

Wealth and Consumption: French Households in the Crisis*

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Relying on an original household survey (PATER survey), we document how the 2008–9 crisis affected households' wealth, expectations, and consumption plans in France. We then show that households experiencing losses relating to their housing or their financial wealth were more likely to change their plans by reducing consumption expenditure. Moreover, our results suggest a certain degree of heterogeneity in consumption reaction across individuals depending on their level of wealth, on the composition of their consumption basket, and on the type of shocks experienced (gains/losses). Besides the direct wealth effect, our results also provide evidence of the role played by changes in expectations on consumption plans (confidence channel).

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“The principal objective factors which influence the propensity to consume appear to be the following: [. . .]

(3) Windfall changes in capital-values not allowed for in calculating net income.”

John Maynard Keynes,
The General Theory of Employment, Interest, and Money,
Book III, Chapter 8

1. Introduction

In a financial and economic crisis, households face a high level of uncertainty regarding the evolution of financial and real estate prices,¹ increasing labor market risks, and stronger financial constraints. In this context, it has become crucial to measure how households are impacted by the financial crisis and the Great Recession in order to assess whether the “unexpected” turmoil acts as a drag on recovery by significantly and lastingly altering households’ saving and consumption behavior.

According to the life-cycle theory, households use wealth accumulation to smooth consumption over their life cycle (Ando and Modigliani 1963). Consequently, any unexpected changes in wealth, resulting from unanticipated developments in stock or housing prices, may lead households to revise their consumption plans. The question of the impact of wealth variations on household consumption has been widely studied in the macroeconomic literature and is a crucial issue in forecasting models (see, among others, Modigliani 1971, Aron et al. 2010, Buiter 2010, Muellbauer 2010, and Carroll, Otsuka, and Slacalek 2011). In the case of France, small but significant wealth effects on consumption are found in aggregate data (Slacalek 2009 and Chauvin and Damette 2010): the marginal propensity to consume out of wealth ranges from eight-tenths of a cent to one cent on annual consumption for every one-euro increase. However, a number of shortcomings have been identified with respect to estimates based on aggregate data, and this paper is the first study

¹For example, in France, the real estate prices decreased by 7 percent over the year 2008 and the stock market index dropped dramatically by 40 percent over the same period.

to use micro data on the impact of wealth changes on consumption for France.

Obviously, the heterogeneity in households' consumption reaction due to differences in wealth, age, or portfolio composition cannot be accounted for with macro data. But a more important point is that some key missing common determinants (such as households' expectations) may induce a spurious correlation between wealth and consumption (see, for instance, Attanasio et al. 2009 or Carroll, Otsuka, and Slacalek 2011). Microeconomic surveys on household finances and consumption help to counter these shortcomings. Recent micro-data-based estimates show differences in the impact of wealth on consumption according to age, homeownership, or level of wealth (e.g., Bover 2005, Guiso, Paiella, and Visco 2005, Campbell and Cocco 2007, Paiella 2007, Attanasio et al. 2009, or Disney, Gathergood, and Henley 2010). Moreover, self-assessed expectations collected in household surveys play a significant role in explaining consumption changes (Jappelli and Pistaferri 2000, Pistaferri 2001, or Disney, Gathergood, and Henley 2010). This leads us to consider an additional channel by which asset price variations may have an effect on consumption: unexpected changes in asset prices may cause households to revise their future income expectations, and thus to alter their consumption plans. This indirect effect is known as the *confidence channel* (Poterba 2000, Fenz and Fessler 2008).

This paper aims to contribute to this literature by focusing on the recent crisis and by investigating the respective roles played by changes in wealth and changes in expectations over the 2007–9 period in modifying household consumption plans. This empirical analysis is based on an original household survey (the 2009 PATER survey) that provides *qualitative* information on financial and housing losses/gains as well as on consumption plans at the household level. More precisely, the qualitative data at our disposal are (i) households' expectations of spending changes in their consumption basket (food, transport, health, housing, etc.) and (ii) the subjective probabilities assigned by households of a fall in their future overall spending. We are also able to control for various factors that could affect the direct wealth effect estimates. Indeed, we isolate households that experienced a decrease (or an increase) in their wealth caused by asset price variations (and which does not reflect changes

in their savings behavior or investment strategies, for instance). We also take into account the households' past unemployment history (through retrospective questions about unemployment episodes) as well as their income risk (as perceived by the respondents) to control for precautionary saving. While wealth effects can only be estimated on the 2009 cross-section,² we nevertheless take advantage of the panel component of the PATER survey to control for changes in households' asset price and unemployment expectations between the 2007 and 2009 waves.

Our estimates confirm the significant direct wealth effect on consumption in France, stemming both from housing and financial assets. This impact of wealth changes on consumption plans is decreasing with the level of wealth: wealthy households are less likely to reduce their consumption due to financial losses than less wealthy ones.

All expenses are affected by changes in wealth. It seems, however, that changes in financial wealth have stronger effects on highly income-elastic expenses (culture and clothing) than on less income-elastic ones (transport services, health, and food). In addition, there are asymmetries in households' reaction to positive *versus* negative financial wealth variations, the quantitative impact of a negative financial shock being smaller than a positive one.

As regards the role played by household expectations, we find that changes in expectations³ have a significant impact on households' consumption plans: the households pessimistic about stock returns are more likely to reduce their consumption. We also find unemployed people as well as people with periods of unemployment in the past more likely to reduce their consumption, which could be due to specific background risks affecting these individuals. Finally, we obtain some evidence of differences in consumption

²This is because information of consumption plans was only collected in the 2009 wave.

³When comparing the subjective expectations of the same individuals in 2007 and in 2009, we find that, on average, French households were more pessimistic in 2009 than before the crisis (in 2007), as has already been shown for the United States (see Hurd and Rohwedder 2010). A brief descriptive analysis shows that individual experiences (i.e., age, unemployment experiences, or wealth shocks) are correlated with the formation of expectations.

reaction depending on the consumers' perception of the persistence of the crisis.

This paper is organized as follows. A brief overview of the micro-data-based literature about wealth effects on consumption is provided in section 2. We then focus on the recent crisis and document in section 3 how households perceived changes in their financial and housing wealth and how they adjusted their expectations over the 2007–9 period. Finally, we investigate the determinants of consumption plans using household self-assessed qualitative information about their consumption plans, changes in their housing and financial wealth, and changes in expectations in section 4. Section 5 concludes.

2. Direct Wealth Effects and the Role of Expectations

One of the main implications of the life-cycle theory and permanent-income hypothesis is that current consumption is proportional to total wealth (i.e., the sum of real non-human wealth and real human wealth, the latter being defined as the present value of expected future income). As an illustration, let us consider a very simple framework with a zero interest rate, no time preference, no bequest motive, and no uncertainty. Consumption C_t at time t is the sum of present income, denoted by Y_t , expected future income and present wealth, W_t , divided by the expected number of remaining periods ($T - t$ if the horizon is T):

$$C_t = \frac{W_t + \sum_{k=t}^T Y_k}{T - t}. \quad (1)$$

In this framework, consumption is constant over the life cycle unless there are any unexpected changes in asset value (W_t).⁴ This link between consumption and wealth is known as the “direct wealth

⁴The empirical literature suggests that this impact of wealth on consumption differs between permanent and transitory shocks. Lettau and Ludvigson (2004) emphasize, using U.S. aggregate data, that while most wealth changes reflect transitory shocks, only permanent changes in wealth affect aggregate consumption. Using household-level data, Contreras and Nichols (2010) confirm that the reaction of consumption to housing wealth depends on the temporal persistence and on the variance of the shocks.

effect.” Indeed, a positive correlation between consumption and wealth is generally found both on aggregate data (e.g., Lettau and Ludvigson 2004; Case, Quigley, and Shiller 2005, 2011; Calomiris, Longhofer, and Miles 2009; or Carroll, Otsuka, and Slacalek 2011) and on household-level data (e.g., Bover 2005, Guiso, Paiella, and Visco 2005, Campbell and Cocco 2007, Paiella 2007, Attanasio et al. 2009, or Disney, Gathergood, and Henley 2010). These papers also point out some differences in consumption reactions to changes in housing and to changes in financial wealth that could be due to various factors (liquidity, taxes, collateral effect of housing, etc.). Most of the micro-data-based papers find lower, albeit significant, wealth effects. A one-euro increase in housing wealth results in an increase of 1.5 to 3 cents in annual consumption in Italy and Spain (Bover 2005, Guiso, Paiella, and Visco 2005, and Paiella 2007). For Italy, Paiella (2007) finds a larger marginal propensity to consume out of financial wealth (9.2 cents of annual consumption) than out of housing wealth (2.4 cents). In some other countries, financial wealth does not significantly affect consumption: Spain (Bover 2005), Finland (Sierminska and Takhtamanova 2007), and the United States (Bostic, Gabriel, and Painter 2009).

