CFS WORKING PAPER

No. 2011/27

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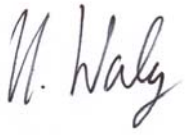

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Wealth Shocks, Unemployment Shocks and Consumption in the Wake of the Great Recession*

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Oktober 14, 2011

Abstract:
We use data from the 2009 Internet Survey of the Health and Retirement Study to examine the consumption impact of wealth shocks and unemployment during the Great Recession in the US. We find that many households experienced large capital losses in housing and in their financial portfolios, and that a non-trivial fraction of respondents have lost their job. As a consequence of these shocks, many households reduced substantially their expenditures. We estimate that the marginal propensities to consume with respect to housing and financial wealth are 1 and 3.3 percentage points, respectively. In addition, those who became unemployed reduced spending by 10 percent. We also distinguish the effect of perceived transitory and permanent wealth shocks, splitting the sample between households who think that the stock market is likely to recover in a year's time, and those who don't. In line with the predictions of standard models of intertemporal choice, we find that the latter group adjusted much more than the former its spending in response to financial wealth shocks.

JEL Classification: E21, D91

Keywords: Marginal Propensity to Consume, Wealth Shocks, Unemployment.

* We thank Chris Carroll, Luigi Pistaferri and Marco Pagano, as well as seminar participants at the 7th CSEF-IGIER Symposium on Economics and Institutions, the Economics of Household Saving Workshop at the 2011 NBER Summer Institute, the Board of Governors of the Federal Reserve System, the Bank of Greece, the 10th CRETE Conference, the Macro and Financial Econometrics Conference in Heidelberg, the Conference on Macroeconomic Policy in Istanbul for helpful comments. The usual disclaimer applies.

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1. Introduction

In 2008, American households experienced a loss of 13.6 trillion in wealth, compared to a disposable income of 11 trillion. Between October 2007 and October 2008 the stock market declined by almost 40 percent, and house prices by almost 20 percent. The unemployment rate, which throughout 2007 averaged 4.8 percent, doubled in less than two years, from 5 percent in January 2008 to 10.1 percent in November 2009. Many analysts link this large, unexpected and unprecedented fall in the market value of household wealth and the dramatic increase in unemployment to the drop in consumption that took place in the second half of 2008 and 2009. Indeed, real consumption expenditures dropped from 9,286 billion dollars (in constant 2005 prices, seasonally adjusted at an annual rate) in the second quarter of 2008 to 8,999 billion dollars in the second quarter of 2009, i.e., a decline of about 3.1 percentage points (pp). All these figures suggest that a special feature of the Great Recession is that households were simultaneously hit by three different shocks: a large drop in house prices, a strong decline in the stock market, and a dramatic worsening of the labor market conditions.

This paper attempts to estimate the separate impact of these three shocks on households' expenditures, using recently available microeconomic data. We use the 2009 Internet Survey of the Health and Retirement Study (HRS) in order to examine the extent to which financial losses, house price declines, and unemployment affected consumption spending of older Americans. The HRS Internet Survey contains detailed measures of both housing wealth losses (between summer 2006 and mid-2009) and of losses in various financial assets (between October 2008 and mid-2009). It also contains measures of consumption growth and qualitative indicators of consumption changes, allowing us to estimate the effect of the losses on adjustments in consumption expenditure. Finally, it has questions on expectations about future stock market movements that allow us to distinguish between households that perceive the stock price decline as permanent and those that think that the market will recover relatively soon.

In contrast with aggregate data, microeconomic data allow researchers to estimate the impact of the crisis on specific population groups, such as households that have suffered significant wealth losses, individuals that have been laid off during the crisis, or individuals who perceive the wealth shocks that they experience as permanent. Even though micro data usually take a long time to be collected and processed, recent experience with Internet surveys shows that these tasks are completed sooner in them than in traditional surveys.

One example of an Internet survey is provided by the Cognitive Economics Study (CogEcon), which is used by Shapiro (2010) in order to assess the effect of the financial crisis on the well-being of older Americans. The initial wave of CogEcon was fielded shortly before the financial crisis that began in the Fall of 2008, and provides baseline wealth measurements and information about the structure of households' portfolios for a representative sample of almost 1,000 U.S. individuals aged 50 years and older. The second wave was completed in summer 2009. Shapiro finds that financial wealth fell by about 15 percent for the median household, and that financial losses were concentrated among households with high levels of wealth, who tend to have higher exposure to the stock market. Nonetheless, households with little financial wealth suffered declines in consumption as large as households with substantial exposure to the stock market. Tight credit market conditions and adverse labor market outcomes account for much of the effect of the financial crisis on the consumption of these low-wealth households.

A second study by Hurd and Rowhedder (2010b) uses the American Life Panel, an ongoing Internet survey of about 2,500 respondents, which was fielded at the beginning of November 2008, immediately following the large declines in the stock market associated with the collapse of Lehman Brothers. They find that between November 2008 and April 2010 almost 40 percent of American households have been affected either by unemployment, negative home equity, arrears on their mortgage payments, or foreclosure. A third study, also by Hurd and Rowhedder (2010a) combines longitudinal data from the Health and Retirement Study (HRS) with the 2009 HRS Internet Survey to provide an overview of the effects of the financial crisis on the population aged 50 or older. According to the descriptive statistics reported by Hurd and Rowhedder, the majority of older households have suffered substantial losses in stocks and/or housing wealth, while some of them have extracted home equity (and, as a result, increased their indebtedness). They also find that almost 30 percent of households reduced spending between 2007 and 2009, and that the average decline was larger than 8 pp.

Two other recent studies also analyze wealth losses during the recession. Bricker et al (2011), using the 2007–09 Survey of Consumer Finance panel, find substantial heterogeneity in changes in wealth among households. Furthermore, these changes appear to reflect changes in asset values (particularly the value of homes, stocks, and businesses) rather than changes in the level of ownership of assets and debts or in the amount of debt held. The study also finds that families appear more cautious in 2009 than in 2007, as most families reported greater desired buffer savings, and many of them expressed concern over future income and employment. Petev and al. (2011) point out that the consumption of the wealthy fell more than that of the less wealthy during the

recession. Using the typical estimates of the wealth effect available in the literature, they show that this factor can explain a significant fraction of the fall in consumption experienced by the wealthy.

The data that we use in this paper refer to the population aged 50 or older, and are therefore particularly well suited to analyze the impact of wealth shocks on consumption. Indeed, older households have accumulated significant amounts of wealth over the lifecycle and therefore control a large fraction of society's resources; thus their decisions have pronounced aggregate implications. Those aged fifty and above typically have higher stock market participation rates than the rest of the population, and a higher fraction of their wealth is invested in risky financial assets. Furthermore, over 90 percent of households in the sample own their home. Hence, our analyses are less likely to suffer from the endogeneity bias that arises when one examines consumption responses to housing wealth losses over homeowners, and the heterogeneity of responses with respect to wealth losses experienced by owners and renters. Finally, recent studies (e.g., Attanasio et al., 2009) emphasize that co-movements in consumption and house prices may be driven by a common factor such as income expectations. Given that the elderly typically face a relatively flat future income profile, this problem may be less severe in our sample.[1] On the other hand, the unemployment rate and the probability of job loss tend to be lower among older households.

We find that capital losses on housing and financial assets, as well as the income loss from becoming unemployed, do indeed lead households to reduce their spending, and that these effects are net of the influence of a number of important socio-economic characteristics including change in family size, health deterioration, and change in working and retirement status. We also look closely at disaggregated financial assets and show that the effects of financial losses come primarily through losses experienced from directly held stocks and individual retirement accounts (IRAs).

More specifically, we estimate that the elasticity of consumption to financial wealth is about 0.09, implying a marginal propensity to consume with respect to financial wealth equal to 3.3 pp. In addition, households in which at least one of the two partners in the main couple (or the single head) became unemployed in 2008 and early 2009 reduced consumption by 10 percent in 2009. Finally, we find that the fall in house prices also has an important impact on consumption (the estimated elasticity is about 0.06 and the associated marginal propensity to consume reaches 1 pp).

It should be noted that, while we study the consumption response to capital losses using data from 2008-2009, the economic relevance of this issue is more general, given that large asset price movements have by now become the norm in the U.S. economy. In Figure 1, we plot capital gains

[1] Indeed, Attanasio et al. (2009) find that younger households (most of which are renters) have higher wealth-consumption correlations than older households, and take this as evidence that the co-movement between consumption and house prices is driven by income expectations, rather than a genuine wealth effect.

and active saving accruing to the US household sector (both are measured as a share of personal disposable income) from 1990 to 2010. As the graph makes it clear, during this period capital gains and losses form a much larger part of households' year-to-year asset accumulation than active saving; in fact, the median yearly absolute ratio of capital gains to active saving is equal to 5.43. Furthermore, the accumulated real (in 1982-1984 prices) capital gains, after subtracting real losses, are equal to 16.8 trillion dollars during this period, while the accumulated real household saving is equal to 3.8 trillion dollars.

According to several models of intertemporal choice, the impact of wealth shocks on consumption depends on the nature of the shocks (permanent or transitory) and the opportunities to smooth them through credit and insurance markets. We attempt to distinguish between permanent and transitory shocks to financial wealth by relying on subjective expectations elicited in the Fall of 2008 about stock market gains or losses expected one year ahead. We split the sample between households that expected the stock market to recover in a year's time, and those who did not. We expect the consumption response to wealth shocks to be larger for the latter group, who are likely to perceive the negative shock to their financial wealth as permanent. Indeed, we find that the response of consumption to this shock is very strong for this group of households, while it is insignificant for the other group. Finally, we investigate the separate role that increased income uncertainty plays in the drop in consumption. We find that our measures of income risk based on subjective expectations do not have a statistically significant effect on consumption.

The remaining of the paper is organized as follows. Section 2 reviews previous literature on the effect of wealth and unemployment shocks on consumption. Section 3 presents the data. Section 4 presents estimates of the effect of wealth shocks and unemployment on consumption. Section 5 splits the sample by stock market expectations and presents estimates of the response of consumption to transitory and permanent wealth shocks. Section 5 presents various robustness checks to corroborate the empirical findings. Section 6 concludes.

