, M.H., Gauger, J. (2003). Wealth Effects and Consumption: A Multivariate Evaluation. Mimeo.

Figures

Figure 1: Household net wealth kernel distribution, 2007

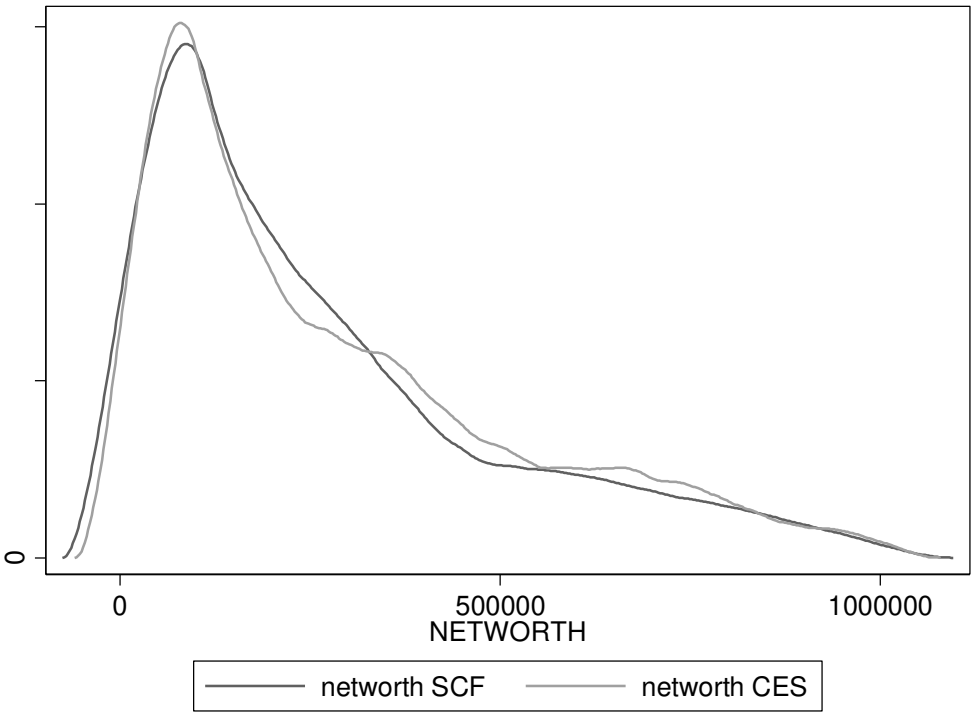


Figure 2: Household net wealth kernel distribution, 2004