Many recent papers (Campbell and Cocco 2007, Attanasio et al. 2009, Contreras and Nichols 2010, and Gan 2010) focus on housing wealth, as higher real house prices stimulate consumption by inducing a direct wealth effect but also by relaxing borrowing constraints by raising the collateral value of housing. This could lead to larger effects of house prices on consumption for homeowners than for renters, as shown by Campbell and Cocco (2007).

However, as underlined in equation (1), consumption is also impacted by income expectations, resulting in an indirect effect, the so-called confidence channel through which asset prices are also likely to impact consumption. That is why several papers (e.g., King 1990, Poterba 2000, Attanasio et al. 2009, Calomiris, Longhofer, and Miles 2009, and Carroll, Otsuka, and Slacalek 2011) claim that the correlation obtained by regressing consumption on wealth and by controlling for current income does not necessarily reflect a causal effect. Indeed, if consumption and asset price developments are both driven by a permanent-income shift, this correlation may be spurious. For instance, Attanasio et al. (2009) show that young people

are more impacted by changes in local house prices than old people, and they argue that this effect results from changes in expectations about permanent income which are correlated with changes in house prices. According to the empirical literature on the permanent-income hypothesis (see Jappelli and Pistaferri 2000, Pistaferri 2001, or Jappelli and Pistaferri 2009 for a recent survey), households' self-assessed expectations about future income help to distinguish the direct wealth effect from the confidence effect. Disney, Gathergood, and Henley (2010) adopt this approach using UK data and conclude that not taking into account financial expectations may lead to over-estimating the wealth effect on consumption.

3. Perceptions and Reactions to the 2008–9 Crisis

3.1 Data

3.1.1 Source

The PATER household survey was first conducted by the French National Statistical Institute (Insee) in 1998 and then in 2002, 2007, and in 2009 upon our own initiative. This survey mainly focuses on preferences (risk aversion, time preference, altruism, and impatience for the short term). It also covers a wide range of topics regarding households' saving behavior (see Arrondel and Masson 2009).⁵ In particular, it provides data regarding households' self-assessed expectations relative to the economic environment (house and stock prices five years ahead, duration of the crisis, etc.) and expectations relative to each individual situation (expected increase/decrease in income, chances of future job loss, health risks). Moreover, it includes information on household wealth (financial wealth, housing wealth,

⁵The PATER survey can be viewed as complementary to the French wealth survey (Enquête Patrimoine) conducted by the French National Statistical Institute (Insee). The French wealth survey aims at collecting very detailed information on household wealth (housing wealth, financial wealth and business assets, loans) and at providing reliable measures of households' assets and debt, while the PATER survey focuses on households' preferences, anticipations, financial literacy, etc.

debt, portfolio components)⁶ and the traditional sociodemographic characteristics (age, household composition, education, social status, activity, etc.).

In the 2009 survey, new (qualitative) questions about consumption plans and wealth losses/gains were added, so as to estimate wealth effects on consumption on the 2009 cross-section. Changes in future planned consumption are elicited with two complementary questions⁷ concerning (i) the expected developments in households' consumption basket over the twelve coming months and (ii) the subjective probabilities assigned by households to a reduction in future spending. The qualitative information about wealth changes covers losses/gains recorded by households over the past two years (for financial assets) and over the past five years (for housing wealth). It is possible to identify the existence of changes in wealth that are due to price developments and those resulting from changes in households' saving behavior or portfolio choices.

In order to control for the confidence effect, we take advantage of the panel component of individuals that were surveyed in the previous wave of May 2007 to compute changes in self-assessed expectations between 2007 and 2009 for households surveyed in both waves. This leads us to consider three sub-samples, detailed below.

3.1.2 Sample Definition

The 2009 paper questionnaire of the PATER survey was sent to a sample of 5,000 households representative⁸ of the population in France. The response rate was high, so the final sample consists of 3,783 households. Given the complexity of the probability questions concerning consumption plans and (even more so) those concerning subjective expectations, we have to deal with non-responses to

⁶Most of the information concerning wealth and assets holdings is qualitative. However, quantitative measures of total wealth, housing wealth, and financial wealth are also collected (amounts given in brackets). Financial wealth is defined as all kinds of household financial assets (sight and saving accounts, mutual funds, bonds, shares, etc., excluding business wealth). Housing wealth includes households' main residence and other properties (secondary residences or rented properties).

⁷Similar questions are asked in the American Life Panel (see, for instance, Hurd and Rohwedder 2010).

⁸The respondents are sampled in the TNS-SOFRES metascope panel (30,000 households).

these questions. Among the 3,783 households that participated in the 2009 survey, 3,468 of them answered the questions about consumption plans. We define this sample as sample I. If we consider the households already surveyed in May 2007, the sample is reduced to 2,241 households. Among these 2,241 households of the 2007–9 panel, we define two sub-samples for robustness checks. First, we select households that answered the question on expectations regarding job insecurity (probability of being unemployed) in 2009 to control for precautionary saving and for whom future stock returns in 2007 can be elicited (in order to test for differences in expected/non-expected wealth changes). This yields a sample of 1,163 households (defined as sample II). Second, we restrict this sub-sample to households for whom expectations about stock markets are also given in the 2009 wave to test for the impact of changes in expectations on consumption plans over the 2007–9 period. This is the case for 903 households, defined as sample III. Descriptive statistics for the main variables in the three sub-samples are provided in table 9 in appendix 2 and the issue of sample selection is discussed in section 4.2.

3.2 Consumption Plans during the Crisis

According to the national accounts,⁹ the annual growth rate of consumption expenditure dropped from 2.3 percent to 0.1 percent between 2007 and 2009 and slightly increased to just 1.3 percent in 2010. The growth rate of the purchasing power of gross income was relatively stable and low compared with the pre-crisis period (0.4 percent in 2008 compared with 3.0 percent in 2007) and the savings rate increased significantly (from 15.5 percent in 2008 to 16.5 percent in 2009), leading to a reduction in the consumption rate.

With the PATER survey, we are able to observe how French households were planning to adapt their consumption plans in June 2009 with the following question: “According to you, what are the consequences of the financial crisis on your personal situation in the twelve coming months concerning the amount of your expenses: I will reduce my spending with a (high, medium, low, very low) probability.” More than 60 percent of respondents¹⁰ were expecting to

⁹Source: National accounts, Insee. (Available on http://www.insee.fr/en/themes/comptes-nationaux/tableau.asp?sous_theme=2.3&xml=t_2202p).

¹⁰Results were obtained on the weighted sample representative of the population in France.

Table 1. Percentage of Respondents Planning to Reduce Consumption Expenditure by Categories of Goods and Services

	Percentage of Households Planning to Reduce the Considered Expenditure	Share of the Category of Goods or Services in the Aggregate Consumption (Source: Insee)
Food	60.9	25.0
Housing	72.4	18.8
Transport	41.3	17.6
Textiles	68.5	9.0
Health	43.3	4.2
Technological Products	64.3	5.9
Cultural Goods	72.6	9.7
Other Services	—	11.1
Balance	—	−1.2

Source: PATER survey (2009)—weighted sample representative of French households, and Insee.

reduce their overall consumption expenditure with a *very high* or *high* probability. Then detailed questions about categories of consumption expenditures are asked: “Personally, do you think that the turmoil affects or will affect each of the following expenses¹¹: by buying less, by buying cheaper, by postponing your project, by abandoning your project, or that it will have no effect?” According to this information, households were mainly expecting consumption changes related to their homes such as furnishings, equipment, and energy consumption (about 72 percent of respondents), as well as textiles (68.5 percent of respondents) and cultural goods and services (72.6 percent of respondents; see table 1). Before turning to

¹¹The list of considered spending is the following: food, housing, transport (public transport, car maintenance), textiles (clothes, shoes), health, technological products (TV, computer, mobile phone, etc.), and cultural goods (books, DVDs, theater, cinema, tourism).