2. Wealth and unemployment shocks

Standard models of intertemporal choice suggest that unexpected and permanent drops in wealth reduce consumption, and that this reduction equals the annuity value of the drop in wealth. There is, however, much disagreement about the magnitude of the impact of wealth shocks on consumption. Most of the literature attempting to estimate this impact is based on two implicit

assumptions: (i) wealth shocks (whether due to house price changes or movements in stock prices) are not predictable, and therefore not anticipated by consumers; (ii) current prices are the best predictors of future asset prices, and therefore changes in asset prices constitute a permanent wealth shock. According to the permanent income hypothesis, it follows from (i) and (ii) that wealth shocks should have a relatively large impact on consumption, equivalent to the annuity value of the wealth shock (in the order of 2 to 5 pp, depending on the assumed real interest rate).

Several studies, relying on macroeconomic or regional data, regress the logarithm of consumption, consumption growth or saving on shocks to housing or financial wealth, but no consensus has yet emerged on the link between house prices and consumption.[2] Studies using microeconomic data allow researchers to dig deeper into this link. While changes in stock prices imply unambiguous wealth effects on consumption, as discussed in Sinai and Souleles (2005), Campbell and Cocco (2007) and Attanasio et al. (2009), the consumption response to a house price decline is quite heterogeneous across the population. Most empirical analyses using micro-data refer to the U.S. and the U.K. Engelhardt (1996) estimated an MPC of 0.03 or higher for the U.S. in the 1980s, and Juster et al. (2001) found an even higher MPC out of stock price changes. On the other hand, Hoynes and McFadden (1997) found that households who had experienced housing capital gains increased their saving rather than their spending, and Hryshko et al. (2010) find that after a job loss homeowners can smooth consumption easier than renters in times of higher house prices. In the U.K. Disney et al. (2010) find a relatively low MPC out of housing wealth (of the order of 0.01), while Campbell and Cocco (2007) a relatively strong response for older households that own their home. Attanasio et al. (2009) conclude that the co-movements in consumption and house prices are not generated by a causal link running from the former to the latter, but by common factors, contradicting the findings in Campbell and Cocco (2007).

On balance, results based on micro-data are also mixed, with some papers finding large responses of expenditure to house and stock prices shocks, while others find smaller effects. This literature generally suffers from some limitations. First and foremost, house and stock price changes are likely correlated with other economic events, and therefore have an impact on expectations of future income. A second limitation is that most studies rely on aggregate measures of house price changes (either at the national, regional or county level), while house price risk has also an idiosyncratic component specific to each dwelling. A third limitation of current studies is that they

[2] Davis and Palumbo (2001) estimate that the MPC out of total wealth is in the range of 0.04-0.06. Case et al. (2003) provide estimates from a panel of developed countries and a panel of U.S. states. In both datasets, they find an MPC out of housing wealth of around 0.03-0.04 and a small and insignificant MPC out of stock market wealth. Ludwig and Sløk (2004) found a larger effect of stock wealth than housing wealth in a panel of OECD countries. But in a recent study, Carroll et al. (2010) estimate the longer run effects on consumption from housing wealth changes, as opposed to the immediate ones (e.g. those of the next quarter), to be larger than the effects of financial wealth shocks.

usually don't distinguish between transitory and permanent wealth shocks, which should have different impact on consumption. As we shall see, our survey provides information that allows us to provide some evidence on this issue. Furthermore, most evidence refers to house price booms (as in the U.K. in the 1990s), while the present paper focuses on wealth losses during the Great Recession, which allows us to estimate the impact of very large losses in both housing and financial wealth on consumption. As noted in Browning and Collado (2001), consumers may tend to smooth consumption when income or wealth changes are large, but are less likely to do so when the changes are small and the cost of adjusting consumption is not trivial. Indeed, it is quite possible that the literature has not been able to obtain more precise estimates of the MPC out of wealth shocks because some of the shocks are small, and consumers might react mostly to large shocks.[3]

During the Great Recession households also experienced negative income shocks, particularly those who became unemployed. The consumption response to unemployment shocks depends on the extent to which the shock is anticipated, on the persistence of the shock, and on the degree of imperfections of credit and insurance markets (Jappelli and Pistaferri, 2010). According to the permanent income hypothesis, the impact should be strongest when the shock is not anticipated (as is most likely the case for those who became unemployed in 2007-08), when the shock is perceived to be permanent, and when consumers are liquidity constrained. One should also bear in mind that unemployment shocks may be partially insured through unemployment insurance. Therefore, a complete analysis of the impact of unemployment requires explicit modeling of the type of insurance available to individuals as well as of the possible interactions between public and private insurance.[4]

One of the earlier attempts to look at the effect of unemployment shocks on consumption is Gruber (1997). Using the PSID, he constructs a sample of workers who lose their job between period $t-1$ and period t, and regresses the change in food spending over the same time span against the unemployment insurance (UI) replacement rate an individual is eligible for. Gruber finds a large smoothing effect of UI, in particular that a rise in the replacement rate by 10 pp reduces the fall in consumption upon unemployment by about 3 percent. He also finds that the fall in consumption at a

[3] In quite different contexts, this "magnitude hypothesis" has been tested by Coulibaly and Li (2006) and Scholnick (2010), who argue that the final mortgage payment represents a large expected disposable income shock (that is, income net of pre-committed debt service payments). The test of the magnitude hypothesis looks at whether the response of consumption to expected income increases depends on the relative amount of mortgage payments. Stephens (2008) studies consumption adjustments due to an expected rise in income following the last repayment of a vehicle loan. Shapiro and Slemrod (2003) and Agarwal et al. (2007) examine consumption responses to the receipt of a tax rebate.

[4] Some of these interactions stem from the fact that most welfare programs are means- and asset-tested. For example, in the US individuals with more than $2,000 in liquid assets are not eligible to receive Food Stamps, Medicaid and other popular welfare programs even if they have no income. The disincentives to save (self-insure) induced by the presence of public insurance (which in most cases are not subject to time limits) have been studied by Hubbard et al. (1995).

zero replacement rate is about 20 percent, suggesting that consumers face liquidity constraints. Browning and Crossley estimate a small elasticity of expenditures with respect to UI benefit (equal to 0.05) in Canada. But this small effect masks substantial heterogeneity, with low wealth households at the time of job loss exhibiting elasticities as high as 0.2. This finding is also consistent with the presence of liquidity constraints.

A related issue is that the recession increased insecurity about the future. Indeed, the Consumer Sentiment Index declined dramatically in the second half of 2007. Petev and al. (2011) suggest that increased uncertainty may have reduced spending through precautionary saving, and that the credit crunch that followed the financial crisis may have prevented some households from purchasing goods that are typically acquired through borrowing. Deaton (2011) analyzes self-reported well-being questions collected by the Gallup Organization. Between the fall of 2008 and the spring of 2009 (at which point the stock market hit bottom), Americans became much more negative when evaluating their lives, were much more worried and stressed, and exhibited declines in positive affect. As we shall see, in our robustness analysis we address these issues by looking at the consumption response to household liabilities and to measures of income risk.

3. The data

In our investigation we use information from two micro-data surveys. Our first data source is the HRS, which is a longitudinal, nationally representative micro survey interviewing those aged fifty and above in the US. The survey, conducted on a biannual basis since 1992, provides extensive information on households' socioeconomic characteristics, income, and assets holdings (for a detailed description of the survey see Hauser and Willis, 2004).

Wave 9 of the HRS, which was conducted between February 2008 and February 2009, interviewed 16,477 individuals belonging to 11,187 different households. In 2009, the HRS asked a subset of the Wave 9 respondents to participate in an Internet survey (our second data source), with the aim to collect information on households' experiences and circumstances during the ongoing recession. Most of the sampled individuals had participated in wave 9 of the HRS and had reported having Internet access, while the few who had not appeared in wave 9 had participated in previous waves of the Internet Survey (2003, 2006, or 2007). The 2009 Internet Survey was conducted from March 2009 through August 2009, and its sample consists of 4,415 respondents belonging to 3,438

households (the sample response rate was about 77 percent).[5] The survey provides information on the wealth losses that respondents have experienced, on the adjustments they have made in their consumption, on changes in their labor status, and on how they cope with financial difficulties. In our analysis we merge the 2009 Internet Survey with the 2008 main survey, thus ending up with a sample of 3,328 households.

For our purposes, a most important feature of the Internet Survey is that respondents are asked about changes in their total spending compared to the previous year (i.e., 2008). They are first asked to indicate whether their current spending is lower, higher, or has stayed the same. Subsequently, they are asked to report the percentage change in their total spending. In our analysis, we are going to examine both the continuous (percentage) and the qualitative (categorical) change in expenditure as our outcomes of interest.[6]

Furthermore, the Internet Survey asks a series of questions aiming to measure the wealth losses that households have suffered. Specifically, households are asked whether their own home is worth more, less or about the same compared to its value in the summer of 2006, which is the year in which house prices peaked in the US. Then, they are also asked to report the change in the value of their house, both as an amount and as a percentage. We will use as a forcing variable in our specifications the answer to the percentage change question, given that the questions on changes in spending and, as we will see below, in the value of financial assets are also asked in percentage terms.[7] Even though in some cases the perceived losses might not reflect exactly the actual asset price movements, one may argue that it is precisely the perceived loss that should influence consumption decisions.

Finally, the Internet Survey also asks a series of questions regarding the percentage losses in the value of the following financial assets: employer retirement saving plans (incl. 401k's); individual retirement accounts (IRAs) or Keogh plans; investment trusts; mutual funds; directly

[5] In order to reduce the possibility that our estimates are affected by outliers, we do not use any observations for which the absolute value of the percentage change in consumption is larger than 0.8, and thus we drop 26 households from our sample.

[6] The Internet Survey also asks about current spending on some basic consumption items. Furthermore, one can recover information on spending in 2008 by using information from the Consumption and Activities Mail Survey (CAMS), which is a supplemental mail survey conducted in 2009, and in which a sub-sample of 2008 HRS respondents were asked about their expenditures over the past 12 months. In principle, one could examine changes in consumption by also using this additional information. In practice, however, it is very difficult to use either of these additional sources of data on expenditure. First, there are very few observations (less than 400 households) for which the information needed from all three surveys (i.e., 2008 HRS, 2009 CAMS and the Internet Survey) exists. This is the case because the vast majority of households participating in 2009 CAMS do not participate in the Internet Survey. Second, the Internet Survey does not provide any information on a number of major expenditure items (e.g., housing expenses, recreation, personal care).