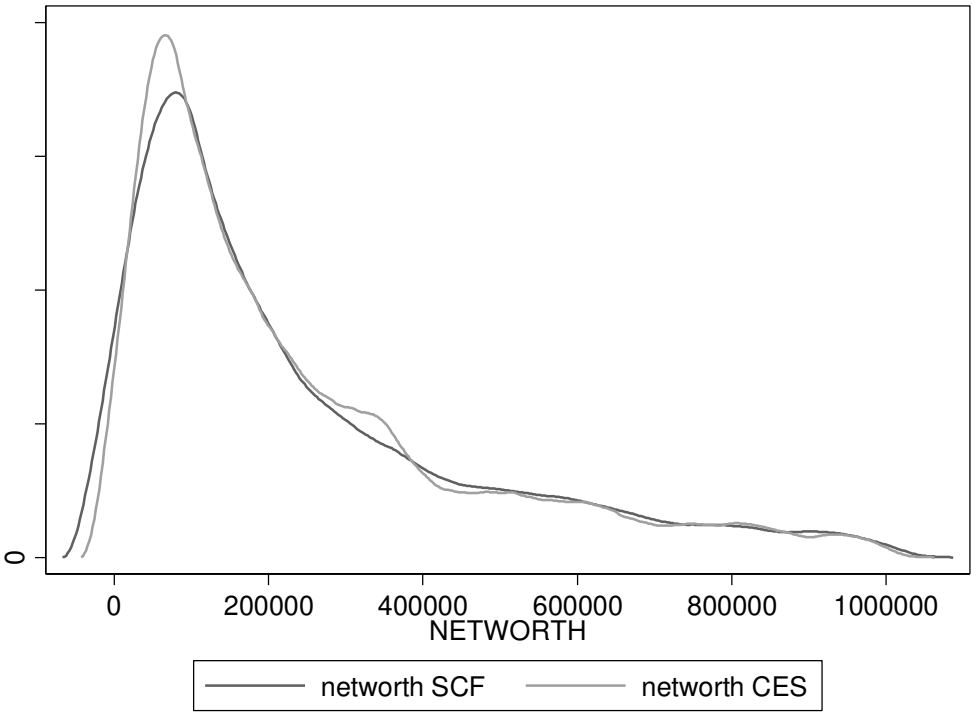


Figure 3: Household net wealth kernel distribution, 2001

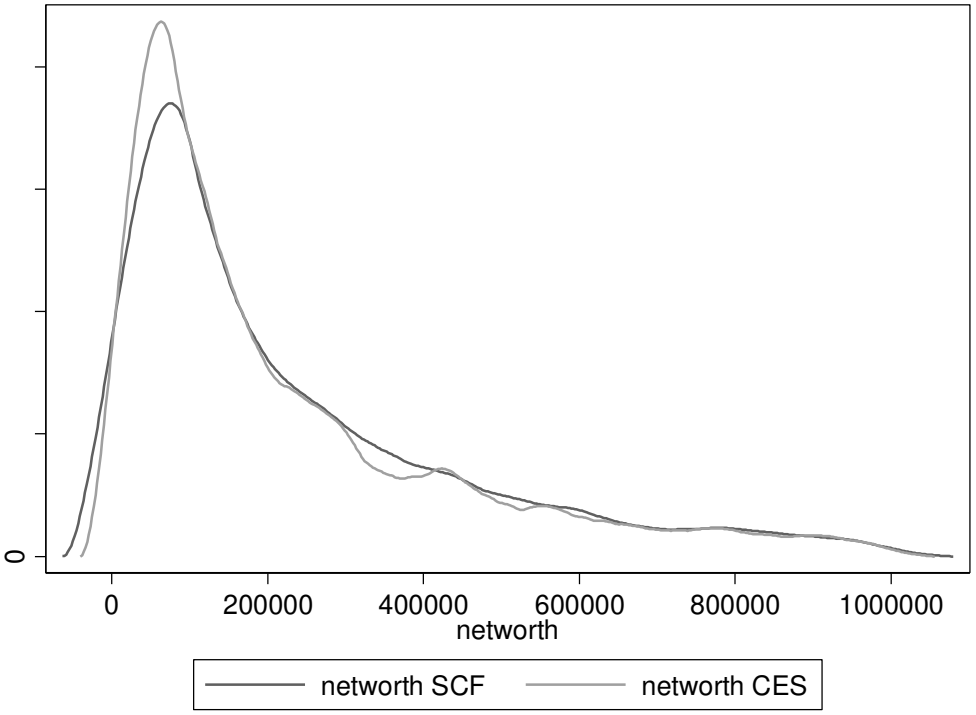


Figure 4: Household net wealth kernel distribution, 1998

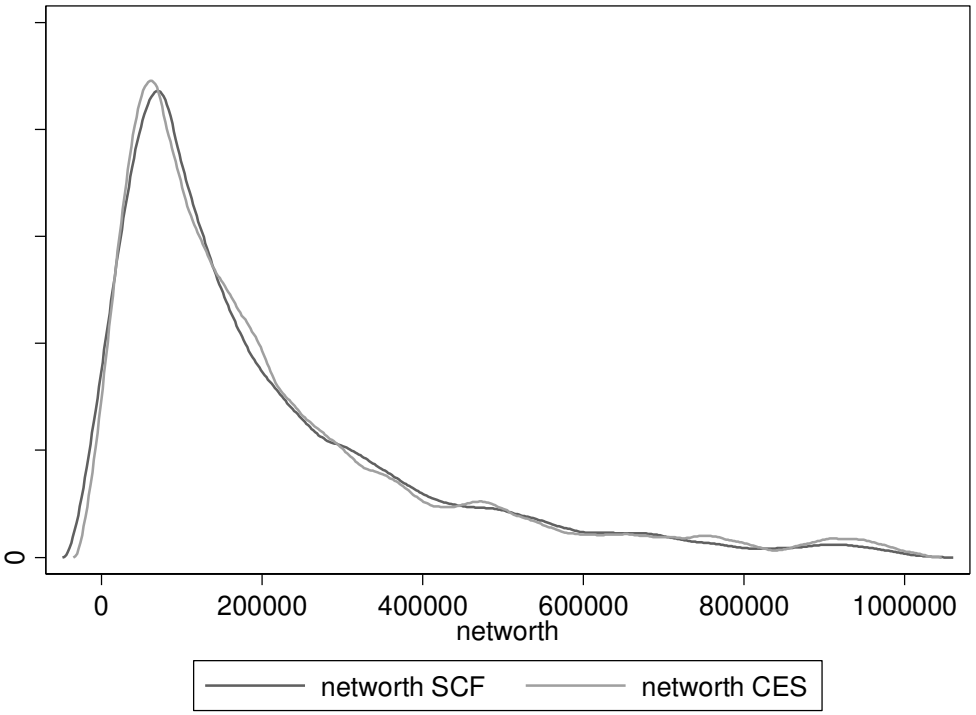