Table 2. Households' Wealth in France: Main Assets

	Participation Rate (percentage)	Median Value (thousand euros)
Main Residence	55.3	193.8
Other Real Estate Property	24.7	115.9
Self-Employment Business Wealth	8.9	53.1
Deposits	99.6	6.5
Mutual Funds	10.7	6.9
Bonds	1.7	12.0
Shares Publicly Traded	14.7	6.9
Whole Life Insurance/ Voluntary Private Pensions	37.5	10.6

Source: HFCS-French wealth survey (Insee), ECB (2013).
Note: Median values are computed conditionally on participation.

our main issue—i.e., estimating the impact of the key factors that could explain these changes in consumption plans—we provide some descriptive statistics on wealth losses reported by households as well as on their changes in expectations.

3.3 Changes in Wealth at the Household Level

According to the national accounts data, average gross wealth decreased by 4 percent over 2008 in France (−7 percent for financial wealth). At the household level, the household's mean net wealth is estimated at around 233,400 euros (in 2010; see European Central Bank 2013). Real estate property is the main component of households' total assets. It represents about 50 percent of the households' total assets, financial assets represent about 30 percent, and other assets (business wealth, valuables, vehicles) represent about 20 percent. The homeownership rate is 55.3 percent and, in most cases, the household main residence is the most valuable asset for the households (see table 2). About 20 percent of households are stockholders, either directly or indirectly through mutual funds.

Table 3. Financial Wealth Changes 2007–9: Percentage of Households

Wealth Variation	Because of	Percentage
Decrease	The value of your assets decreased.	35.8
	You sold, at least partly, your assets.	28.4
Stable		6.1
		36.1
Increase		14.4
	The value of your assets increased.	4.4
No Answer or Not Concerned	You realized some gains that you invested again.	0.6
	You saved more.	9.1
		15.3

Source: PATER survey (2009)—weighted sample representative of the population in France.

Notes: Financial wealth changes are elicited by asking sequentially (i) “According to you, did your financial asset (a) increase, (b) remain stable, or (c) decrease over the past two years?” If the answer is (a) (increase), “Is it because (i) the value of the financial assets you owned has increased (returns, dividends, asset value), (ii) you realized some gains that you invested again, or (iii) you saved more?” If the answer is (b) (stable), “The value of your assets remained stable because (i) you did not rebalance your portfolio, (ii) you registered gains on some assets and losses on other ones and the profits offset the losses, or (iii) you rebalanced your portfolio by selling some assets and buying other ones and the value of your portfolio did not change.” If the answer is (c) (decrease), “Is it because (i) the value of your assets decreased or (ii) you sold some assets?”

Based on our PATER survey, a preliminary descriptive analysis¹² underlines some heterogeneity in the perception of wealth changes over the crisis.

About 35.8 percent of the respondents reported that their financial wealth decreased over 2007–9 (see table 3). This shift mainly reflected a fall in financial asset prices (for 28.4 percent of individuals). At the opposite, some individuals (14.4 percent) reported

¹²This analysis is based on qualitative information on gains/losses reported by respondents. As the PATER survey does not aim at measuring wealth, quantitative information on wealth is only collected in brackets and cannot be used to compute accurate measures of wealth changes over 2007–9. Detailed information on households’ portfolio based on the French wealth survey (Enquête Patrimoine, Insee) can be found in European Central Bank (2013).

that the value of their financial wealth increased, mainly because they saved more (9 percent). However, 4.4 percent actually declared that the value of their financial assets had increased. For 36.1 percent of respondents, their financial wealth remained stable over the period. Bricker et al. (2011) identified a similar pattern for American families (losses, but also gains for some of them), but with a substantially broader negative impact¹³ since 63 percent of American families declared wealth reductions.

As all individuals are not affected to the same extent by these wealth shocks, we estimate an ordered probit model to determine the main characteristics of households experiencing losses (see table 4). We define a qualitative ordered dependent variable that reflects the gains/losses which are only due to changes in asset values (see appendix 1 for the definitions of variables). We obtain that the probability of facing financial losses is significantly higher for individuals holding stocks or mutual funds, as they are obviously the most likely to be affected by the drop in stock prices. A positive and increasing correlation with age is also found: individuals between ages 55 and 64 are the most likely to declare financial losses. The level of financial wealth as well as “never” or “rarely” reading financial newspapers are both negatively correlated with the probability of declaring financial losses, a finding that could reflect the fact that wealthy and/or informed people seem paradoxically less likely to say they were affected by the crisis, everything else being equal.

The picture of changes in housing wealth looks a little different, as about 30 percent of respondents (see table 5) reported increases in housing wealth. However, 10 percent of individuals declared diminishing housing values. These differences between losses/gains in housing wealth compared with losses/gains in financial wealth may be due to several factors. First of all, the reference periods are not exactly the same in the questionnaire: individuals are asked whether the value of their wealth has changed over the past two years (i.e., 2007–9) for their financial portfolio and over the past five years (i.e.,

¹³Identifying the institutional reasons underlying the differences in the impact of the 2008–9 crisis on household wealth in the United States and in France is beyond the scope of this paper. It is nevertheless worth mentioning that French households are less exposed to stock prices given the very low proportion of stockholders in France (around 20 percent of households compared with 55 percent in the United States).

Table 4. Probability of Facing Financial Losses: Ordered Probit Model

		Coef.		SE
Financial Wealth (euros)	Less than 3,000	Ref.		
	3,000–14,999	−0.21	**	0.066
	15,000–44,999	−0.27	***	0.071
	45,000–149,999	−0.45	***	0.081
	More than 150,000	−0.57	***	0.114
	Don't Know	−0.01		0.110
Stocks and Bonds	Yes	0.664	***	0.060
	No	Ref.		
Mutual Funds	Yes	0.136	*	0.076
	No	Ref.		
Age	Less than 25			
	25–34	Ref.		
	35–44	0.138	*	0.080
	45–54	0.201	**	0.083
	55–64	0.416	***	0.085
	65–74	0.564	***	0.095
	More than 74	0.447	***	0.099
Read Financial Newspapers	Often	Ref.		
	Sometimes	−0.2		0.126
	Rarely	−0.3	**	0.120
	Never	−0.4	***	0.117
	Don't Know	−0.71	**	0.285
Dependent Variable	Financial Assets Value			
	Decreased	N1		985
	Stable	N2		1838
	Increased	N3		174
N	N1+N2+N3			2997
Log-Likelihood				−2306.0

Source: PATER survey (2009).

Note: Other control variables: income, diploma, marital status. Dependent variable: ordered qualitative variable with three modalities—"decrease," "stable," "increase" in financial asset values. We consider a "decrease" in financial asset values for individuals answering that the value of their financial assets decreased over 2007–9. The modality "increase" concerns individuals who answered that the amount of financial wealth increased between 2007 and 2009 because the value of their financial assets increased or because they registered gains. Otherwise, respondents without changes in financial wealth, or with changes only due to portfolio rebalancing, are considered as belonging to the "stable financial asset values" category. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Table 5. Housing Wealth Changes 2004–9: Percentage of Households

Wealth Variation	Because of	Percentage
Decrease	The value of your assets decreased.	10.1
	You sold, at least partly, your assets.	9.6
Stable		0.5
		20.9
Increase		33.0
	The value of your assets increased.	28.6
Not Concerned (Renters)	You made new investments in housing.	4.4
		30.2
No Reply		5.8

Source: PATER survey (2009)—weighted sample representative of the population in France.

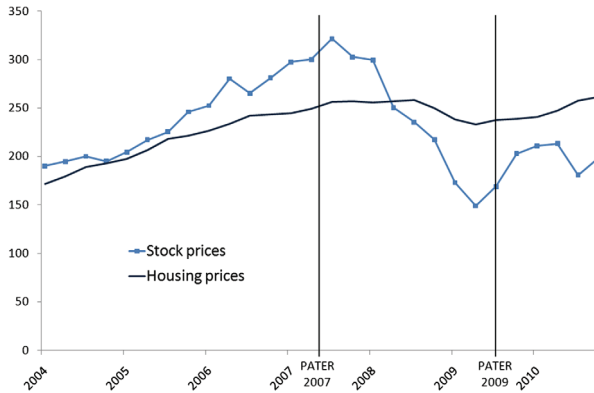
Notes: The housing wealth changes are elicited by asking sequentially (i) “According to you, did your housing wealth (a) increase, (b) remain stable, or (c) decrease over the past two years?” If the answer is (a) (increase), “Is it because (i) the value of the properties you owned has increased or (ii) you made new investments in housing?” If the answer is (b) (stable), “Your housing wealth remained stable because (i) the value of your properties did not change, (ii) you registered gains on some assets and losses on other ones and the profits offset the losses, (iii) you rebalanced your housing portfolio by selling some assets and buying other ones and the value of your portfolio did not change.” If the answer is (c) (decrease), “Is it because (i) the value of your assets decreased or (ii) you sold some assets?”