[7] For cases in which the percentage change in the value of the home is missing we calculate it by using information from the amount change in the home value, and the current value, which are related to the percentage change by the equation $p=DV/(V-DV)$, where p denotes the percentage change, DV the change in value, and V the current value.

held stocks; and stocks held through other assets.[8] For each of these assets owners are asked to report the percentage decline of the asset value since September 2008, which was the month in which Lehman Brothers collapsed, resulting in a major upheaval in financial markets worldwide. Unlike the questions on the change in the value of the house, the questions on changes in the value of financial assets ask only about losses, and hence the values of the corresponding variables are censored at zero. However, given the fact that financial markets went in a tailspin in the fall of 2008, and that the US stock market in particular hit bottom in March 2009 (i.e., one month before the Internet Survey began), we think that very few, if any, households in the survey may have experienced any financial gains. In any case, in order to test the sensitivity of our results to this feature of the data, we also tried as an alternative to the continuous percentage change variable a four-level categorical variable, the top level of which denotes no losses (or gains), while the other three levels the terciles of financial losses. As will be discussed below, using this alternative categorical variable did not change our results in any significant way.

Our primary objective is to examine the relationship between, on the one hand, changes in consumption and, on the other hand, capital losses in housing and financial assets, as well as unemployment. The latter will be expressed either as a weighted average of the percentage change in the aforementioned six financial assets, or as six separate percentage change variables. We construct the weighted average of the percentage change in the value of financial assets, by weighing the percentage change in each of the six asset categories with the financial portfolio share of the respective asset, as recorded in the Internet Survey. As we will discuss below, we have also tried an unweighted average of the changes in the value of the individual financial assets, and this change left our results unaffected.[9]

Table 1 summarizes changes in consumption, both in percentages and in categorical form (lower, same, or higher compared to the previous year), by quartiles of percentage changes in asset values. Descriptive statistics suggest a negative association between asset capital losses and spending. While the median household has not reduced its consumption, households that have suffered the largest losses in housing have reduced their spending by 4.4 percent on average, while

[8] There are no questions in the Internet Survey about less risky financial assets like checking or savings accounts and bonds.

[9] We should note that the Internet Survey asks households to give an estimate of the current value of the six financial assets in question. It is not possible, however, to combine this information with asset values reported in the 2008 HRS in order to calculate percentage losses for each financial asset. This is the case because changes in asset values do not distinguish between active saving and changes in market prices. Furthermore, there is not an exact correspondence between financial assets about which questions are asked in HRS 2008, and those in the Internet Survey (e.g., there is no information on employer provided plans and trusts in the 2008 HRS). As a result, we have to use the Internet Survey question on percentage changes in asset values in order to measure asset losses.

the corresponding drop for those with the largest losses in financial assets is 6 percent. On the other hand, households with the smallest losses (i.e., those in the 4th quartile), change their spending by 2.1 percent and 2.4 percent due housing and financial losses, respectively. The results on qualitative consumption changes suggest a similar picture, as the fraction of those reporting a decline (increase) in consumption increases (decreases) when losses are higher (i.e., at the lower quartiles).

In Table 2 we show statistics on losses on housing and total (weighted) financial assets, as well as for each financial asset separately. It is immediately clear that a significant fraction of households have suffered losses in housing (53 percent) and in their financial assets (96 percent), conditional on ownership. The prevalence of losses is also very severe (between 74 percent and 92 percent) in all six financial assets.

About half of the households that have experienced a drop in their housing wealth have lost at least 18 percent of the value of their main home between the summer of 2006 and the spring of 2009. This implies a considerable hit to household net worth, given that the house is typically the dominant asset in household portfolios. The drop in households' financial wealth has also been very striking. Among those who have suffered losses the median percentage loss with respect to the four major asset categories (i.e., employer-based pension plans, IRAs, mutual funds, and direct stocks) is about 30 percent since September 2008. Furthermore, one out of four households with losses has witnessed a decline of at least 40 percent in the value of its investments in the aforementioned four assets.

Apart from changes in housing and financial wealth, we will use in some of our specifications variables denoting a variety of socio-economic characteristics, information on which is taken from the 2008 HRS. These include age, household size, marital status, being in fair/poor health, working status, education, and race. Moreover, we use the number of correct answers to a numeracy test (five successive subtractions of the same number) as an indicator of cognitive ability.[10] Furthermore, we take into account households' resources in 2008 by controlling for total household income, and net worth.[11] Finally, we include dummy variables representing a transition into unemployment, an exits into retirement, and a deterioration in health status between HRS 2008 and the Internet Survey.[12]

[10] Shapiro (2010) also associates cognition with changes in consumption.

[11] We control for net income and net wealth, which both have highly skewed distributions, by using the inverse hyperbolic sine transformation: $\log(x+(x^2+1)^{1/2})$, which allows for nonlinear effects and is defined for zero and negative values.

[12] In the case of couples characteristics represent a combination of the information from the two partners. In particular we use average age, worse reported health status, and the maximum of educational level and of the numeracy score. Furthermore, the couple is determined to be in the labor force if any of the two partners is working and retired if both are retired. With reference to changes in occupation, a couple with at least one newly unemployed or newly retired member between HRS 2008 and the Internet Survey is classified as becoming unemployed or retired, respectively.

Table 3 provides summary statistics on the aforementioned socioeconomic characteristics. The mean age is about 64 years, while households in which there are two partners form 75 percent of the sample. In about half of the households at least one member was employed full time, hence facing a potential risk of unemployment. On the other hand, in 41 percent of cases both partners were retired. In a non-trivial fraction of older households (5 percent) at least one of the two partners (or the single head) became newly unemployed between the 2008 HRS and the Internet Survey (as opposed to almost 6 percent for the population at large in the same period). In the same period, the rate of exit into retirement was 12 percent. Roughly 9 percent of households have at least one member declaring deterioration in health status in comparison to 2008, while one out of four households declares health problems in 2008. The median household income was about 63,900 dollars, while the corresponding numbers for financial and net real assets are 65,400 and 182,900 dollars, respectively (the latter figure is mainly due the high home ownership rates and relatively low amounts of outstanding mortgages).

Figure 2 highlights graphically our main results. We plot the change in the value of financial assets and the home against consumption growth, with the data aggregated in bins. Both relations are positive, suggesting sizeable wealth effects. The response of consumption to financial losses appears, however, to be much stronger. In particular, the left panel of Figure 2 shows that a drop in the value of housing wealth of 25 percent is associated with a decrease in expenditure of about 2 percent. On the other hand, the right panel of Figure 2 shows that financial wealth losses of 25 percent are associated with a reduction in consumption of about 4 percent.

4. Model specification and empirical results

We will study the effect that capital gains on housing and financial assets have on consumption by using a linear specification, in which the percentage change in consumption *C* will be associated to the percentage changes in the values of housing and financial wealth (denoted by *HW* and *FW*, respectively)[13], as well as to various changes over time in a vector of demographic and economic variables ***X***. Thus, we estimate the following equation:

$$\Delta \log C_{it} = \alpha \Delta \log HW_{it} + \beta \Delta \log FW_{it} + \gamma \log \Delta X_{it} + \varepsilon_{it} \quad (1)$$

[13] In the variables denoting percentage changes, negative values will denote capital losses; in other words, these variables will effectively denote capital gains.

where ε denotes an error term. This specification has been often used in the literature in order to capture the effect of various impulses on the growth rate of consumption. As Souleles (1999) notes, equation (1) nests the linearized Euler equation of Zeldes (1989) and Lusardi (1986) when α and β are equal to zero.[14] Due to differencing, estimation is not affected by any household fixed effects that could influence the expenditure in levels (Parker, 1999).

In this framework, the coefficients of the variables denoting percentage changes in the values of the two assets (i.e., α and β) have a straightforward economic interpretation: they represent the elasticity of consumption with respect to those assets. Note that a specification in first differences implies that variables that are constant over time (such as gender) drop from the estimation. As we will discuss in Section 6 below, we check the robustness of our results to the assumption of linearity by re-estimating all our specifications using the fractional variable framework of Papke and Wooldridge (1996, henceforth PW).

We will estimate four different variants of each model that will include four different sets of covariates, in addition to those denoting capital gains. The first set includes age and household size, i.e., we have a basic specification as used in Zeldes (1989). The second set includes in addition variables that capture changes in the households' circumstances between the main HRS survey of 2008 and the 2009 Internet Survey: whether at least one of the two partners (or the single head) become unemployed, retire, or report a deterioration in their health. In the third set we additionally control for economic resources by adding net real and financial assets, as recorded in the main HRS survey in 2008. Finally, in the fourth set we add further controls from the 2008 survey in order to check the sensitivity of our results and capture potential heterogeneous consumption responses of different population groups. These controls include: being in a couple, educational attainment, the score in a numeracy test, being in fair or bad health, working status, and race.[15]

We first show in Panel A of Table 4 the elasticities derived from associating the percentage change in consumption to the percentage changes in the values of the house and in the weighted percentage change in financial assets. We observe that the elasticity of consumption with respect to the value of the house is roughly equal to 0.056 across all four specifications and significant at the 10 percent level. Gains on financial assets appear to have a stronger positive association with the change in consumption, as the estimated elasticity equals 0.089 and is also significant at the 1

[14] Other papers that use the same framework include Parker (1999), Johnson et al. (2006), Agarwal et al. (2007), and Disney et al. (2010).

[15] We use two dummies denoting unemployment in the 2008 HRS, as well as becoming unemployed between that time and the 2009 Internet Survey interview, given that if one is already unemployed in 2008, then the transition to unemployment dummy will be equal to zero. Therefore, using both variables gives us more information on the effects of unemployment on spending. Analogous arguments apply for the transitions into bad health and into retirement.

percent level. Obviously, a constant elasticity does not imply that rich and poor households change their expenditure by the same amount in response to a given percentage drop in their wealth. In fact, as rich households generally spend more than poor ones, a constant elasticity implies that they will reduce their consumption by a greater amount.[16]

When we look at the remaining variables in our specification we find very strong associations of the percentage change in consumption with the transitions into unemployment and into retirement (the semi-elasticities are equal to 0.1 and 0.026, respectively).[17] The strong effect of unemployment suggests that it represents a shock that is at least partly unanticipated and against which the household can only partially insure. The negative association of consumption with retirement points to the lack of perfect consumption smoothing, as well as to the possible existence of consumption items that are complementary to working (Banks et al., 1996).