Figure 5: Household net wealth kernel distribution, 1995

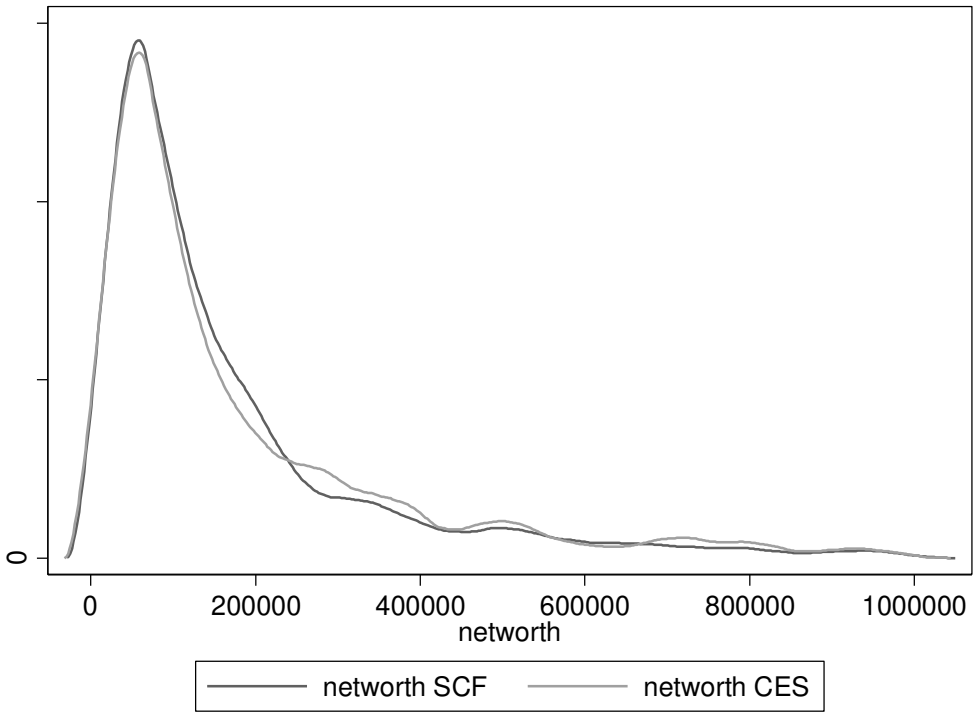


Figure 6: Household net wealth kernel distribution, 1992

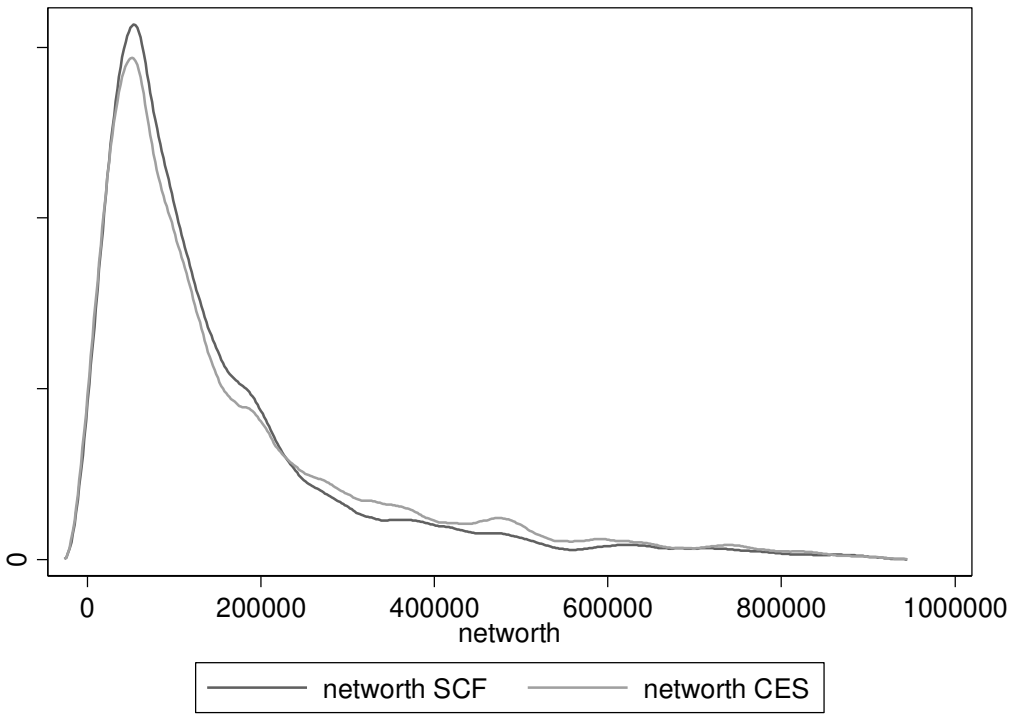
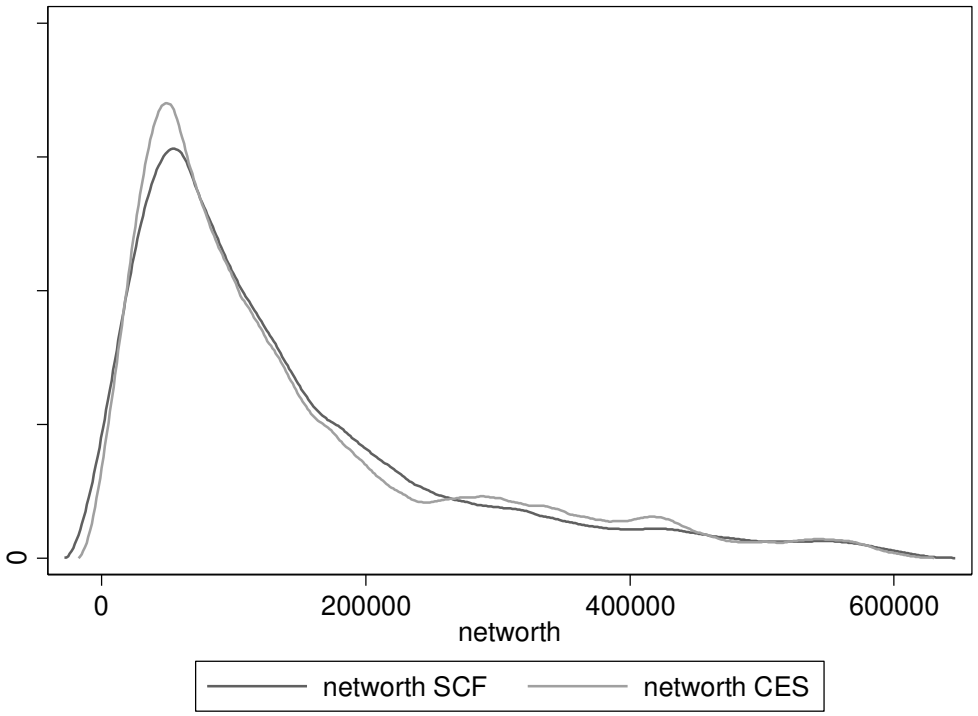