2004–9) for their housing. Second, housing and stock prices do not evolve in the same way: over the year 2008, housing prices decreased by 7 percent in France following a steady growth over the previous decade (+50 percent), whereas the primary stock market index fell by 40 percent (see figure 1).

3.4 Households' Expectations and the Crisis

A bad economic outlook may have two effects on household savings behavior. First, if individuals are expecting a deterioration of the economic situation, they might also expect a decrease in their permanent income. Second, bad times—and, in particular, the 2008–9 crisis—could also be viewed as exacerbating income and unemployment risks. This background risk is, in turn, likely to prompt more

Figure 1. Evolution of the Stock Market (CAC 40 Index) and the Housing Market: 1996–2010



Source: Euronext and Insee.

Notes: The two indexes are set to 100 on January 1, 1996 and are based on quarterly data. CAC 40 is the index of the forty largest French market capitalizations provided by Euronext. The housing market is represented by Insee's index of the prices of second-hand dwellings.

precautionary saving. Taking into account these two effects (lower permanent income and higher background risks), one would expect households to be more likely to revise their consumption plans by reducing spending.

Following the developing literature on the measurement of expectations (see Manski 2004 and Pesaran and Weale 2006), the PATER survey collects individuals' self-assessed expectations on stock market returns, income, and unemployment. The information collected consists of probabilistic expectations and allows us to construct various indicators such as the expected five-year stock return, the expected income growth rate, and the unemployment risk.¹⁴ Moreover, as the sample of the PATER survey includes a panel of households interviewed in both the 2007 and the 2009 waves, we are able to compare the expectations of the *same* individuals before and during the crisis (see table 6).

¹⁴See appendix 1 for detailed information about the construction of the variables.

Table 6. Household Expectations in 2007 and 2009

		2007	2009	Expectation Changes ΔE
<i>Expectations on Stock Market</i>				
Expected Five-Year Stock Return:	$E_t \left[\frac{P_{t+5}}{P_t} - 1 \right]$	5.8%	4.5%	-1.3%
Percentage of . . .	$E_t \left[\frac{P_{t+5}}{P_t} - 1 \right] < 0$	15.2%	24.1%	
	$E_t \left[\frac{P_{t+5}}{P_t} - 1 \right] = 0$	27.2%	22.6%	
	$E_t \left[\frac{P_{t+5}}{P_t} - 1 \right] > 0$	57.6%	53.3%	
<i>Expectations on Income</i>				
Expected Income Growth:	$E_t \left[\frac{Y_{t+5}}{Y_t} - 1 \right]$	2.8%	1.6%	-1.2%
Percentage of . . .	$E_t \left[\frac{Y_{t+5}}{Y_t} - 1 \right] < 0$	19.8%	25.8%	
	$E_t \left[\frac{Y_{t+5}}{Y_t} - 1 \right] = 0$	31.9%	32.8%	
	$E_t \left[\frac{Y_{t+5}}{Y_t} - 1 \right] > 0$	48.3%	41.4%	
<i>Expectations on Employment Risk</i>				
Probability of Unemployment: p_t		35.1%	34.1%	
Current Monthly Income: Y_t		2535.55	2644.35	
Expected Loss of Income Due to Unemployment: $p_t Y_t$		837	855	18
Measure of Risk Due to Unemployment: $p_t(1 - p_t)Y_t^2$		938,870	1,057,393	118,523

Source: PATER survey (2009), sub-sample III ($N = 903$).

Notes: The expected five-year stock return $\left(E_t \left[\frac{P_{t+5}}{P_t} - 1 \right] \right)$ is elicited by asking, “Within five years, what is the probability, according to you, that the stock market will increase by more than 25%, between 10% and 25%, or less than 10%; will be the same as today; or will decrease by less than 10%, by 10% to 25%, or by more than 25%?” The expected income growth $\left(E_t \left[\frac{Y_{t+5}}{Y_t} - 1 \right] \right)$ is elicited by asking, “Within five years, what is the probability, according to you, that your income will . . . [same modalities as for stock returns]?” The subjective probability of unemployment (p_t) comes from the answer to “On a scale from 0 to 10, how would you rank the risk of losing your job during the next twelve months? (0 means that there is no risk of you losing your job and 10 means that the risk is high.)” We consider the response divided by ten as a proxy for the probability of unemployment (p_t).

According to these figures, households were more pessimistic in 2009 than in the previous wave of the survey in 2007. The average expected stock returns decreased by 1.3 percentage points from 5.8 percent in 2007 to 4.5 percent in 2009. In particular, the percentage of households expecting *negative* returns on stock markets increased from 15.2 percent to 24.1 percent between 2007 and 2009. Expectations on income also became more pessimistic: the average expected income growth rate decreased by 1.2 percentage points from 2.8 percent in 2007 to 1.6 percent in 2009 and the proportion of households expecting a positive income growth decreased by 7 percentage points (from 48.3 percent to 41.4 percent). Concerning the perception of unemployment risk, our measures do not show a significant change between 2007 and 2009.¹⁵

A number of recent papers have focused on households' expectation formation during the recent crisis (Hurd and Rohwedder 2012, Hudomiet, Kezdi, and Willis 2011). They show that subjective expectations are impacted by stock market evolutions, and in particular, they find increased heterogeneity in beliefs after the 2008 stock market crash. While studying expectation formation is beyond the scope of this paper, it is, however, interesting to gain some insights on this issue by examining how individual experiences correlate with individual expectations in 2009 among French households. With this objective in mind, we perform three OLS regressions, where we successively examine the sociodemographic determinants of the individual expected five-year stock return, the five-year expected income growth, and the risk of income loss due to unemployment.¹⁶ First, a negative correlation with age is obtained for each kind of expectation: older people are less optimistic than younger ones. This result is also coherent with Hudomiet, Kezdi, and Willis (2011). Another interesting result is the link between expectations and experiences in unemployment: individuals currently unemployed or with past experiences of unemployment are also less optimistic than others, concerning both the stock market returns and their future income. We obtain a specific result for stock market expectations which are also

¹⁵These measures do not directly take into account unemployment benefits; however, as unemployment benefits are proportional to income, they can be considered reliable proxies for unemployment risk.

¹⁶Results are available from the authors upon request.

correlated with personal wealth shocks. Indeed, people who experienced housing or financial wealth losses over 2007–9 also expected lower stock returns than people who declare no changes in wealth.

To sum up, three main conclusions are drawn from this simple descriptive analysis. First, we observe that some households experienced wealth losses due to the fall in asset prices during the 2008–9 crisis. Second, on average, households changed their expectations and became more pessimistic as regards their stock returns and future incomes. Third, most individuals adapted their consumption plans and planned to reduce their expenditures. The next section examines whether these changes in consumption plans are related to a wealth effect.

4. The Determinants of Changes in Consumption Plans

4.1 *Empirical Strategy*

To study whether households compensate for the loss in their asset values by reducing their consumption expenditure, our empirical analysis takes into account both the changes in wealth and the changes in expectations about future income. This empirical analysis is then closely related to Disney, Gathergood, and Henley (2010), who obtain significant effects on consumption from changes in expectations and of capital gains. However, instead of considering actual consumption reported in successive panel waves to measure changes in consumption (Disney, Gathergood, and Henley 2010), we explain households' self-assessed changes in consumption plans. These modifications to consumption plans are proxied by relying on two complementary questions about (i) the subjective probabilities indicated by households to the idea of spending less in the near future, and (ii) the expected evolution of households' consumption baskets.