Having thus calculated the elasticity of consumption with respect to the values of the house and of financial assets, we can subsequently calculate the marginal propensity to consume out of those two assets (shown in Table 4, Panel B), which is equal to the elasticity divided by the ratio of the value of the associated asset to consumption expenditure. For housing, we use the value of the house as recorded in the 2006 HRS, as the question is about changes in the price of the house since the summer of 2006. For financial assets, we use the value of risky financial assets as recorded in the 2008 HRS, as respondents in the Internet Survey are asked about their losses since September 2008. For the associated consumption expenditure, we use the values of total expenditure recorded in the 2007 and 2009 CAMS surveys, which also partly cover the previous calendar year. As already discussed, however, when we merge the CAMS surveys with the Internet Survey we have information on total expenditure only for relatively few households (367 for CAMS 2007, and 386 for CAMS 2009). The values of the marginal propensities to consume that we obtain (shown Panel B of Table 4) using the asset to consumption ratios recorded for households in the Internet Survey are equal to 0.009 for housing and to 0.033 for financial assets[18]; both MPC estimates fall within the range of estimates found in previous literature, which we reviewed in Section 2.

The relatively smaller MPC with respect to housing is likely to be due to the prevalence of homeowners in our sample. In fact, homeowners who expect to remain in their current dwelling for a very long time are hedged against fluctuations in rents and house prices, which have no effect on

[16] This is consistent with the evidence presented by Petev et al. (2011), who, using CEX data, find that during the recession the consumption of the rich fell more than that of the poor.

[17] We also find a positive association of the growth rate of consumption with age. We cannot distinguish, however, between age and cohort effects in our framework.

[18] For the calculation of the MPC out of financial assets we included bond holdings recorded in the 2008 HRS because: (i) the single question on them therein also includes bond holdings in mutual funds; (ii) in the Internet Survey, we have information on the capital losses on mutual funds only for all of them combined. When we repeated our calculations excluding bond holdings, the calculated MPC out of financial assets was only slightly higher at 0.034.

their real wealth. Furthermore, in the absence of any substitution effects or credit constraints, a change in house prices should not affect consumption choices. For homeowners planning to trade down, or stay in the same home and access their housing wealth through an equity release scheme, a decline in house prices might induce a decline in consumption.[19] On the other hand, for homeowners wishing to trade up in the future the effect is ambiguous, as the value of both their current property and of any future dwelling will have unexpectedly declined. As in our sample over 90 percent of households are homeowners, and to the extent that most of them do not plan to sell their house or withdraw equity from it, it is quite plausible that changes in house prices have a small impact on their spending.

In order to check whether our results on the MPCs are affected by the relatively small number of observations used in their calculation, we applied the estimated elasticities (i.e., the regression coefficients) not only to the households in the Internet Survey that also appear in the main HRS surveys in 2006 and 2008, but rather to all households in the 2008 (2006) HRS for which expenditure information exists from the 2009 (2007) CAMS. We can do this because the elasticities are fixed numbers, i.e., they don't depend on any of our independent variables on which information can be found in the Internet Survey but not in the 2006 and 2008 HRS. The advantage of using these alternative samples is that we end up with quite larger numbers of households on which we can calculate the MPCs (1,846 households for the MPC out of housing, and 1,294 households for the MPC out of financial assets). We found that the calculated MPC out of housing remained the same at 0.009, while the MPC out of financial assets was slightly lower at 0.03. Therefore, we conclude that our MPC estimates from the Internet Survey are not significantly affected by the relatively small number of observations used for their calculation.

Our calculated elasticities of consumption with respect to asset values can be used to deduce the response of aggregate consumption in the U.S. to the decline in asset values observed for the household sector in the aggregate. This exercise would rest on the assumption that the elasticities calculated from our sample of the 50+ are also valid for the U.S. population as a whole. While it is difficult to assess the validity of this assumption, life-cycle theory implies that the MPC of young households should be lower than that of older ones, who have a shorter horizon. On the other hand, younger households are more likely to think that their permanent income will be more negatively affected by the crisis compared to older households who have a shorter working life left or whose

[19] As suggested by Aoki et al. (2001), a fall in house prices might also affect access to credit in the form of equity withdrawal. In fact, a reduction in house prices reduces collateral available to homeowners, discouraging them to borrow.

main source of income is their pension. Therefore, it is not a priori clear whether the response of consumption to wealth shocks will be stronger in our sample than in the aggregate economy.

In any case, using data from the Flow of Funds of the United States (Board of Governors of the Federal Reserve System, 2010), we calculated that from the third quarter of 2006 to the second quarter of 2009 households suffered capital losses on housing roughly equal to 28.1 percent, while from the third quarter of 2008 to the second quarter of 2009 the losses on the financial assets asked about in the Internet Survey were approximately equal to 20.2 percent (details of our calculations can be found in Appendix A.1). Using our estimated elasticities of consumption (0.056 with respect to housing, and 0.089 with respect to financial assets), we calculate that aggregate consumption was lower, ceteris paribus, by 1.6 percent due to housing losses, and by 1.8 percent due to financial losses. In addition, using our estimated semi-elasticity of expenditure to becoming unemployed that is equal to about 0.1, the fact that unemployment increased from by about 4 pp between the second quarter of 2008 and that of 2009 should have led to a decrease in expenditure of about 0.4 percent. Thus, we calculate the total effect of capital losses and unemployment on consumption to be equal to 3.8 percent. This is a substantial magnitude, which is also roughly comparable to the aforementioned 3.1 percent decline in aggregate consumption that the U.S. economy experienced between the second quarter of 2008 and the corresponding quarter in 2009.

It should be also noted that, even if one focuses only to households in which the reference person is over 50 years old, such households account for about 46% of total household spending in 2008, as can be gleaned from micro data from the US Consumer Expenditure Survey.[20] Therefore, the consumption response of older households to capital losses and unemployment suffered during the Great Recession should form a large part of the drop in aggregate consumption that has taken place in the US in 2008-2009.

In order to check whether our results are sensitive to any outliers in the variable denoting consumption growth, we re-estimated our model using as a dependent variable the categorical change in consumption relative to the previous year instead of the continuous percentage change. As there are three possible values (lower, the same, higher) to this categorical variable, we show in Table 5 the marginal effects on the three associated probabilities, derived from an ordered probit (more details about the calculation of marginal effects are given in Appendix A.3). We note that a capital gain of 15 pp (our assumed perturbation of the capital gains variables) lowers the probability of reducing consumption by about 1.5 pp and 2.2 pp in the case of housing and financial assets,

[20] For this calculation we have used the tabulations of household spending by the age of the reference person that are part of the Expenditure Tables of the Consumer Expenditure Survey (Bureau of Labor Statitics, 2011). More details are available from the authors upon request.

respectively. Analogously, this capital gain makes the probability of increased spending higher by 1.6 pp and 2.4 pp. Importantly, the housing capital gain is statistically significant at the 5 percent level in most cases, while the p-value of the financial capital gain is always below 1 percent. Becoming unemployed has a large negative impact on consumption, as it increases that probability of smaller spending by roughly 21 pp, while it decreases the probability of higher spending by roughly 14 pp. Therefore, we conclude that our results obtained by using the continuous consumption growth as the dependent variable are robust to the presence of outliers.

As we have detailed information on the composition of financial assets, we repeat our analysis using as separate controls the percentage changes in the asset values of the six financial assets found in the Internet Survey (as before, positive values of these six variables denote financial gains). This allows us to estimate to which financial assets in particular we should attribute the strong effect of changes in total financial wealth on consumption displayed in Table 4. The results of this disaggregated analysis are shown in Table 6, and it is clear that the association of financial wealth shocks to consumption is to a large extent due to directly held stocks (the estimated elasticity is 0.088). It is also worth noting that in this specification the estimated elasticity of changes in housing wealth (0.068) is slightly larger than the one estimated from the specification that uses changes in the value of aggregated financial wealth. Importantly, this elasticity is now statistically significant at the 5 percent level, which indicates that the value of the home quite likely has a considerable effect on consumption expenditure. Losing one's job during the crisis has essentially the same large negative impact as before.

One notable feature of the results shown in Tables 4 and 6 is that the household's net worth as recorded in the main HRS survey in 2008 is not associated with the subsequent change in consumption, after controlling for capital gains. Households' indebtedness could, however, affect the response of consumption to capital losses; a household with large debts might have more difficulties in adjusting consumption smoothly to any changed circumstances due to the financial crisis. Therefore, instead of net worth we introduced separately in our specification real assets (gross financial assets), and all debts. We found (results are available upon request) that larger debts were indeed strongly negatively associated with the change in consumption, while the results for changes in the values of the home and financial assets were affected very little (the elasticity with respect to housing is 0.052, while the elasticity with respect to total financial assets is 0.079).

5. Permanent vs. transitory wealth shocks

One of the core predictions of the life-cycle theory of consumption is that, when hit by unexpected wealth or income shocks, households should adjust their consumption much more when they consider the shock to be permanent rather than transitory.[21] In order to determine whether shocks are transitory or permanent, one can estimate the process generating the shocks, or rely on subjective expectations. Contreras and Nichols (2010) follow the first approach. They exploit regional variability in house price dynamics and estimate that the consumption responses to permanent shocks to housing wealth is between 3.5 and 9.2 pp, while in the case of responses to transitory shocks the MPC is between 0.5 and 3.7 pp. The second strategy, forcefully endorsed by Manski (2004), is to use subjective expectations as recorded in survey data in order to elicit information on the distribution of future shocks.[22] In the case of stock market expectations this is actually the only feasible approach, because stock market prices do not vary among individuals or geographical districts.

We follow the latter approach, and thus examine households' expectations about the course of the stock market in the near future in order to understand whether they consider the financial losses experienced during the crisis as permanent.[23] These expectations, even if not fulfilled, can induce substantial consumption adjustments. We would expect financial wealth losses to have a stronger effect on consumption for households that perceive the stock market decline to be permanent, compared to those that anticipate stock prices to recover relatively fast.

This heterogeneity in expectation formation among households can be properly studied only by using micro survey data. To that effect, we exploit the fact that in both the 2008 main survey and the Internet Survey households are asked to report the probability that blue chips shares (like those in the Dow Jones Industrial Average) will be higher in a year's time. The distribution of answers to this question in the 2008 HRS is as follows: the first quartile is equal to 30 pp, the median is 50 pp, and the third quartile equal 70 pp (the mean is 49 pp). The corresponding quartiles computed from the 2009 Internet Survey are 10, 30, and 60 pp (the mean is 37 pp). The shift of the distribution to

[21] Several studies have examined this prediction using aggregate or regional data (Lettau and Ludvigson, 2004; Luengo-Prado and Sorensen, 2008). There are also studies that use survey data in order to examine consumption responses to income shocks, and to distinguish between the effect of permanent and transitory shocks (Blundell et al., 2008). Recently, Campbell and Cocco (2007) have used survey data to investigate the impact of housing wealth fluctuations on consumption, distinguishing between anticipated and unanticipated changes in housing prices.