Figure 7: Household net wealth kernel distribution, 1989



Tables

Table 1. Correlations between logarithmic income and the wealth (SCF) variables

	2007		**2004**		**2001**		**1998**	
	SCF	CES	SCF	CES	SCF	CES	SCF	CES
fin	0.26**	0.16**	0.26**	0.18**	0.27**	0.14**	0.22**	0.11*
nfin	0.27**	0.30**	0.25**	0.26**	0.24**	0.18**	0.19**	0.17**
asset	0.32**	0.29**	0.30**	0.26**	0.31**	0.20**	0.25**	0.17**
debt	0.46**	0.43**	0.41**	0.40**	0.47**	0.42**	0.38**	0.29**
networth	0.30**	0.26**	0.28**	0.23**	0.29**	0.18**	0.23**	0.16**
kgtotal	0.21**	0.21**	0.18**	0.15**	0.18**	0.09*	0.13**	0.12*

	1995		**1992**		**1989**	
	SCF	CES	SCF	CES	SCF	CES
fin	0.18**	0.12*	0.24**	0.19**	0.25**	0.08**
nfin	0.20**	0.09*	0.16**	0.09**	0.21**	0.10**
asset	0.24**	0.12**	0.21**	0.11**	0.27**	0.13**
debt	0.32**	0.29**	0.28**	0.14**	0.39**	0.33**
networth	0.22**	0.10**	0.19**	0.10**	0.25**	0.12**
kgtotal	0.14**	0.04*	0.12**	0.07**	0.15**	0.06**

Notes: *, ** significant at 5 and 1% respectively.

Table 2. Descriptive statistics of consumption, income and wealth variables (thousands of $)