4.1.1 *The Subjective Probabilities of Spending Plans*

As already explained, the interest variable (changes in consumption) is not observed; we only observe a qualitative information on households' plans to reduce consumption. The empirical model is then assumed to be a probit model. Following the literature on wealth effects (see equation (1)), the underlying latent variable is defined as

$$y_i^* = \beta_0 + \beta_{1F}\Delta W_{Fi} + \beta_{1H}\Delta W_{Hi} + \beta_2\Delta Y_i + \beta_3\Delta E_i + \beta_4 Z_i + \varepsilon_i \quad (2)$$

with¹⁷ ΔW_{Fi} the financial wealth variation, ΔW_{Hi} the housing wealth variation, ΔY_i the income variation, ΔE_i the changes in expectations, and Z_i the control variables such as time horizon (measured by age) or sociodemographic variables (number of children, marital status) that account for consumption tastes and indicators of past episodes of unemployment in order to account for heterogeneity in precautionary saving. ε_i is a random term normally distributed across observations. The subjective probabilities of spending plans are elicited by asking, “According to you, what are the consequences of the financial crisis on your personal situation in the twelve coming months concerning the amount of your expenses: I will reduce my spending with a (high, medium, low, very low) probability.” In other words, we only observe a discrete variable y_i with four modalities:

$$y_i = \begin{cases} 1 & \text{if } y_i^* \leq \mu_1 \text{ (very low probability to reduce spending)} \\ 2 & \text{if } \mu_1 < y_i^* \leq \mu_2 \text{ (low probability)} \\ 3 & \text{if } \mu_2 < y_i^* \leq \mu_3 \text{ (medium probability)} \\ 4 & \text{if } y_i^* \geq \mu_4 \text{ (high probability)} \end{cases}$$

with μ_j ($j = 1, \dots, 4$) unknown threshold values such as $\mu_j < \mu_{j+1}$. Therefore, this model can be estimated as a standard ordered probit with unknown thresholds.

4.1.2 *The Expected Evolution of the Consumption Basket*

We also look at the expected evolution of households' consumption baskets. Let us consider a latent variable $\Delta C_{k,i}^{e*}$ characterizing the expected variation of consumption for the item k of the consumption basket of household i . We define the following model explaining the

¹⁷See the construction of the variables in appendix 1. In particular, we define financial and housing wealth variations (ΔW_{Fi} and ΔW_{Hi}) such as accounting for changes in asset values that are only due to asset prices.

latent variation of the planned consumption:

$$\begin{aligned} \Delta C_{i,k}^{e*} = & \pi_{0,k} + \pi_{F1,k} \Delta W_{Fi} + \pi_{H1,k} \Delta W_{Hi} + \pi_{2,k} \Delta Y_i + \pi_{3,k} \Delta E_i \\ & + \pi_{4,k} Z_i + \omega_{ik}. \end{aligned} \quad (3)$$

Similarly to equation (2), the explanatory variables are ΔW_{Fi} , the financial wealth variation; ΔW_{Hi} , the housing wealth variation; ΔY_i , the income variation; ΔE_i , the changes in expectations; and Z_i , the control variables such as time horizon (measured by age) or sociodemographic variables (number of children, marital status) that account for consumption tastes and indicators of past episodes of unemployment in order to account for heterogeneity in precautionary saving.

The expected variation of consumption for seven items ($k = 1, \dots, 7$) is elicited with our second question about consumption plans: “Personally, do you think that the turmoil affects or will affect each of the following expenses¹⁸: by buying less, by buying cheaper, by postponing your project, by abandoning your project, or that it will have no effect?” For each item k , we then define the following binary variable reflecting a decrease in household expenses *versus* no change in consumption plans:

$$\Delta C_{i,k}^e = \begin{cases} 0 & \text{if } \Delta C_{i,k}^{e*} \geq 0 \text{ (no effect on expenses } k) \\ 1 & \text{if } \Delta C_{i,k}^{e*} < 0 \text{ (buying less, cheaper, postponing} \\ & \text{or abandoning the planned expenses } k). \end{cases}$$

ω_{ik} is a random term such as

$$\omega_i \sim \mathcal{N}_7(0, \Sigma).$$

Taking into account correlations between error terms ω_i for a given individual leads us to estimate equation (3) as a multivariate probit with seven equations.¹⁹

¹⁸The list of considered spending is the following: food, housing, transport (public transport, car maintenance), textiles (clothes, shoes), health, technological products (TV, computer, mobile phone, etc.), and cultural goods (books, DVDs, theater, cinema, tourism).

¹⁹Our estimates are obtained using the module *mvpobit* on STATA (Cappellari and Jenkins 2003). This module applies the GHK simulation method for maximum-likelihood estimation of multivariate probit. We set the number of simulations to 500 and have checked that the estimates did not vary with the seed.

4.2 Results

The main results for equation (2) are presented in table 7. Table 8 displays the estimated marginal effects both on subjective probabilities (equation (2)) and on the categories of consumption expenditure (equation (3)).

4.2.1 Wealth Effects

Our results support the existence of financial and housing wealth effects on consumption during the 2008–9 crisis. While in June 2009 most of the people were planning to reduce their consumption, wealth losses significantly reinforced this probability. Indeed, compared with people experiencing a positive shock on their financial wealth, we obtain significantly raised subjective probabilities of reduced spending for households whose financial wealth did not change (+8.3 percentage points) and *particularly* for households that suffered losses in financial assets (+15.5 percentage points), everything else being equal.^{20,21} Similar conclusions are given for the housing wealth effect: compared with people experiencing an increase in their housing wealth over the previous period, individuals who suffered losses in housing wealth were +11.2 percentage points more likely in June 2009 to plan lower spending over the following months (+4.8 percentage points for households with stable housing wealth).

The dependent variable reflecting changes in consumption and the explanatory variables about wealth changes are qualitative information self-reported by the respondents. A key issue is whether they will actually modify their consumption. While we cannot verify *ex post* if it is the case, Hurd and Rohwedder (2010) provide a very detailed analysis of similar questions about spending expectations in the American Life Panel. In particular, they show that expectations of spending change are very accurate when compared with

²⁰If not specified, the estimated coefficients of the results presented in this section are significantly different from the reference at the 1 percent level (see table 7).

²¹Marginal effect of losses in financial wealth is computed as the mean of the differences of estimated probabilities (i) given losses (or stable wealth) and (ii) given gains in wealth across the population (equation (2)).

Table 7. Main Results for the Probability to Reduce Consumption in the Twelve Coming Months (Equation (2), Ordered Probit)

	Regression I		Regression II		Regression III	
	Estim.	SE	Estim.	SE	Estim.	SE
Variation of Financial Assets	0.455	0.090	0.486	0.153	0.505	0.179
	0.231	0.086	0.239	0.148	0.249	0.175
	Ref.		Ref.		Ref.	
Variation of Housing Assets	0.492	0.099	0.638	0.187	0.676	0.223
	0.631	0.198	0.065	0.415		
	0.326	0.069	0.236	0.120	0.235	0.134
	0.132	0.050	0.066	0.081	0.066	0.091
	Ref.		Ref.		Ref.	
Expectation Changes—Stock Market	0.264	0.053	0.095	0.093	-0.005	0.108
	0.134	0.096	0.241	0.175	0.154	0.207
	—	—	—	—	-0.011	0.003
Expectation Changes—Loss of Income Due to Unemployment	—	—	3.0E-05	4.9E-05	2.4E-05	5.5E-05
	—	—	-2.8E-08	3.5E-08	-4.2E-08	3.9E-08
Risk of Unemployment	—	—	—	—	—	—

(continued)

Table 7. (Continued)

	Regression I		Regression II		Regression III	
	Estim.	SE	Estim.	SE	Estim.	SE
Variation of Income	—	—	0.010	0.125	-0.034	0.141
Stable	—	—	Ref.		Ref.	
Increase	—	—	0.080	0.205	0.012	0.241
Unemployed	0.432	0.167	0.594	0.403	0.979	0.442
Once Previously						
Unemployed Several	0.459	0.131	1.272	0.356	1.295	0.462
Times Previously				***		***
Never Been Unemployed	0.486	0.189	0.806	0.465	0.875	0.468
				*		*
Unemployed and Unaware Whether He/She Has Already Been Unemployed						
Employed and ...	0.167	0.047	0.179	0.077	0.124	0.087
				**		
Unemployed						
Once Previously	0.266	0.055	0.207	0.096	0.357	0.110
Unemployed Several				**		***
Times Previously						
Never Been Unemployed	Ref.		Ref.		Ref.	
N	3468		1163		903	
Log-Likelihood	-3951.7		-1314.6		-1016.3	
Pseudo-R ²	5.7%		6.2%		8.8%	

Source: PATER survey (2009).
Notes: The dependent variable is the subjective ordered probability to reduce spending. Other control variables include number of children in the household, age, and marital status. The specification of column 1 is also estimated on sample II and sample III; see the results in table 11 in appendix 2. Ordered probit with unknown threshold. Standard errors are in parentheses. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Table 8. Marginal Effects on Consumption Plans (Equations (2) and (3))