[22] Other papers that rely on subjective expectations to distinguish between transitory and permanent income shocks include Hayashi (1985), who used a four-quarter panel of Japanese households containing respondents' expectations about expenditure and income in the following quarter, and Pistaferri (2001), who combined income realizations and quantitative subjective income expectations contained in the Italian Survey of Household Income and Wealth (SHIW).

[23] There are no questions in the 2008 HRS on households' expectations about housing prices.

the left suggests that many households became more pessimistic in the second interview about the future course of stock prices. On the other hand, a non-trivial fraction of households in our sample (32 percent) become more positive about the stock market between the two surveys, in the sense that they reported a larger probability of a rise in the stock market in 2009 than in 2008. This upward revision in the reported probabilities likely indicates that these households consider the decline in stock prices to be temporary. Hence, their spending should be less affected by financial capital losses compared to that of households with a more pessimistic outlook on the stock market (i.e., those that report the same or a smaller probability in 2009 compared to 2008).

To check our intuition, we re-estimated our baseline model after splitting our sample between these two types of households. The results are shown in Table 7, Panels A.1 and A.2. We find that, in line with our expectations, households that consider the stock market decline as non-transitory respond quite strongly to financial capital losses. Indeed, the estimated elasticity equals 0.12, substantially higher than the one found in our basic specification for the whole sample (shown in Table 4), which was about 0.09. On the other hand, we estimate much weaker and statistically insignificant consumption adjustments by households that in 2009 revise their expectations about stock prices upwards compared to 2008.

An alternative way to check the effect of permanent and transitory wealth shocks is to split the sample based only on the expectation about higher stock prices reported in the main HRS survey in 2008. We consider households that reported a probability larger than 50 pp as likely to believe that the drop in stock prices is temporary, whereas those that reported a probability less or equal to 50 pp were considered as more likely to think of the drop as a lasting one. Once more, our estimates (shown in Panels B.1 and B.2 of Table 7) strongly suggest that households that view the stock market slump as more likely to persist respond strongly to financial capital losses (the elasticity is equal to 0.134), whereas the response of those that expect a rebound in stock prices is again weak and not significant.

It is well documented (see, e.g., Fischhoff and Bruine de Bruin, 1999) that respondents in household surveys who cannot answer a question about the probability of a future event sometimes give an answer of 50 percent instead of admitting their inability to answer. In order to check the robustness of the results discussed in this Section to this pattern of answers, we repeated all our analyses after excluding all households who gave an answer equal to 50 percent. None of our results were affected by this exclusion.

6. Robustness checks

To check the robustness of the results presented in Sections 4 and 5 we performed a number of robustness checks. Due to space constraints, we show only some of the results discussed in this Section. All results are available from the authors upon request.

First, given that the values of the percentage change in consumption lie between minus one and plus one, we redid our estimation using the PW fractional variable model (discussed in further detail in Appendix A.2), which features a conditional mean that is nonlinear in the regressors. This nonlinearity could be important because the closer this mean gets to the variable bounds, the less it should be influenced by changes in the regressors. In contrast, a linear model produces a constant effect of the regressors across all ranges of the conditional mean, hence potentially leading to an overestimation of the effect for sample units with predicted means close to the bounds. In addition, nothing prevents a linear model from predicting out of range. The results from the PW model, however, proved to be essentially identical both in sign and in magnitude to those obtained from the linear model. We conclude, therefore, that the linearity of our main statistical model is unlikely to lead to any bias in our results.

Second, instead of using as forcing variables the percentage changes in the values of the home and of financial assets, we used: (i) the quartiles of the capital gains in housing; (ii) the four levels of capital gains in total financial assets, which we described in Section 2 above. Using a categorical variable is a natural way to check whether our estimates are affected by the fact that in our data the financial capital gains variables are censored at zero. The results of our estimation are shown in Table 8, and we observe that the association of housing capital gains with the percentage change in consumption is strong and statistically significant at the top quartile: households that experience the largest capital gains (or smallest losses) increase their spending by roughly 2.4 pp compared to those with the lowest gains (or largest losses). The fact that we find a statistically significant association only for the top quartile of gains is indeed an indication of a non-linearity in the effect of housing capital gains. On the other hand, all levels of financial gains have a positive effect on the change in consumption (e.g., the effect of the highest level of financial gains is roughly equal to 3.4 pp across the four specifications). The effects of all remaining variables (including the transition into unemployment) are essentially identical to those shown in Table 4. In Appendix Table A.1 the analysis is repeated with the categorical change in consumption as the dependent variable, and the results are essentially the same as those shown in Table 5: housing gains again matter at the highest quartile, while financial gains matter at all levels. As a result, we conclude that expressing our gains

variables as categorical variables largely confirms our findings up to now; in particular, the censoring of the financial gains variable at zero has no apparent effect on our estimates.

We also estimated a specification with the categorical change in consumption as the dependent variable that includes disaggregated financial assets. Our results (shown in Appendix Table A.2) confirm those shown in Table 6 for the continuous variable denoting change in consumption, namely that gains on both housing and direct stocks are associated with increases in consumption, while the opposite is true for becoming unemployed. Importantly, we find in three out of four specifications an additional positive and economically significant association of changes in consumption with capital gains in IRAs: a 15 percent increase in the latter raises by more than 1.5 pp the probability that households spend more. Given that the prevalence of IRA ownership is larger than that of stocks, capital losses in IRAs are likely to be an important transmission channel of the effect of the financial crisis on household spending.

We then wanted to check whether the associations of capital gains with consumption differed by whether household members were retired or not. As already discussed, while households with members that still work might feel a stronger drop in their permanent income because of the recession, older households have less time to adjust their spending to any negative shocks; therefore, which of the two effects prevails is an empirical issue. When we interacted our retirement dummy with our variables denoting gains, the interaction term was insignificant, and the same was true for a dummy denoting that both partners (or the single household head) were less than 65 years old. In all cases, our results were unaffected by the inclusion of these interacted terms.

One factor that could possibly affect our results could be the perception (especially by the younger households in our sample) that permanent income has taken a negative hit during the Great Recession. This negative development could be reflected at the local level (e.g., due to the closing of a factory), and thus could affect the value of one's home. In order to control for perceived changes in permanent income, we used a question that asks the persons in our sample who work to report the probability that they will become unemployed in the next year.[24] We found that our results remained unaffected by the inclusion of this additional variable, which had a negative sign as expected but was not statistically significant.

The same probability p, when added in the specification in the form $p(1-p)$, could be used as a measure of uncertainty that households face about their future income prospects (Guiso et al., 1999). Such uncertainty has been proposed in some quarters as a reason for the drop in consumption in the

[24] We set this probability equal to zero for retirees. We tried two approaches to deal with the value of this probability for the unemployed: (i) given that they are asked about the probability that they will find a job next year, we used one minus this probability; (ii) we took the unemployed out of our sample. In neither case did our results change.

US. We find that the coefficient of our proxy for uncertainty is statistically insignificant and no change in the effect of the financial capital gains on consumption. As for housing capital losses, their effect now becomes insignificant in our baseline specification, but it remains highly significant when expressed in quartiles and also when financial capital losses are disaggregated. This is true when consumption growth is expressed both as a continuous variable and as a categorical one. As a result, we still think that the weight of the evidence indicates that housing capital gains have an economically and statistically significant effect on consumption growth.

We also tried to account for negative permanent income developments and increased uncertainty by including information at the regional level. To that effect, we used the change in the GDP per capita and in the unemployment rate from the 2nd quarter of 2008 to the corresponding quarter in 2009 for each Census Division, which is the most disaggregated regional level for which information is available in the data. We find that the a negative change in the regional GDP per capita has a strong negative effect on the growth in household consumption (a 1 percent decrease in regional GDP per capital leads to a 0.4 percent decrease in consumption), while we find a negative but statistically insignificant effect of an increase in regional unemployment (possibly because we already control for unemployment at the household level). In any case, the inclusion of these two regional-level variables leaves our main results unchanged.

We also checked whether the elasticity of consumption with respect to assets varies by the level of the assets that the household possesses (as already noted, the MPC does so because it is equal to the elasticity multiplied by the consumption to asset ratio). When we interacted, however, our variables denoting capital gains with the corresponding assets, the interaction terms were not significant. The same was true of the interaction of the gains with the amount of household debt, although, as already mentioned, the coefficient of the uninteracted debt term was negative and statistically significant. The inclusion of these interaction terms did not change the coefficients of the uninteracted capital losses terms.

We then wanted to check whether our results were affected by time effects. For example, there were considerable fluctuations in asset prices during our sample period (the S&P 500 Index increased by about 22 percent from between March and June 2009). When we included dummies for the interview month, however, our results did not change.

Given that consumption could be affected not only by financial capital gains and losses, but also by any buying or selling of financial assets, we included in our specification both dummies that denoted buying and dummies that denoted selling of each of the financial assets recorded in the

survey.[25] Once more, our results were not affected by taking into account these financial transactions.

Finally, we checked the sensitivity of our results to the weighting procedure that we used to calculate the weighted percentage capital gain, as described in Section 2. To that effect, we calculated the unweighted percentage capital gain on financial assets for any given household by taking the simple arithmetic average of the percentage gains in all the financial assets owned by that household. The estimation results obtained from using this unweighted magnitude are essentially identical to those shown in Table 4. We thus conclude that the particular weighting we use to derive the overall financial capital gain variable does not affect our results.

7. Conclusions

We have examined the effects of the recent crises in the US housing and stock markets on household spending, using recently available micro-data for the population aged fifty and above. The dataset records both capital losses and consumption changes at the household level, as well as stock market expectations between 2008 and 2009. We find that housing and financial losses have a substantial negative effect on household consumption, and the same is true if someone in the household loses his/her job. In particular, we estimate that the marginal propensities to consume with respect to housing wealth and financial wealth are 1 percent and 3.3 percent, respectively. The effects of financial losses stem primarily from directly held stocks, while there is some evidence that losses on IRAs matter as well. Our results are very robust to numerous variations in specifications, outcome variables, and forcing variables. Importantly the derived marginal propensities to consume out of both housing and financial assets are economically significant and fall within the range of estimates previously found in the literature on the effects of housing and financial wealth on consumption.