		1989	*1992*	*1995*	*1998*	*2001*	*2004*	*2007*
cons	mean	27.2	29.4	31.6	32.9	40.1	42.8	49.5
	std. dev.	21.3	23.6	23.6	26.5	30.7	37.4	41.3
	min.	0.9	1.4	1.1	0.7	0.8	0.0	0.1
	max.	384.1	551.9	334.6	487.4	434.1	1018.1	867.5
non dur.	mean	15.9	17.5	18.5	19.0	24.0	26.4	30.9
	std. dev.	12.3	14.6	13.4	15.0	18.6	24.9	28.7
	min.	0.5	0.5	0.8	0.7	0.1	0.0	0.1
	max.	212.0	532.8	149.8	274.3	246.1	936.8	835.1
income	mean	31.0	34.0	35.9	41.3	48.3	57.5	66.6
	std. dev.	25.9	28.3	29.5	39.7	45.6	51.4	62.6
	min.	0.3	0.1	0.0	0.0	0.0	0.5	0.3
	max.	415.7	225.4	280.0	590.2	600.1	567.5	549.7
fin	mean	83.5	75.7	91.3	143.0	185.9	177.5	216.3
	std. dev.	795.8	400.2	519.1	1587.1	1271.3	1030.7	1090.6
	min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	max.	28100.0	25200.0	19600.0	142000.0	77200.0	42700.0	37500.0
houses	mean	72.9	76.2	80.3	99.7	124.3	179.1	225.3
	std. dev.	135.5	152.4	126.7	191.5	235.0	346.2	408.4
	min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	max.	2000.0	6000.0	2850.0	6000.0	5000.0	10500.0	10400.0
ore	mean	124.1	234.7	183.6	212.9	174.9	189.5	245.9
	std. dev.	1686.9	2866.1	2342.2	1529.6	1422.5	966.8	1167.9
	min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	max.	92400.0	93200.0	150000.0	50200.0	65700.0	23100.0	37500.0
debt	mean	26.3	38.5	41.3	52.9	54.5	85.0	105.9
	std. dev.	67.7	198.4	103.1	164.1	102.0	173.4	205.1
	min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	max.	3155.0	16500.0	2717.0	11700.0	1830.0	5336.3	4659.0
All	Obs.	8216	8494	7963	9865	12170	14405	12451

Notes: all descriptive statistics are taken from implications no. 1.

Table 3. Equation (2), dependent variable: total consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.429***	0.389***	0.322***	0.369***	0.398***	0.528***	0.475***	0.410***
fin	0.003	0.000	0.007**	0.006**	0.004*	-0.003	-0.002	0.003***
ore	0.004	0.008***	0.006**	0.005**	0.003	0.003	0.003	0.005***
house	0.008	0.018***	0.015*	0.009	0.011*	0.028***	0.026***	0.015***
old*income	0.003	0.000	-0.003	-0.001	-0.003	0.001	-0.004	-0.002
old*fin	-0.007	0.001	0.002	-0.005	-0.005	0.005	0.008	0.001
old*ore	0.003	-0.006	0.002	0.001	0.007	0.004	-0.000	0.002
old*house	-0.001	-0.007**	-0.001	0.003	0.000	-0.008***	-0.001	-0.001
age	0.018***	0.012***	0.017***	0.017***	0.013***	0.010***	0.007***	0.013***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
North East	-0.017	-0.027	0.020	0.010	-0.043***	-0.099***	-0.070***	-0.031***
Midwest	-0.077***	-0.101***	-0.027	-0.065***	-0.061***	-0.091***	-0.090***	-0.074***
South	-0.056***	-0.052***	-0.009	-0062***	-0.088***	-0.132***	-0.095***	-0.073***
educ	0.101***	0.095***	0.107***	0.094***	0.095	0.065***	0.082***	0.093***
famsize	0.054***	0.063***	0.067***	0.067***	0.069***	0.051***	0.046***	0.062***
single	-0.155***	-0.124***	-0.163***	-0.146***	-0.128***	-0.078***	-0.100***	-0.130***
not working	-0.105***	-0.113***	-0.085***	-0.083***	-0.034**	-0.011	-0.001	-0.061***
race-black	-0.103***	-0.087***	-0.054**	-0.057***	-0.061***	-0.053***	-0.070***	-0.067***
race-other	-0.054	-0.0312	-0.062*	-0.036	-0.021	-0.020	-0.029	-0.031***
home renter	0.027	0.082	0.052	0.037	0.014	0.269***	0.231***	0.087***
constant	4.952***	5.428***	6.018***	5.586***	5.524***	4.117***	4.861***	5.177***
y1992								0.049***
y1995								0.105***
y1998								0.068***
y2001								0.171***
y2004								0.125***
y2007								0.238***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.67	0.66	0.63	0.60	0.60	0.64	0.65	0.65