	Financial Assets			Housing Assets		
	Decrease	Stable	Increase	Decrease	Stable	Increase
<i>Equation (2): Subjective Probability to Reduce Spending</i>						
Total Spending	Average Probability	+15.5	+8.3	60.5%	+11.2	62.5%
	Marginal Effects			Ref.	+4.8	Ref.
<i>Equation (3): Expected Evolution of the Consumption Basket</i>						
Food	Average Probability	+10.9	+5.2	54.4%	+12.6	58.1%
	Marginal Effects			Ref.	+3.7	Ref.
Refurbishment	Average Probability	+6.4	+2.5	71.5%	+10.9	73.4%
	Marginal Effects			Ref.	+4.9	Ref.
Transportation	Average Probability	+10.3	+4.7	34.0%	+10.8	38.0%
	Marginal Effects			Ref.	+6.0	Ref.
Clothing	Average Probability	+16.4	+10.7	57.9%	+9.1	66.1%
	Marginal Effects			Ref.	+5.4	Ref.
Health	Average Probability	+12.3	+7.6	35.2%	+14.0	38.9%
	Marginal Effects			Ref.	+6.9	Ref.
Techn. Prod.	Average Probability	+15.3	+10.2	55.9%	+10.6	64.3%
	Marginal Effects			Ref.	+4.2	Ref.
Cult. Prod.	Average Probability	+16.0	+11.5	63.0%	+4.2	72.2%
	Marginal Effects			Ref.	+4.6	Ref.

Source: PATER survey (2009).
Notes: Marginal effects are in percentage points and average estimated probabilities are computed from the regressions displayed in tables 7 and 10 (sub-sample I). Equation (2) (probability to reduce spending): Marginal effect of facing losses in financial wealth: $E[Pr(y_i \geq 3 | \text{losses in financial wealth}) - Pr(y_i \geq 3 | \text{gains in financial wealth})]$. The average probability of having medium or high probability to reduce consumption was 60.5 percent in June 2009 for people experiencing gains in financial wealth. Everything else being equal, this probability increased by 15.5 percentage points for people experiencing losses. Equation (3) (evolution of the consumption basket): Standard marginal effects for a probit model. The average probability to reduce food consumption is 54.4 percent for people experiencing gains in financial wealth. If the household suffered losses, this probability increases by 10.9 percentage points.

recollections of spending change. Concerning our data, we need, however, to acknowledge a possible framing effect because our questions about consumption mention the financial crisis context. The variables about changes in wealth do not raise such a concern for two reasons. First, they do not explicitly refer to the crisis (the questions are about changes over the past two (or five) years). Second, these questions are at the beginning of the questionnaire, in the wealth section, just after households' wealth composition and not in the new module focused on the perception of the crisis.

Heterogeneity across the Wealth Distribution. We rely on quantitative information given by the PATER survey on total financial and total housing wealth (amounts given in brackets) to test for heterogeneity in consumption reaction across the wealth distribution. We interact households' wealth (decomposed by quartile) with the qualitative variables reflecting wealth increase/decrease (ΔW_{Fi} and ΔW_{Hi}). We find that the impact on consumption of wealth changes decreases with wealth: households at the bottom of the wealth distribution are more likely than wealthier families to reduce consumption when facing losses.²² For instance, in the case of negative shocks on financial wealth, the probability of decreasing consumption rises by +14.4 percentage points for households belonging to the second quartile of the wealth distribution, whereas it increases only by +7.5 percentage points for households in the third quartile of wealth distribution (everything else being equal). This wealth effect is even non-significant for households in the top quartile of wealth distribution. These differences could be partly explained by the heterogeneity in the precautionary savings behavior: wealthy households save for precautionary motives proportionally less than less wealthy households (Carroll and Kimball 1996).

Heterogeneity across the Categories of Consumption Expenditure. Another striking result is that households' expenses are not uniformly impacted by wealth variations.²³ Financial wealth has a large impact on clothes and cultural goods and services and a smaller effect on less elastic expenditures such as transport, health, or food. For a given category of expenses, the quantitative impact of

²²These results are available from the authors upon request.

²³See table 8 for the estimated marginal effects and table 10 in appendix 2 for detailed estimation results.

housing and financial wealth variations may differ: financial wealth gains have an impact on all categories of expenses, whereas housing wealth reduction has no significant effect on clothing or cultural expenses.

In order to facilitate the comparison between positive and negative wealth shocks, we consider here the modality “stable” financial/housing wealth as the reference point. It is then obvious that the quantitative impact of a negative financial wealth shock is smaller than a positive one (+3.2 versus -13.5 percentage points on the average probability of reducing consumption). According to our results, negative shocks on financial wealth mainly increase the probability of reducing expenses on food (+5.7 percentage points), transport (+5.6 percentage points), and health (+5.7 percentage points), whereas positive financial wealth variations reduce the probability of limiting consumption during the crisis to a greater extent: clothing (-10.2 percentage points), technological products (-10.2 percentage points), and culture (-11.5 percentage points).

4.2.2 Expectations

Stock Market and Income Expectations. Consumption plans are significantly affected by changes in households’ expectations, especially concerning stock markets: households expecting a recovery of stock market prices are also less likely to reduce their consumption (see table 7, column 3). This result is obtained by considering self-reported expectations that are fully in line with the empirical literature (e.g., Pistaferri 2001 or Manski 2004). Moreover, Howrey (2001) also shows that such variables have a significant predictive power on consumption. Being probabilistic questions and not only point estimates, they are also richer than in previous studies such as Disney, Gathergood, and Henley (2010). Nevertheless, there are also legitimate concerns about measurement errors when collecting such variables, especially if unobservable elements of individual heterogeneity are affecting both the dependent variable (about consumption plans) and the explanatory variables about expectations. As our dependent variable is only available in the 2009 wave, unobservable heterogeneity cannot be accounted for with panel estimation methods. However, the problem of systematic bias due to measurement errors in expectations at the individual level is likely mitigated by

the fact that the estimated models are written in differences and include differences in expectations between 2007 and 2009 (and not levels of expectations).

Concerning background risks, we do not obtain a significant effect of unemployment risk (as measured by the variation of income variance between 2007 and 2009) on consumption plans. However, current unemployment and (to a lesser extent) periods of past unemployment increase the probability of a reduction in consumption. This may reflect heterogeneity in precautionary savings behavior due to differences in exposure to unemployment risk.

The loss of significance of housing wealth coefficients seems to be due to the reduction of the sample size rather than to the introduction of the expectation variables, as regressions on sub-sample II and sub-sample III without introducing the expectation variables leads to similar results (see table 11 in appendix 2). However, the non-responses to questions about expectations that lead to the reduction of the econometric sample (see section 3.1) raise the issue of a non-random sample selection. In order to test for the exogeneity of this sample selection, we perform a two-step estimate. First we estimate the probability of an individual answering the questions about expectations where we consider the number of non-responses in the full questionnaire for each individual as an instrumental variable²⁴ and introduce the other control variables of the main equation (age, household composition, changes in wealth, changes in expectations) as other explanatory variables. Then we compute the Mills ratio from this estimated equation and introduce it as an additional regressor in the main equation.²⁵ As the estimated coefficient of the Mills is non-significant, we do not find evidence of a systematic sample-selection bias due to non-responses that could affect our results.

Transitory versus Permanent Effect of the Crisis. The PATER survey provides an opportunity to investigate whether consumption reacts more strongly to a permanent wealth effect than to a transitory shock as emphasized by Lettau and Ludvigson (2004). A question is asked to elicit individuals' perceptions concerning the

²⁴The questions about the expectations are clearly the most difficult to answer in the survey. Most of the questionnaire is devoted to simple questions about everyday life to assess individuals' preferences.

²⁵Results are available from the authors upon request.

persistence of the crisis: “Concerning the current economic situation in France, which of the following sentences is the closest to your opinion: (i) the current financial crisis is going to lead to a long recessionary period, or (ii) the current financial crisis is going to lead to a short recessionary period.”

About 70 percent of respondents were expecting a long recessionary period in June 2009. When estimating in separate regressions the housing and financial wealth effects for people expecting long/short recessionary periods, significant financial wealth effects are only obtained for those expecting a long recessionary period. While it cannot be considered as a formal test, this result is, however, consistent with the existence of differences in consumption reaction depending on the consumers’ perception of the persistence of the shocks.