Our results imply that as long as the US housing and stock markets remain at depressed levels, and as long as the employment situation does not improve, it will not be easy to obtain a rebound in household expenditure, given that households will need to rebuild their assets position by saving. This process is unlikely to be brief because households have lost such a large chunk of their wealth, while still being saddled with considerable debt and experiencing very modest income growth.

[25] There are trivially few households in our sample who changed their home between the 2008 HRS main survey and the 2009 Internet Survey. Furthermore, the precise amounts of financial assets bought or sold are not known.

Finally, given that the effect of financial losses was found to depend on whether they are perceived as temporary or permanent, a key factor that could help the US economy recover would be the confidence that households have in the economy's prospects in the near future. As we have found, optimistic expectations about the stock market are likely to increase spending, thus helping the economy and the stock market, to recover. In turn, this could make households even more optimistic, leading to further increases in spending. All this implies that if policy makers could steer households' expectations about asset prices into a more positive direction, then this could generate a virtuous circle that could help the US economy get back on track faster.

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Appendix

A.1. Calculation of percentage losses in housing and financial assets from aggregate data

The values of capital gains/losses in housing and risky financial assets are taken from the Flow of Funds of the United States (Board of Governors of the Federal Reserve System, 2010). To compute capital gains on housing, we use data on capital gains on real estate owned by households and non-profit institutions (Table R.100, line 10). Table R.100 does not break down these capital gains/losses by residential and non-residential real estate, and the Flow of Funds does not provide separate data on capital gains for non-profit institutions. Therefore, our calculations rest on the assumptions that percentage capital gains/losses on residential real estate are similar to those on non-residential real estate, and that non-profit institutions experienced roughly the same capital losses on real estate (in percentage terms) as households. In order to compute the percentage capital losses in housing we divide the accumulated capital losses from 2006Q3 to 2009Q2 with the value of real estate owned by households and non-profit institutions at the end of 2006Q2 (Table B.100, line 3).

Our data on financial capital gains and losses come from the capital gains on corporate equities, mutual fund shares, equity in non-corporate business and life insurance and pension fund reserves as recorded in Table R.100 (lines 11-14). In order to compute the percentage capital losses in risky financial assets we cumulate the changes in asset values from 2008Q3 to 2009Q2, and then divide them by the sum of the values of corporate equities, mutual fund shares, life insurance reserves, pension fund reserves, and equity in non-corporate business at the end of 2008Q2, as recorded in Table B.100 (lines 24, 25, 27-29).

A.2. The Papke-Wooldridge fractional variable model

In the PW model the mean of the dependent variable conditional on the regressors X is assumed to be equal to $G(X\beta)$, where G denotes a function the range of which matches that of the dependent variable, and β a vector of parameters. The usual practice for variables that lie in [0,1] is to use the cumulative statistical distribution as the form of G. In our case, and since our dependent variable denoting percentage changes in consumption lies in [-1,1], we rescale it to lie in [0,1] by adding one to it and then multiplying it by one half. This linear transformation of the dependent variable simply results in a rescaling of the estimated coefficients and does not affect the results in any way. Having thus transformed our dependent variable, we choose the cumulative standard normal function to model G.

PW use a quasi-maximum likelihood estimation strategy that, under the assumption that the dependent variable has $G(X\beta)$ as a conditional mean, results in consistent estimates (Gourieroux, Monfort and Trognon, 1984). The quasi ML estimation needs to be performed by using a member of the linear exponential family of distributions, and we follow PW in choosing the Bernoulli distribution. Hence, the log likelihood of a household i reporting a percentage change y_i is given by:

$$l(y_i) = y_i \ln(G(X_i\beta)) + (1 - y_i)\ln(1 - G(X_i\beta))$$

The quasi ML approach proposed by PW has been found to perform very well in estimation problems involving fractional variables (Kieschnick and McCullough, 2003) and requires no additional assumptions about other features of the data generating process (e.g. about the variance

of the errors, which are heteroskedastic as the conditional mean approaches zero or one). Therefore, standard errors of the estimates need to be corrected for possible misspecifications of the likelihood, and hence we obtain them by using 500 bootstrap replications. As the PW model is a nonlinear one, we calculate the marginal effects and their standard errors as described in Appendix A.2 below.

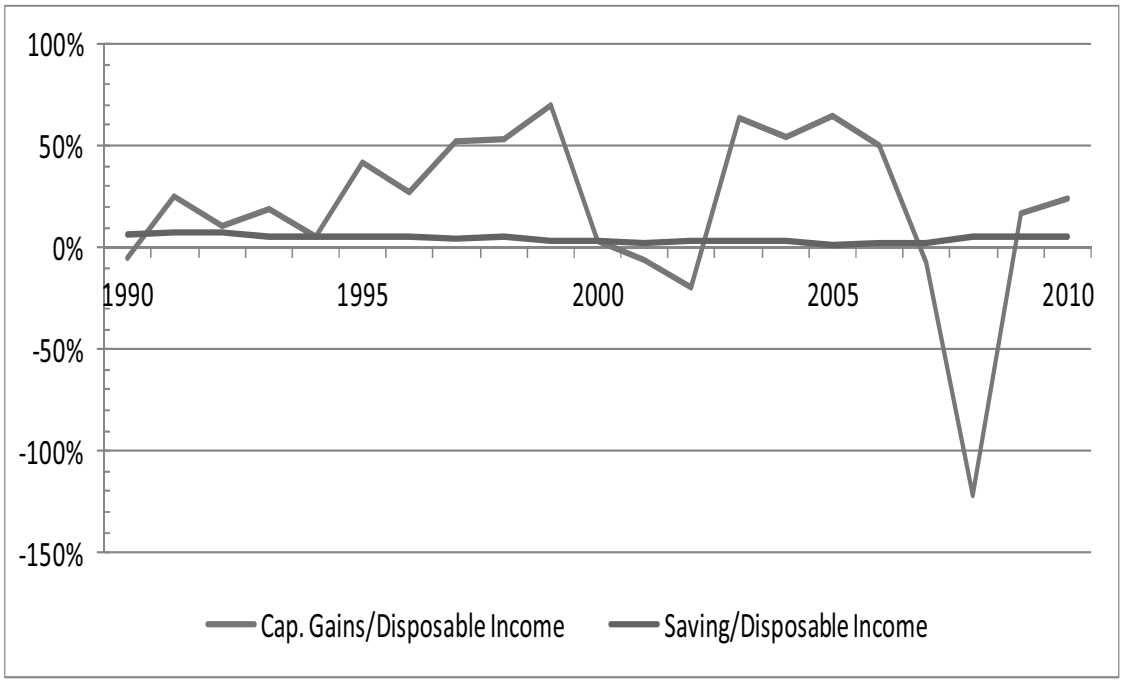
A.3. Calculation of magnitudes of interest via Monte Carlo simulation

Given that marginal effects, elasticities, and marginal propensities to consume are nonlinear functions of the estimated parameters $\hat{\beta}$, we compute their point estimates and standard errors via Monte Carlo simulation (Train, 2003) by using the formula:

$$E(g(\beta)) = \int g(\beta) f(\beta) d\beta$$

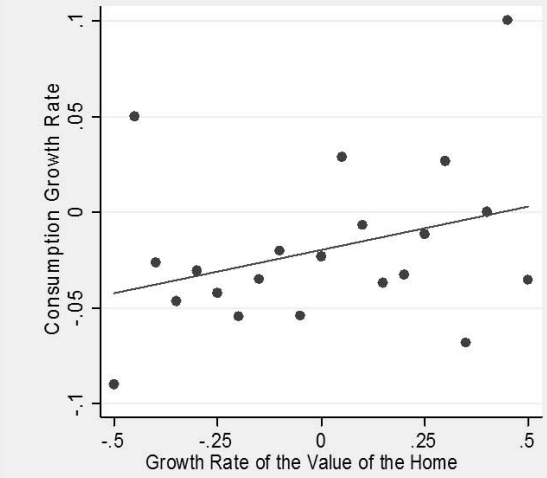
where $g(\beta)$ denotes the magnitude of interest and $f(\beta)$ the joint distribution of all the elements in β. We implement this simulation estimator by drawing 1,000 times from the joint distribution of the estimated vector of parameters $\hat{\beta}$ under the assumption that it is asymptotically normal with mean and variance-covariance matrix equal to the maximum likelihood estimates. Then, for a given parameter draw j we generate the magnitude of interest $g(\hat{\beta}^j)$. We first calculate the this magnitude for each household in our sample, and then calculate the average (median) marginal effect as the average (median) of the effect across all households in our sample. We then estimate $E(g(\beta))$ and its standard error as the mean and standard deviation, respectively, of the distribution of $g(\hat{\beta}^j)$ over all parameter draws.