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 4. Equation (2), dependent variable: non durables consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.400***	0.368***	0.317***	0.366***	0.393***	0.513***	0.488***	0.400***
fin	0.003	0.007**	0.008***	0.005**	0.007***	0.001	0.003	0.006***
ore	0.005	0.006**	0.007**	0.004**	0.002	0.003	0.004**	0.004***
house	0.012**	0.014**	0.016*	0.014**	0.013**	0.029***	0.025***	0.019***
old*income	-0.006	-0.014**	-0.014**	-0.012*	-0.010*	-0.008	-0.012**	-0.012***
old*fin	-0.015**	-0.005	-0.002	-0.010*	-0.12**	-0.008*	-0.004	-0.008***
old*ore	0.000	-0.008	-0.001	0.001	0.006	0.003	0.002	0.001
old*house	0.016***	0.016***	0.017***	0.020***	0.017***	0.013***	0.017***	0.017***
age	0.013***	0.012***	0.014***	0.013***	0.011***	0.005**	0.005***	0.011***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000**	-0.000***
North East	0.045***	0.046***	0.075***	0.052***	-0.029**	-0.069***	-0.047***	0.011*
Midwest	-0.023	-0.031***	0.051***	0.005	-0.020	-0.039***	-0.018	-0.011**
South	0.000	0.010	0.052***	0.010	-0.058***	-0.082***	-0.032***	-0.017***
educ	0.093***	0.089***	0.102***	0.088***	0.098***	0.068***	0.080***	0.089***
famsize	0.069***	0.075***	0.077***	0.074***	0.067***	0.055***	0.044***	0.068***
single	-0.141***	-0.128***	-0.143***	-0.123***	-0.131***	-0.105***	-0.114***	-0.130***
not working	-0.099***	-0.100***	-0.095***	-0.085***	-0.040**	-0.028*	-0.016	-0.066***
race-black	-0.073***	-0.046**	-0.022	-0.054***	-0.050***	-0.058***	-0.064***	-0.051***
race-other	-0.075*	-0.036	-0.037	-0.032	-0.060**	-0.050**	-0.076***	-0.050***
home renter	0.036	0.024	0.024	0.048	0.009	0.235***	0.205**	0.095***
constant	4.679***	5.023***	5.475***	5.059***	4.987***	3.768***	4.142***	4.670***
y1992								0.057***
y1995								0.097***
y1998								0.056***
y2001								0.181***
y2004								0.148***
y2007								0.258***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.68	0.67	0.65	0.63	0.63	0.65	0.65	0.67

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 5. Equation (3), dependent variable: total consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.432***	0.390***	0.326***	0.373***	0.401***	0.524***	0.472***	0.412***
netfin	0.000	0.000	0.000	0.001	0.001	0.001*	0.001	0.001***
ore	0.005*	0.007***	0.007***	0.006***	0.004*	0.002	0.002	0.005***
house	0.008	0.019***	0.018**	0.011*	0.012**	0.026***	0.025***	0.016***
old*income	0.000	0.001	-0.003	-0.003	-0.005	0.005	0.002	-0.001
old*netfin	-0.002	-0.003	0.002	-0.001	-0.001	0.000	0.001	0.000
old*ore	0.002	-0.005	0.002	0.000	0.006	0.005	0.001	0.002
old*house	-0.001	-0.007**	-0.001	0.002	-0.001	-0.008***	0.001	-0.002
age	0.018***	0.012***	0.017***	0.017***	0.012***	0.010***	0.007***	0.013***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
North East	-0.17	-0.027	0.020	0.009	-0.043***	-0.100***	-0.070***	-0.031***
Midwest	-0.077***	-0.101***	-0.027	-0.066***	-0.061***	-0.092***	-0.091***	-0.074***
South	-0.055***	-0.052***	-0.010	-0.062***	-0.088***	-0.132***	-0.095***	-0.073***
educ	0.102***	0.096***	0.112***	0.097***	0.096***	0.064***	0.082***	0.094***
famsize	0.054***	0.062***	0.066***	0.066***	0.069***	0.053***	0.048***	0.062***
single	-0.156***	-0.125***	-0.167***	-0.147***	-0.128***	-0.076***	-0.100***	-0.131***
not working	-0.106***	-0.110***	-0.094***	-0.086***	-0.038**	-0.012	-0.002	-0.063***
race-black	-0.105***	-0.091***	-0.056**	-0.058***	-0.061***	-0.050***	-0.068***	-0.069***
race-other	-0.058	-0.033	-0.063*	-0.037	-0.023	-0.019	-0.027	-0.032***
home renter	0.030	0.096	0.069	0.046	0.021	0.252***	0.222***	0.092***
constant	4.930***	5.405***	5.984***	5.579***	5.523***	4.163***	4.890***	5.170***
y1992								0.049***
y1995								0.105***
y1998								0.069***
y2001								0.172***
y2004								0.125***
y2007								0.238***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.67	0.66	0.63	0.60	0.60	0.64	0.65	0.65