5. Conclusion

The recent crisis sheds light on the impact that changes in asset prices can have on the economy and, in particular, on households’ behavior. In this context, the old concern about the wealth effect on consumption reemerged: do unanticipated changes in wealth affect consumption? The aim of this paper was to provide some new empirical results on this issue.

We study how households have adapted their consumption plans during the 2009 crisis by relying on an original French household survey (PATER survey). First, we document that the crisis has heterogeneous effects on households in France: about 35.8 percent of individuals declare that the value of their financial assets decreased over 2007–9, while others registered gains (14.4 percent) and about 36 percent declared no change to their financial wealth. As expected, the probability of facing financial losses is significantly higher for individuals holding stocks or mutual funds. Second, we compare self-assessed expectations for the same individuals in 2007 and in 2009. We find that households were more pessimistic about the economic outlook in 2009 than before the crisis, especially as regards their future income and the expected returns of the stock market. Third, we estimate the impact of wealth changes on the probability of modifying consumption plans as measured by two complementary proxies: subjective probabilities of consuming less and the

self-assessed changes in consumption plans detailed by categories of expenditures. We control for household expectations regarding stock prices and unemployment risk.

We find a significant wealth effect on consumption plans during the crisis driven by the changes in both housing and financial wealth. We also find that this impact of wealth changes on consumption plans is decreasing with the level of wealth: wealthy households are less likely to reduce their consumption due to financial losses than less wealthy ones. Our results show that all expenses are affected by changes in wealth. It seems, however, that changes in financial wealth have stronger effects on highly income-elastic expenses (culture and clothing) than on less income-elastic ones (transport services, health, and food). Moreover, we find asymmetries in the reaction to positive *versus* negative financial wealth variations.

Besides this direct wealth effect, we find some evidence regarding the significant role played by expectations on household consumption plans. Indeed, the crisis dramatically changed households' expectations and we find the pessimistic households more likely to reduce their consumption. This result could be viewed as providing new evidence of the existence of the confidence channel, by which the crisis is transmitted to the households in addition to the direct wealth effect.

Appendix 1. Definitions of Variables

Consumption Plans: Two dependent variables are considered to measure household changes in consumption plans:

- (i) $\Delta C_{i,k}^*$, the expected variation of consumption for the item k of the consumption basket of household i . The 2009 PATER survey asks whether the respondents expect to modify their consumption plans for detailed items of their consumption basket: food, housing (furnishing, equipment, energy consumption but excluding rents and imputed rents), transport (public transport, car maintenance), textiles (clothes, shoes), health, technological products (TV, computer, mobile phone, etc.), and cultural goods (books, DVDs, theater, cinema, tourism). For each component, the question is, "Personally, do you think that the turmoil affects or will affect each of the following

expenses: by buying less, by buying cheaper, by postponing your project, by abandoning your project, or that it will have no effect?"

The qualitative variable reflecting the expected variation of consumption for the item k is defined as

$$\Delta C_{i,k}^e = \begin{cases} 0 & \text{if } \Delta C_{i,k}^{e*} \geq 0 \text{ (no effect on expenses } k) \\ 1 & \text{if } \Delta C_{i,k}^{e*} < 0 \text{ (buying less, cheaper, postponing} \\ & \text{or abandoning the planned expenses } k). \end{cases}$$

- (ii) y_i , a qualitative variable reflecting the opinion of household i about its probability to reduce overall spending such as

$$y_i = \begin{cases} 1 & \text{if very low probability to reduce spending} \\ 2 & \text{if low probability} \\ 3 & \text{if medium probability} \\ 4 & \text{if high probability.} \end{cases}$$

These subjective probabilities are collected through the following question: "According to you, what are the consequences of the financial crisis on your personal situation in the twelve coming months concerning the amount of your expenses: I will reduce my spending with a (high, medium, low, very low) probability." (See table 9 for descriptive statistics.)

Wealth Variations (ΔW_{Fi} and ΔW_{Hi}): Housing and financial wealth variations (ΔW_{Hi} and ΔW_{Fi}) are measured using qualitative information based on households' assessments. In each case, the PATER survey makes it possible to distinguish between wealth changes caused by prices evolution and those due to portfolio reallocation.

The qualitative *financial wealth variable*, ΔW_{Fi} , is defined as follows:

$$\Delta W_{Fi} = \begin{cases} 1 & \text{if decrease in financial assets value} \\ 2 & \text{if stable financial assets value} \\ 3 & \text{if increase in financial assets value.} \end{cases}$$

We use sequential questions to define ΔW_{Fi} , such as reflecting only asset prices effects:

**Table 9. Descriptive Statistics (Means):
Equations (2) and (3)**

Variables		Sample I	Sample II	Sample III
Probability to Reduce Expenses: y_i	High Probability	16.03	13.67	12.85
	Medium Probability	51.90	51.50	50.5
	Low Probability	24.91	27.34	28.46
	Very Low Probability	7.15	7.48	8.19
Variation of Financial Assets	Decrease	28.40	33.10	34
	Stable	53.00	53.57	54.15
	Increase	5.02	5.16	4.76
	Not Concerned	12.49	7.48	6.76
	No Reply	1.10	0.69	0.33
Variation of Housing Assets	Decrease	9.92	9.11	9.63
	Stable	26.59	27.69	27.91
	Increase	29.21	37.75	38.87
	Not Concerned	29.90	21.67	20.16
	No Reply	4.38	3.78	3.43
Expectation Changes—Stock Market		—	—	—1.29
Expectation Changes—Loss of Income Due to Unemployment		—	30.50	18.08
Expectation Changes—Risk of Unemployment		—	107991.17	118522.76
Variation of Income	Decrease	—	7.65	7.97
	Stable	—	89.77	89.59
	Increase	—	2.58	2.44
N		3468	1163	903
Age	Less than 25	8.22	1.38	1.44
	25–34	15.37	11.44	11.07
	35–44	17.91	22.70	22.92
	45–54	17.91	22.10	23.15
	55–64	17.94	23.22	23.70
	65–74	14.13	13.07	12.40
	More than 74	8.54	6.10	5.32
Marital Status	Married	51.01	58.21	58.80
	In a Relationship	10.76	9.46	8.97
	Single	22.98	18.40	18.94
	Divorced	8.28	8.43	8.42
	Widow	6.98	5.50	4.87

(continued)

Table 9. (Continued)

Variables		Sample I	Sample II	Sample III
No. of Children	0	64.19	58.38	58.36
	1	14.33	16.42	16.06
	2	14.65	17.45	17.61
	3	5.74	6.62	6.98
	More than 3	1.10	1.12	1.00
Unemployed and . . .	Unemployed Once	1.38	0.69	0.78
	Previously			
	Unemployed	2.51	1.12	0.89
	Several Times			
	Previously			
Employed and . . .	Never Been	1.07	0.52	0.66
	Unemployed			
	Unemployed Once	16.35	20.55	20.71
	Previously			
	Unemployed	11.56	10.58	10.96
Retired	Several Times			
	Previously			
	Never Been	25.75	28.98	29.79
	Unemployed			
	No Response	0.03	60.10	0.00
Inactive		29.96	31.81	30.68
N		11.39	5.76	5.54
		3468	1163	903

Source: PATER Survey (2009).
Note: The selection of the samples is described in section 3.1.

(i) “If the amount of your financial assets decreased over the two last years, would you say that it is because . . . (two possible answers):

- The value of your financial assets decreased.
- You sold, partly or totally, your financial assets.”

We define a *decrease* in financial assets value ($\Delta W_{Fi} = 1$) when the respondent selects the first of the two answers. Otherwise, we consider that the financial wealth did not change due to prices ($\Delta W_{Fi} = 2$).

(ii) “If the amount of your financial assets increased over the last two years, would you say that it is because . . . (three possible answers):

- The value of your financial assets increased (because of dividends, returns, capital gain . . .).
- You realized some gains that you invested again.
- You saved more (buying new assets or increasing your participation in old assets)."

We define an *increase* in financial asset value ($\Delta W_{Fi} = 3$) when the respondent selects the first or the second possibilities (increase in the value or realized gains). Otherwise, we consider that the financial wealth did not change due to prices ($\Delta W_{Fi} = 2$).

The qualitative *housing wealth variable*, ΔW_{Hi} , is defined as follows:

$$\Delta W_{Hi} = \begin{cases} 1 & \text{if decrease in housing assets value} \\ 2 & \text{if stable housing wealth} \\ 3 & \text{if increase in housing assets value.} \end{cases}$$

The questions used to define negative and positive variations of housing wealth are the same as for financial wealth, except that they consider the last five years instead of the last two years.