Figure 1. Capital gains and saving, 1990-2010



Source: Board of Governors of the Federal Reserve System (2010). Saving and disposable income as measured in the National Income and Product Accounts. For the definition of capital gains see Appendix A.1

Figures 2. Growth rates of consumption and of the value of assets



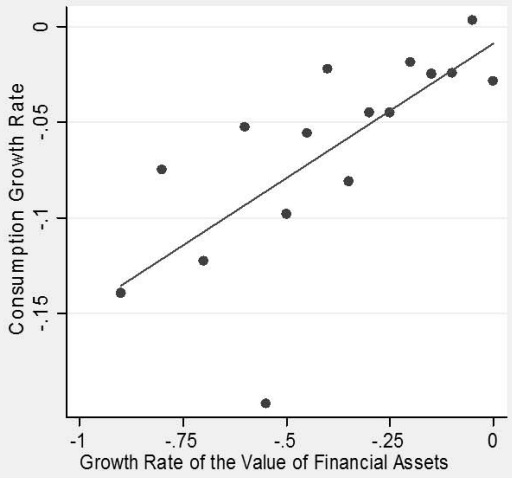


Table 1. Changes in consumption and capital gains

Gains in Assets	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Percentage Change in Consumption (Unconditional)				Qualitative Change in Consumption		
	25th quantile	50th quantile	75th quantile	Mean	Lower	Same	Higher
Panel A. Housing							
1st quartile	-0.150	0.000	0.000	-0.044	0.292	0.479	0.229
2nd quartile	-0.125	0.000	0.000	-0.041	0.278	0.535	0.187
3d quartile	-0.100	0.000	0.000	-0.029	0.222	0.566	0.212
4th quartile	0.000	0.000	0.000	-0.021	0.202	0.569	0.229
Panel B. Total Financial Assets							
1st level	-0.150	0.000	0.000	-0.060	0.272	0.559	0.170
2nd level	-0.100	0.000	0.000	-0.042	0.245	0.549	0.206
3d level	-0.050	0.000	0.000	-0.025	0.193	0.561	0.246
4th level	-0.005	0.000	0.000	-0.024	0.214	0.533	0.253

Notes: The 4th level of gains in financial assets denotes zero or positive appreciation. The remaining three levels denote the terciles of financial losses (e.g., the 1st level denotes the largest losses).
Source: 2009 HRS Internet Survey

Table 2. Capital losses in housing and financial assets

Asset	(1)	(2)	(3)	(4)	(5)	(6)
	Ownership Prevalence	Prevalence of Losses, Conditional on Ownership	Quantiles of Losses, Conditional on Having Any			
			25th quantile	50th quantile	75th quantile	Mean
Panel A. Main Residence and All Financial Assets						
Main Residence	0.890	0.534	-0.260	-0.183	-0.105	-0.199
Financial Assets	0.659	0.935	-0.354	-0.266	-0.162	-0.271
Panel B. Financial Assets in Detail						
Employer-Provided Pension Plans	0.348	0.865	-0.400	-0.300	-0.200	-0.304
Individual Retirement Accounts	0.387	0.910	-0.400	-0.300	-0.200	-0.303
Mutual Funds	0.422	0.915	-0.400	-0.300	-0.200	-0.294
Directly Held Stocks	0.312	0.834	-0.400	-0.288	-0.193	-0.312
Trusts	0.116	0.836	-0.350	-0.250	-0.150	-0.265
Other Assets Invested in Stocks	0.238	0.743	-0.350	-0.225	-0.150	-0.258

Note: Lower quantiles of losses denote larger losses (more negative gains).
Source: 2009 HRS Internet Survey

Table 3. Demographics and economic characteristics in the sample

Variable	Statistic
Age	64.41
Household Size	2.19
Becomes Unemployed Between 2008 and 2009	0.05
Becomes Retired Between 2008 and 2009	0.12
Health Deterioration Between 2008 and 2009	0.09
Couple	0.75
High School Education	0.49
More than High School	0.49
Self-reported Health Fair or Bad	0.26
Numeracy Score (max. 5)	4.54
Working	0.54
Retired	0.41
White	0.87
Household net real assets (median)	182,854
Household net financial assets (median)	65,377
Household income (median)	63,868

Notes: Figures reflect average age, household size, numeracy score, and median net real and financial assets and household income. The remaining figures denote prevalence. All magnitudes are measured at the household level as discussed in the text.
Source: 2008 HRS main survey and 2009 HRS Internet Survey.

Table 4. Elasticities and marginal propensities to consume

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
Panel A. Regression Estimates								
Age/100	0.3515	0.0540 ***	0.3302	0.0550 ***	0.3160	0.0569 ***	0.2416	0.0713 ***
Household Size	0.0084	0.0049 *	0.0094	0.0050 *	0.0091	0.0050 *	0.0065	0.0053
Becomes Unemployed			-0.1014	0.0277 ***	-0.1018	0.0277 ***	-0.0990	0.0277 ***
Becomes Retired			-0.0267	0.0123 **	-0.0278	0.0124 **	-0.0241	0.0128 *
Health Deterioration			-0.0123	0.0174	-0.0113	0.0175	-0.0143	0.0176
Household Income (IHS)					0.0019	0.0013	0.0020	0.0014
Household Net Worth (IHS)					0.0025	0.0048	0.0057	0.0050
Couple							0.0189	0.0137
High School Education							-0.0215	0.0443
More than High School							-0.0359	0.0446
Bad Health							-0.0008	0.0112
Numeracy Score							-0.0105	0.0063 *
Working							-0.0077	0.0253
Retired							0.0148	0.0245
White							-0.0127	0.0180
Percentage Change in Value of the Main Residence	0.0578	0.0305 *	0.0537	0.0307 *	0.0572	0.0309 *	0.0541	0.0308 *
Percentage Change in Value of Financial Assets	0.0887	0.0277 ***	0.0862	0.0279 ***	0.0997	0.0290 ***	0.0838	0.0294 ***
Number of Observations	1,915		1,883		1,883		1,881	
Panel B. Marginal Propensities to Consume								
Implied Marginal Propensity to Consume with Respect to the Value of the Main Residence	0.0094	0.0050 *	0.0090	0.0051 *	0.0094	0.0052 *	0.0091	0.0050 *
Implied Marginal Propensity to Consume with Respect to the Value of Financial Assets	0.0323	0.0102 ***	0.0319	0.0107 ***	0.0370	0.0110 ***	0.0321	0.0112 ***

Notes: The implied marginal propensity to consume out of the value of the main residence and out of financial assets is computed as the corresponding elasticity (which is equal to the regression coefficient) divided by the ratio of the associated asset to total expenditure. This ratio is computed using information recorded in the main HRS surveys of 2006 and 2008, and in the CAMS surveys of 2007 and 2009.*,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table 5. Categorical change in consumption

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
				Probability that Consumption is lower				
Becomes Unemployed	-..-	-..-	0.2107	0.0531 ***	0.2128	0.0534 ***	0.2063	0.0525 ***
Percentage Change in Value of the Main Residence	-0.0153	0.0068 **	-0.0149	0.0069 **	-0.0151	0.0070 *	-0.0146	0.0067 *
Percentage Change in Value of Financial Assets	-0.0240	0.0063 ***	-0.0227	0.0064 ***	-0.0246	0.0066 ***	-0.0204	0.0066 ***
				Probability that Consumption is the same				
Becomes Unemployed	-..-	-..-	-0.0720	0.0303 **	-0.0732	0.0309 **	-0.0691	0.0295 **
Percentage Change in Value of the Main Residence	-0.0006	0.0008	-0.0008	0.0008	-0.0008	0.0009	-0.0008	0.0008
Percentage Change in Value of Financial Assets	-0.0015	0.0013	-0.0017	0.0013	-0.0020	0.0014	-0.0014	0.0012
				Probability that Consumption is higher				
Becomes Unemployed	-..-	-..-	-0.1387	0.0241 ***	-0.1396	0.0238 ***	-0.1373	0.0243 ***
Percentage Change in Value of the Main Residence	0.0159	0.0073 **	0.0156	0.0075 **	0.0159	0.0075 **	0.0153	0.0072 **
Percentage Change in Value of Financial Assets	0.0255	0.0072 ***	0.0244	0.0073 ***	0.0266	0.0075 ***	0.0218	0.0073 ***
Number of Observations	1,940		1,907		1,907		1,905	

Notes: Marginal effects of the percentage changes in the values of the main residence and of financial assets are computed after assuming a change of 15 pp in the two underlying variables. *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table 6. Elasticities of consumption obtained using disaggregated financial assets

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
Age/100	0.3255	0.0514 ***	0.3049	0.0523 ***	0.2882	0.0535 ***	0.2378	0.0670 ***
Household Size	0.0065	0.0047	0.0077	0.0048	0.0073	0.0048	0.0051	0.0051
Becomes Unemployed			-0.1005	0.0263 ***	-0.1008	0.0263 ***	-0.0994	0.0263 ***
Becomes Retired			-0.0161	0.0116	-0.0172	0.0116	-0.0145	0.0121
Health Deterioration			-0.0041	0.0170	-0.0028	0.0170	-0.0037	0.0172
Household Income (IHS)					0.0022	0.0013 *	0.0024	0.0013 *
Household Net Worth (IHS)					0.0028	0.0046	0.0060	0.0049
Couple							0.0142	0.0129
High School Education							-0.0177	0.0435
More than High School							-0.0321	0.0439
Bad Health							0.0052	0.0103
Numeracy Score							-0.0107	0.0058 *
Working							-0.0029	0.0242
Retired							0.0127	0.0235
White							-0.0163	0.0167
Percentage Change in Value of the Main Residence	0.0704	0.0285 **	0.0665	0.0289 **	0.0692	0.0290 **	0.0668	0.0288 **
Percentage Change in Value of Employer-Provided Pension Plans	0.0107	0.0274	0.0126	0.0277	0.0171	0.0282	0.0119	0.0283
Percentage Change in Value of IRAs	0.0372	0.0277	0.0329	0.0275	0.0417	0.0276	0.0316	0.0274
Percentage Change in Value of Mutual Funds	0.0208	0.0288	0.0136	0.0286	0.0218	0.0288	0.0179	0.0289
Percentage Change in Value of Stocks Directly Held	0.0880	0.0252 ***	0.0776	0.0251 ***	0.0830	0.0252 ***	0.0785	0.0254 ***
Percentage Change in Value of Trusts	-0.0181	0.0403	-0.0029	0.0413	-0.0008	0.0414	-0.0014	0.0421
Percentage Change in Value of Other Assets Invested in Stocks	0.0052	0.0345	0.0100	0.0352	0.0103	0.0353	0.0044	0.0349
Number of Observations	2,235		2,193		2,193		2,191	

Notes: *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table 7. Consumption and changes in expectations about the stock market between the 2008 and 2009 surveys

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
Panel A1. Negative or zero change in the reported probability of a rise in stock prices								
Percentage Change in Value of Financial Assets	0.1192	0.0359 ***	0.1129	0.0357 ***	0.1291	0.0363 ***	0.1214	0.0367 ***
Number of Observations	1,015		1,001		1,001		1,000	
Panel A2. Positive change in the reported probability of a rise in stock prices								
Percentage Change in Value of Financial Assets	0.0739	0.0537	0.0799	0.0546	0.0643	0.0576	0.0665	0.0555
Number of Observations	483		473		473		472	
Panel B1. Reported probability in 2008 of a rise in stock prices equal to .5 or lower								
Percentage Change in Value of Financial Assets	0.1390	0.0394 ***	0.1403	0.0394 ***	0.1369	0.0414 ***	0.1195	0.0414 ***
Number of Observations	916		904		904		903	
Panel B2. Reported probability in 2008 of a rise in stock prices higher than .5								
Percentage Change in Value of Financial Assets	0.0378	0.0398	0.0335	0.0399	0.0536	0.0406	0.0496	0.0414
Number of Observations	765		748		748		747	