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 6. Equation (3), dependent variable: non durables consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.403***	0.373***	0.322***	0.368***	0.396***	0.510***	0.489***	0.404***
netfin	0.000	0.001	0.001	0.001**	0.002***	0.002***	0.002***	0.001***
ore	0.005*	0.008***	0.008***	0.005**	0.004*	0.004	0.005**	0.005***
house	0.013**	0.016***	0.019**	0.015***	0.016***	0.029***	0.027***	0.021***
old*income	-0.013**	-0.015***	-0.015**	-0.017***	-0.016***	-0.010**	-0.012***	-0.015***
old*netfin	-0.005**	-0.004	0.000	-0.003	-0.002	-0.002	-0.001	-0.002***
old*ore	-0.002	-0.009**	-0.002	-0.001	0.003	0.002	0.001	-0.001
old*house	0.014***	0.016***	0.016***	0.018***	0.015***	0.011***	0.016***	0.015***
age	0.013***	0.012***	0.014***	0.013***	0.011***	0.005**	0.005**	0.010***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000**	-0.000***
North East	0.045***	0.046***	0.075***	0.051***	-0.028**	-0.069***	-0.047***	0.011*
Midwest	-0.023	-0.031*	0.051***	0.004	-0.020	-0.039***	-0.019	-0.011**
South	0.000	0.009	0.052***	0.010	-0.058***	-0.082***	-0.032**	-0.018***
educ	0.094***	0.092***	0.106***	0.089***	0.099***	0.067***	0.080***	0.091***
famsize	0.069***	0.074***	0.076***	0.074***	0.067***	0.056***	0.044***	0.067***
single	-0.142***	-0.130***	-0.147***	-0.124***	-0.132***	-0.102***	-0.115***	-0.131***
not working	-0.101***	-0.103***	-0.105***	-0.086***	-0.046***	-0.033**	-0.019	-0.070***
race-black	-0.072***	-0.054**	-0.024	-0.054***	-0.049***	-0.055***	-0.063***	-0.052***
race-other	-0.078*	-0.040	-0.037	-0.032	-0.062**	-0.048**	-0.075***	-0.051***
home renter	0.037	0.033	0.038	0.048	0.017	0.220***	0.216***	0.099***
constant	4.663***	5.006***	5.451***	5.075***	4.998***	3.826***	4.153***	4.671***
y1992								0.058***
y1995								0.099***
y1998								0.059***
y2001								0.183***
y2004								0.150***
y2007								0.260***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.68	0.67	0.65	0.63	0.63	0.65	0.65	0.67

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 7. Equation (4), dependent variable: total consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.432***	0.397***	0.329***	0.373***	0.402***	0.537***	0.485***	0.416***
fin	0.004	0.003	0.009***	0.008***	0.006**	0.000	0.000	0.005***
nettng	0.001	0.002	0.002*	0.000	0.000	0.000	0.001	0.001**
old*income	0.004	-0.004	-0.009	-0.001	-0.003	0.002	-0.004	-0.003
old*fin	-0.005	-0.003	0.000	-0.006	-0.005	0.003	0.005	-0.001
old*nettng	0.000	-0.004	0.009**	0.006**	0.007**	-0.003	0.002	0.003**
age	0.019***	0.013***	0.017***	0.018***	0.014***	0.010***	0.007***	0.014***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
North East	-0.017	-0.027	0.021	0.010	-0.043***	-0.098***	-0.069***	-0.031***
Midwest	-0.078***	-0.102***	-0.027	-0.065***	-0.062***	-0.091***	-0.090***	-0.074***
South	-0.057***	-0.052***	-0.010	-0.062***	-0.088***	-0.132***	-0.095***	-0.073***
educ	0.103***	0.098***	0.110***	0.096***	0.096***	0.069***	0.085***	0.095***
famsize	0.054***	0.064***	0.068***	0.067***	0.070***	0.052***	0.048***	0.062***
single	-0.164***	-0.131***	-0.170***	-0.153***	-0.133***	-0.084***	-0.103***	-0.136***
not working	-0.109***	-0.116***	-0.087***	-0.086***	-0.037**	-0.010	0.001	-0.063***
race-black	-0.103***	-0.097***	-0.058***	-0.062***	-0.065***	-0.059***	-0.070***	-0.072***
race-other	-0.054	-0.036	-0.063*	-0.036	-0.020	-0.017	-0.026	-0.030***
home renter	-0.058***	-0.098***	-0.093***	-0.065***	-0.107***	-0.040***	-0.068***	-0.078***
constant	5.020***	5.557***	6.103***	5.568***	5.592***	4.325***	5.060***	5.286***
y1992								0.050***
y1995								0.107***
y1998								0.070***
y2001								0.174***
y2004								0.131***
y2007								0.246***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.67	0.66	0.63	0.6	0.6	0.64	0.65	0.65

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 8. Equation (4), dependent variable: non durables consumption