Income Variation (ΔY_i): Changes in household income ΔY_i between 2007 and 2009 can be observed for panel respondents. The following qualitative variable is then defined:

$$\Delta Y_i = \begin{cases} 1 & \text{if negative variation of household income} \\ 2 & \text{if stable income} \\ 3 & \text{if positive variation of household income.} \end{cases}$$

As this variable can only be computed for panel respondents, it leads to reducing significantly the econometric sample. That is why we also consider other proxies to account for modifications in household income: a dummy variable with nine modalities reflecting the current employed/unemployed status as well as past unemployment periods.

Changes in Expectations (ΔE_i): The adaptation of households' financial expectations between 2007 and 2009 is taken into account by considering expectations about labor income as well as expectations about stock prices.

Labor income expectations: Two measures are considered:

- (i) changes in the average loss of income due to unemployment (permanent-income effect): $\Delta E_{yi} = p_t Y_t - p_{t-1} Y_{t-1}$, where p_t is the subjective probability of unemployment,²⁶ Y_t is the current income,²⁷ t refers to the 2009 survey, and $t - 1$ refers to the 2007 survey.
- (ii) increase in unemployment risk (background risk effect): proxied by the variation of variance income between 2007 and 2009, $\Delta E_{vi} = p_t(1 - p_t)Y_t^2 - p_{t-1}(1 - p_{t-1})Y_{t-1}^2$.

Stock market expectations: We consider the differences in expected mean of stock return as assessed by each respondent in 2007 and in 2009: $\Delta E_{ri} = r_{it} - r_{it-1}$, where the expected mean of stock return r_{it} is computed using the following question: “Within five years, what is the probability according to you that the stock market:

- will increase by [more than 25 percent, by 10 percent to 25 percent, less than 10 percent]?
- will be the same as today?
- will decrease by [less than 10 percent, 10 percent to 25 percent, more than 25 percent]?

(Responses have to add up to 100 percent.)

²⁶The subjective probability of unemployment is elicited by asking the following question:

“We are interested in the various risks that are linked to your job. On a scale from 0 to 10 (0 means that your job is not subject to any risk, 10 that it is subject to serious risks; in-between scores can be used to qualify your assessment), indicate whether your job is subject to the following risks:

- Health.
- Unemployment.
- Irregular income.
- Not concerned.”

We consider the response divided by ten as a proxy for the probability of unemployment, p_t .

²⁷As income is collected in brackets, we compute Y_t as the mean of the lower and the upper bound of each bracket. For the lowest (resp. highest) interval, we take the upper (resp. lower) bound.

We call q_1 to q_7 the respective answers to these questions. τ_j is the lower bound of the interval of the j th question ($\tau_1 = 25$ percent, $\tau_2 = 10$ percent, $\tau_3 = 0$ percent, $\tau_4 = 0$ percent, $\tau_5 = 10$ percent, $\tau_6 = -25$ percent). We set the upper bound of the return distribution to $\tau_0 = 50$ percent and the lower bound to $\tau_7 = -50$ percent. Following Pistaferri (2001), the expected stock return is computed as

$$r_{it} = \sum_{j=0}^7 q_{j+1,it} \frac{\tau_j + \tau_{j+1}}{2}.$$

Appendix 2. Additional Tables
Table 10. Probability to Reduce Consumption by Category of Expenses
(Equation (3), Multivariate Probit)

		Food	Refurb.	Trans.	Clothing	Health	Tech. Prod.	Cult. Prod.	
Past Variation of Financial Assets	Decrease	0.290*** (0.107)	0.215* (0.111)	0.279*** (0.108)	0.464*** (0.107)	0.326*** (0.109)	0.429*** (0.107)	0.492*** (0.109)	
	Stable	0.138 (0.102)	0.0824 (0.106)	0.132 (0.104)	-0.293*** (0.102)	-0.206*** (0.105)	-0.278*** (0.102)	-0.342*** (0.103)	
	Increase	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
	Not Concerned	0.340*** (0.0730)	0.128* (0.0752)	0.437*** (0.0702)	0.148** (0.0737)	0.231*** (0.0693)	0.0298 (0.0720)	0.0298 (0.0720)	-0.00667 (0.0748)
	No Reply	0.523** (0.225)	0.206 (0.223)	-0.0533 (0.211)	0.223 (0.215)	0.306 (0.209)	0.0286 (0.209)	0.0286 (0.209)	-0.208 (0.204)
Past Variation of Housing Assets	Decrease	0.346*** (0.0838)	0.387*** (0.0917)	0.277*** (0.0804)	0.263*** (0.0839)	0.358*** (0.0803)	0.309*** (0.0853)	0.128 (0.0850)	
	Stable	0.0974* (0.0584)	0.163*** (0.0624)	0.157*** (0.0583)	0.156*** (0.0596)	0.180*** (0.0580)	0.119** (0.0599)	0.147** (0.0615)	
	Increase	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	
	Not Concerned	0.0837 (0.0635)	-0.225*** (0.0665)	-0.0658 (0.0622)	-0.00167 (0.0651)	0.0322 (0.0619)	-0.0727 (0.0641)	-0.0381 (0.0670)	
	No Reply	0.0560 (0.115)	0.0654 (0.123)	0.0654 (0.112)	0.0291 (0.116)	0.0707 (0.112)	-0.0131 (0.114)	0.0152 (0.119)	

(continued)

Table 10. (Continued)

	Food	Refurb.	Trans.	Clothing	Health	Tech. Prod.	Cult. Prod.
Unemployed and...	0.289 (0.191) 0.478***	-0.0390 (0.189) 0.234	0.289 (0.191) 0.478***	-0.0390 (0.189) 0.234	0.289 (0.191) 0.478***	-0.0390 (0.189) 0.234	0.289 (0.191) 0.478***
Unemployed Times Previously Never Been	0.166 (0.167) 0.166	(0.168) -0.0553 (0.210)	(0.167) 0.166 (0.215)	(0.168) -0.0553 (0.210)	(0.167) 0.166 (0.215)	(0.168) -0.0553 (0.210)	(0.167) 0.166 (0.215)
Employed and...	0.207*** (0.0557) 0.321***	0.161*** (0.0595) 0.255***	0.207*** (0.0557) 0.321***	0.161*** (0.0595) 0.255***	0.207*** (0.0557) 0.321***	0.161*** (0.0595) 0.255***	0.207*** (0.0557) 0.321***
	(0.0653) Ref. 0.0870	(0.0704) Ref. -0.0816	(0.0653) Ref. 0.0870	(0.0704) Ref. -0.0816	(0.0653) Ref. 0.0870	(0.0704) Ref. -0.0816	(0.0653) Ref. 0.0870
N	(0.137)	(0.139)	(0.137)	(0.139)	(0.137)	(0.139)	(0.137)
Log-Likelihood	3468 -10775.8						

Source: PATER survey (2009).

Notes: The dependent variable is a vector of the reductions of consumption for each category of expenses. Other control variables included are number of children in the household, age, and marital status. Sample: Sample I, described in section 3.1. Multivariate probit. Standard errors are in parentheses. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Table 11. Robustness Checks for Sample Selection: Probability to Reduce Total Consumption in the Twelve Coming Months (Equation (2))

		Sample II			Sample III		
		Estim.		SE	Estim.		SE
Variation of Financial Assets	Decrease	0.486	***	0.153	0.500	***	0.179
	Stable	0.237		0.148	0.260		0.174
	Increase	Ref.			Ref.		
	Not Concerned	0.638	***	0.187	0.679	***	0.222
	No Reply	0.081		0.415	0.865		0.663
Variation of Housing Assets	Decrease	0.236	*	0.120	0.241	*	0.134
	Stable	0.068		0.081	0.070		0.091
	Increase	Ref.			Ref.		
	Not Concerned	0.101		0.093	0.022		0.107
	No Reply	0.245		0.174	0.098		0.206
N		1163			903		
Log-Likelihood		-1315.1			-1024.8		
Pseudo- R^2		5.1%			7.0%		

Source: PATER Survey (2009).
Notes: We run regression I of table 7 on the samples of regression II and III. The dependent variable is the subjective probability to reduce spending. Other control variables included are number of children in the household, age, marital status, and employment status. Changes in expectations are not included. Ordered probit with unknown threshold. Standard errors in parentheses. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent level, respectively.

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