Notes: *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table 8. Changes in consumption using quartiles of changes in asset values

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
Age/100	0.3525	0.0543 ***	0.3311	0.0554 ***	0.3136	0.0572 ***	0.2386	0.0716 ***
Household Size	0.0082	0.0049 *	0.0093	0.0050 *	0.0089	0.0050 *	0.0065	0.0053
Becomes Unemployed			-0.1008	0.0277 ***	-0.1017	0.0278 ***	-0.0982	0.0278 ***
Becomes Retired			-0.0263	0.0124 **	-0.0273	0.0124 **	-0.0232	0.0129 *
Health Deterioration			-0.0134	0.0174	-0.0123	0.0174	-0.0151	0.0175
Household Income (IHS)					0.0020	0.0014	0.0021	0.0014
Household Net Worth (IHS)					0.0026	0.0048	0.0058	0.0050
Couple							0.0177	0.0137
High School Education							-0.0227	0.0442
More than High School							-0.0388	0.0446
Bad Health							0.0011	0.0114
Numeracy Score							-0.0105	0.0064
Working							-0.0076	0.0254
Retired							0.0159	0.0245
White							-0.0141	0.0181
2nd Quartile of Percentage Change in Value of the Main Residence	0.0023	0.0154	0.0032	0.0155	0.0023	0.0156	0.0039	0.0155
3d Quartile of Percentage Change in Value of the Main Residence	0.0216	0.0152	0.0212	0.0155	0.0214	0.0155	0.0234	0.0155
4th Quartile of Percentage Change in Value of the Main Residence	0.0307	0.0138 **	0.0305	0.0138 **	0.0327	0.0138 **	0.0329	0.0137 **
2nd Level of Percentage Change in Value of Financial Assets	0.0260	0.0118 **	0.0254	0.0118 **	0.0247	0.0118 **	0.0234	0.0119 **
3d Level of Percentage Change in Value of Financial Assets	0.0378	0.0117 ***	0.0373	0.0117 ***	0.0371	0.0117 ***	0.0358	0.0117 ***
4th Level of Percentage Change in Value of Financial Assets	0.0346	0.0126 ***	0.0331	0.0126 ***	0.0401	0.0134 ***	0.0305	0.0137 **
Number of Observations	1,915		1,883		1,883		1,881	

Notes: *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table A1. Categorical changes in consumption using quartiles of changes in asset values

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
				Probability that Consumption is lower				
Becomes Unemployed	-..-	-..-	0.2067	0.0531 ***	0.2095	0.0534 ***	0.2022	0.0524 ***
3d Quartile of Percentage Change in Value of the Main Residence	-0.0197	0.0298	-0.0170	0.0297	-0.0171	0.0292	-0.0204	0.0294
4th Quartile of Percentage Change in Value of the Main Residence	-0.0563	0.0233 **	-0.0526	0.0240 **	-0.0549	0.0238 *	-0.0556	0.0247 *
2nd Level of Percentage Change in Value of Financial Assets	-0.0620	0.0243 **	-0.0605	0.0239 **	-0.0601	0.0239 *	-0.0537	0.0232 *
3d Level of Percentage Change in Value of Financial Assets	-0.0894	0.0247 ***	-0.0824	0.0244 ***	-0.0843	0.0252 ***	-0.0755	0.0245 ***
4th Level of Percentage Change in Value of Financial Assets	-0.0670	0.0225 ***	-0.0642	0.0228 ***	-0.0708	0.0248 ***	-0.0524	0.0240 *
				Probability that Consumption is the same				
Becomes Unemployed	-..-	-..-	-0.0697	0.0302 **	-0.0714	0.0305 **	-0.0670	0.0294
2nd Quartile of Percentage Change in Value of the Main Residence	-0.0042	0.0060	-0.0038	0.0057	-0.0042	0.0062	-0.0033	0.0057
3d Quartile of Percentage Change in Value of the Main Residence	0.0021	0.0039	0.0017	0.0037	0.0017	0.0039	0.0020	0.0038
4th Quartile of Percentage Change in Value of the Main Residence	0.0016	0.0038	0.0009	0.0036	0.0009	0.0037	0.0012	0.0036
2nd Level of Percentage Change in Value of Financial Assets	0.0079	0.0048 *	0.0066	0.0045	0.0074	0.0049	0.0050	0.0041
3d Level of Percentage Change in Value of Financial Assets	0.0053	0.0054	0.0043	0.0053	0.0054	0.0055	0.0027	0.0048
4th Level of Percentage Change in Value of Financial Assets	0.0079	0.0047 *	0.0066	0.0045	0.0072	0.0048	0.0052	0.0040
				Probability that Consumption is higher				
Becomes Unemployed	-..-	-..-	-0.1370	0.0243 ***	-0.1381	0.0242 ***	-0.1352	0.0243 ***
2nd Quartile of Percentage Change in Value of the Main Residence	-0.0188	0.0245	-0.0196	0.0255	-0.0200	0.0254	-0.0166	0.0243
3d Quartile of Percentage Change in Value of the Main Residence	0.0176	0.0267	0.0154	0.0270	0.0153	0.0262	0.0184	0.0266
4th Quartile of Percentage Change in Value of the Main Residence	0.0547	0.0210 ***	0.0517	0.0220 **	0.0541	0.0216 **	0.0545	0.0226 **
2nd Level of Percentage Change in Value of Financial Assets	0.0542	0.0211 **	0.0539	0.0212 **	0.0527	0.0208 **	0.0488	0.0207 **
3d Level of Percentage Change in Value of Financial Assets	0.0841	0.0234 ***	0.0781	0.0233 ***	0.0790	0.0236 ***	0.0728	0.0234 ***
4th Level of Percentage Change in Value of Financial Assets	0.0591	0.0192 ***	0.0576	0.0197 ***	0.0637	0.0216 ***	0.0472	0.0210 **
Number of Observations	1,940		1,907		1,907		1,905	

Notes: Marginal effects of the percentage changes in the values of the main residence and of financial assets are computed after assuming a change of 15 pp in the two underlying variables. *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

Table A2. Changes in consumption (categorical) using changes in the values of disaggregated financial assets

Variable	Model 1		Model 2		Model 3		Model 4	
	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error	Marg. Eff.	Std. Error
				Probability that Consumption is lower				
Becomes Unemployed	-..-	-..-	0.2090	0.0513 ***	0.2109	0.0513 ***	0.2059	0.0510 ***
Percentage Change in Value of the Main Residence	-0.0146	0.0061 **	-0.0136	0.0063 **	-0.0139	0.0063 *	-0.0137	0.0060 *
Percentage Change in Value of Employer-Provided Pension Plans	-0.0033	0.0068	-0.0028	0.0070	-0.0029	0.0069	-0.0030	0.0069
Percentage Change in Value of IRAs	-0.0133	0.0067 **	-0.0128	0.0070 **	-0.0146	0.0068 *	-0.0119	0.0072 *
Percentage Change in Value of Mutual Funds	-0.0080	0.0075	-0.0056	0.0077	-0.0069	0.0075	-0.0050	0.0076
Percentage Change in Value of Stocks Directly Held	-0.0269	0.0064 ***	-0.0243	0.0063 ***	-0.0255	0.0065 ***	-0.0251	0.0063 ***
Percentage Change in Value of Trusts	0.0007	0.0123	-0.0042	0.0121	-0.0037	0.0126	-0.0032	0.0119
Percentage Change in Value of Other Assets Invested in Stocks	0.0020	0.0095	0.0008	0.0097	0.0009	0.0096	0.0013	0.0092
				Probability that Consumption is the same				
Becomes Unemployed	-..-	-..-	-0.0699	0.0295 **	-0.0709	0.0292 **	-0.0679	0.0287 **
Percentage Change in Value of the Main Residence	-0.0008	0.0008	-0.0009	0.0008	-0.0009	0.0008	-0.0009	0.0007
Percentage Change in Value of Employer-Provided Pension Plans	-0.0002	0.0004	-0.0002	0.0004	-0.0002	0.0004	-0.0002	0.0004
Percentage Change in Value of IRAs	-0.0007	0.0008	-0.0009	0.0009	-0.0010	0.0010	-0.0008	0.0008
Percentage Change in Value of Mutual Funds	-0.0004	0.0007	-0.0004	0.0006	-0.0004	0.0006	-0.0003	0.0006
Percentage Change in Value of Stocks Directly Held	-0.0024	0.0015	-0.0023	0.0015	-0.0025	0.0016	-0.0024	0.0014 *
Percentage Change in Value of Trusts	-0.0004	0.0007	-0.0005	0.0009	-0.0005	0.0009	-0.0005	0.0008
Percentage Change in Value of Other Assets Invested in Stocks	-0.0002	0.0005	-0.0002	0.0005	-0.0002	0.0005	-0.0002	0.0005
				Probability that Consumption is higher				
Becomes Unemployed	-..-	-..-	-0.1392	0.0230 ***	-0.1400	0.0233 ***	-0.1379	0.0235 ***
Percentage Change in Value of the Main Residence	0.0154	0.0066 **	0.0145	0.0068 **	0.0147	0.0069 **	0.0146	0.0065 **
Percentage Change in Value of Employer-Provided Pension Plans	0.0035	0.0070	0.0030	0.0072	0.0031	0.0071	0.0032	0.0071
Percentage Change in Value of IRAs	0.0140	0.0073 *	0.0137	0.0077 **	0.0156	0.0075 **	0.0127	0.0078
Percentage Change in Value of Mutual Funds	0.0084	0.0080	0.0059	0.0081	0.0074	0.0079	0.0053	0.0080
Percentage Change in Value of Stocks Directly Held	0.0293	0.0075 ***	0.0266	0.0074 ***	0.0280	0.0077 ***	0.0275	0.0074 ***
Percentage Change in Value of Trusts	-0.0004	0.0124	0.0047	0.0127	0.0042	0.0131	0.0037	0.0123
Percentage Change in Value of Other Assets Invested in Stocks	-0.0018	0.0095	-0.0006	0.0099	-0.0007	0.0098	-0.0011	0.0093
Number of Observations	2,267		2,223		2,223		2,221	

Notes: Marginal effects of the percentage changes in the values of the main residence and of financial assets are computed after assuming a change of 15 pp in the variable of interest. *,**,*** denote statistical significance at 10%, 5% and 1%, respectively. We calculate robust standard errors.

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