	1989	1992	1995	1998	2001	2004	2007	Pooled
income	0.402***	0.373***	0.322***	0.367***	0.396***	0.522***	0.498***	0.406***
fin	0.004	0.009***	0.009***	0.006**	0.008***	0.003	0.005**	0.007***
nettng	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000
old*income	-0.006	-0.016**	-0.017**	-0.008	-0.008	-0.009*	-0.008	-0.011***
old*fin	-0.012*	-0.006	-0.002	-0.007	-0.010*	-0.005	-0.003	-0.005**
old*nettng	0.012**	0.011**	0.018***	0.014***	0.017***	0.014***	0.015***	0.014***
age	0.013***	0.012***	0.014***	0.014***	0.012***	0.005**	0.006***	0.011***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000	-0.000***	-0.000***
North East	0.043***	0.044***	0.073***	0.050***	-0.030**	-0.069***	-0.047***	0.010*
Midwest	-0.026*	-0.033**	0.050***	0.002	-0.022*	-0.040***	-0.019	-0.013**
South	-0.002	0.009	0.050***	0.008	-0.059***	-0.082***	-0.033***	-0.019***
educ	0.095***	0.091***	0.104***	0.089***	0.099***	0.071***	0.083***	0.092***
famsize	0.068***	0.076***	0.077***	0.073***	0.067***	0.055***	0.045***	0.068***
single	-0.148***	-0.132***	-0.155***	-0.130***	-0.135***	-0.110***	-0.119***	-0.136***
not working	-0.105***	-0.103***	-0.100***	-0.088***	-0.042***	-0.027*	-0.015	-0.068***
race-black	-0.075***	-0.053**	-0.024	-0.056***	-0.052***	-0.056***	-0.063***	-0.052***
race-other	-0.072	-0.037	-0.038	-0.029	-0.057**	-0.044**	-0.074***	-0.047***
home renter	-0.124***	-0.157***	-0.159***	-0.134***	-0.160***	-0.114***	-0.012***	-0.137***
constant	4.851***	5.190***	5.640***	5.229***	5.120***	4.025***	4.355***	4.860***
y1992								0.059***
y1995								0.100***
y1998								0.060***
y2001								0.186***
y2004								0.158***
y2007								0.271***
Obs.	7322	7596	7154	9865	12170	14405	12387	70899
R-squared	0.68	0.67	0.65	0.63	0.63	0.64	0.65	0.67

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.

Table 9. Equation (2) by income quartiles, dependent variable: total consumption

	Dep. variable: total consumption				Dep. variable: non durables consumption			
	q1	q2	q3	q4	q1	q2	q3	q4
income	0.185***	0.386***	0.562***	0.616***	0.146***	0.389***	0.568***	0.651***
fin	0.000	-0.001	-0.002	0.002	0.003	-0.001	-0.001	0.003*
ore	0.010***	0.001	-0.001	0.000	0.008***	0.002	0.001	0.000
house	0.014*	0.013**	0.007*	0.008*	0.018***	0.011**	0.005	0.003
old*income	0.005	0.008*	0.005	0.006	0.004	-0.007	-0.009	0.000
old*fin	0.006*	-0.003	0.001	0.002	0.000	-0.006	-0.003	-0.005
old*ore	-0.002	0.003	-0.001	0.005	-0.003	0.003	0.001	0.004
old*house	-0.007***	-0.008***	-0.004	-0.012**	0.006***	0.012***	0.012***	0.002
age	0.020***	0.010***	0.009***	0.016***	0.009***	0.009***	0.012***	0.023***
agesq	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
North East	-0.014	-0.012	-0.047***	-0.061***	0.046***	0.035***	-0.004	-0.042***
Midwest	-0.047***	-0.058***	-0.085***	-0.073***	0.031**	0.005	-0.023***	-0.020**
South	-0.056***	-0.059***	-0.073**	-0.082***	0.013	-0.007	-0.009	-0.039***
educ	0.124***	0.091***	0.062***	0.053***	0.105***	0.083***	0.064***	0.063***
famsize	0.115***	0.059***	0.053***	0.037***	0.116***	0.070***	0.063***	0.040***
single	-0.213***	-0.135***	-0.067***	-0.060***	-0.197***	-0.129***	-0.057***	-0.068***
not working	-0194***	-0.043***	0.008	0.018	-0.177***	-0.040***	0.005	-0.003
race-black	-0.055***	-0.060***	-0.107***	-0.076***	-0.018	-0.049***	-0.107***	-0.092***
race-other	0.008	-0.023	-0.072***	-0.053***	-0.010	-0.056**	-0.074***	-0.084***
home renter	-0.010	0.063	0.033	0.032	-0.076	-0.012	-0.005	0.002
constant	6.985***	5.562***	3.964***	3.279***	7.065***	4.971***	3.158***	2.069***
y1992	0.100***	0.039***	0.006	0.011	0.084***	0.047***	0.207**	0.045***
y1995	0.182***	0.094***	0.021	0.034**	0.160***	0.066***	0.035***	0.056***
y1998	0.159***	0.075***	-0.003	-0.048***	0.135***	0.053***	-0.007	-0.030**
y2001	0.252***	0.181***	0.116***	0.038**	0.255***	0.174***	0.135***	0.078***
y2004	0.192***	0.127***	0.046***	0.022	0.194***	0.135***	0.076***	0.077***
y2007	0.364***	0.250***	0.154***	0.083***	0.335***	0.260***	0.182***	0.136***
Obs.	15438	16851	17799	20811	15438	16851	17799	20811
R-squared	0.54	0.44	0.4	0.39	0.53	0.43	0.38	0.38

Notes: All the estimations were carried out using the Repeated Imputation Inference (RII) , using all the five implications resulting from the CES procedure of imputing missing income values. *, **, *** significant at 10, 5 and 1% respectively.