Wealth Effects on Consumption Plans: French Households in the Crisis

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Abstract

This paper analyzes the wealth effect on consumption by relying on two original household surveys. First, it provides the first estimate of the marginal propensity to consume out of wealth based on micro data for France (Enquête Patrimoine 2009, Insee): a low but significant wealth effect is obtained and financial wealth seems to be significant only for stockholders. Second, it studies how French households have adapted their consumption plans during the crisis by relying on household self-assessed changes in future consumption (survey *PATER*). Besides the direct wealth effect, this analysis confirms the role played by changes in expectations on consumption plans, and thus, by the confidence channel as an additional transmission mechanism of the crisis.

JEL classification: D12, E21, E44, C25

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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

The recent financial and economic crisis brings turmoil to the households. They face large uncertainty regarding the evolution of financial and real estate prices, increasing risks in the labor market as well as reinforced financial constraints. For example, in France, the real estate prices decreased by 7% over the year 2008 after a continuous increase over the last decade (+50%). Similarly, the stock market index dropped dramatically since summer 2007 (by 40% over the year 2008). In this context, it becomes crucial to evaluate how households are impacted by the crisis to assess whether this "unexpected" turmoil is affecting the way to recover by modifying significantly and durably household saving, consumption and portfolio choices.

According to the life cycle theory, wealth accumulation is used by households to smooth their consumption over the life cycle (Ando and Modigliani, 1963). Consequently, unexpected changes in wealth, resulting from unanticipated evolutions of stocks or real estate prices for instance, may lead them to revise their consumption plans. This "wealth effect" is then likely to be at work in the current crisis. The empirical link between consumption and wealth has been widely studied in the macroeconomic literature (see for example Lettau and Ludvigson, 2004, Case et al., 2005, Carroll et al., 2011, Calomiris et al., 2009, or Case et al., 2011). Wealth effect is also pointed out as a crucial issue in forecasting models (see among others Modigliani, 1971, Aron et al., 2010, Buiter, 2010, Muellbauer, 2010, and Carroll et al., 2011).

For France, a small but significant wealth effect on consumption is found with aggregate data (Chauvin and Damette, 2010, and Slacalek, 2006): the marginal propensity to consume out of wealth lies around 0.8 cent to 1 cent on annual consumption for 1 euro increase. However, some shortcomings may be objected to estimates based on aggregate data. Firstly, some important missing common determinants (such as households' expectations) may induce spurious correlation between wealth and consumption.[1] Secondly, the heterogeneity in households' consumption reaction due to differences in wealth, age or portfolio composition cannot be accounted for.

The development of microeconomic surveys dealing with household finance and consumption gives the opportunity to overcome some of these shortcomings.[2] For instance, Maki and Palumbo (2001) show that the wealth effect on the saving rate in the U.S. is mainly concentrated among the rich; Bover (2005) shows variations of wealth effect on consumption according to age, Disney et al. (2010) and Campbell and Cocco (2007) find differentiated impact of wealth on consumption for homeowners and for renters. These studies also obtain differentiated effects for housing and financial wealth. Recent microdata based studies also emphasize the significant role played by financial expectations in explaining consumption changes (Disney et al., 2010, Jappelli and Pistaferri, 2000, or Pistaferri, 2001)[3]. This leads to consider an

[1] Several papers (e.g. King, 1990, Poterba, 2000, Attanasio et al., 2009, Calomiris et al., 2009 and Carroll et al., 2011) argue that the correlation between wealth and consumption could reflect a permanent income effect. It would be the case, for instance, if both increases in consumption and in housing prices are linked to a rise in permanent income.

[2] See Table 13 in the appendix for a detailed literature review of microdata based studies.

[3] Jappelli and Pistaferri (2000) or Pistaferri (2001) use subjective income expectations assessed by households in order to test the permanent income hypothesis (see Jappelli and Pistaferri, 2009 for a recent survey). Using a British survey, Attanasio et al. (2009) show that young people seem to be more impacted by changes in local housing prices than old people and argue that this effect results from changes in expectations about permanent income which are correlated to changes in housing prices. Furthremore Disney et al. (2010) show that not taking into account financial expectations may lead to overestimate the wealth effect on consumption.

additional channel by which asset price variations may have an effect on consumption: unexpected changes in asset prices may lead households to revise their expectations about future incomes, and thus to modify their consumption plans. This indirect effect is known as the *confidence channel* (Poterba, 2000, Fenz and Fessler, 2008).[4]

This paper aims at contributing to this literature by addressing two main concerns. First, it provides the first quantitative estimates of wealth effect on consumption for France based on micro level information, following Paiella (2007), Guiso et al. (2005), or Bover (2005). This empirical analysis is conducted using the French wealth survey (Enquête Patrimoine, Insee) in which quantitative questions about household annual consumption were added in the 2009 wave of the survey for the first time. We obtain low but significant wealth effect: a *one euro increase in total wealth* is associated with an *increase of about 0.3 cents in annual consumption.* This results are in line with macrodata based estimations for France.

Second, we focus on the recent crisis and investigate the respective roles played by changes in wealth and changes in expectations to study how price variations may have induced households to revise their consumption plans. This question is addressed by relying on unique information about *future planned consumption* given by an original household survey (*PATER* survey 2009). More precisely, we have qualitative information on *i)* households' ex-

[4]Let us illustrate the relation between consumption and wealth to shed light on the direct and indirect effects of asset prices. In a very simple framework (with interest rate equals to 0, no time preference, no bequest motive and no uncertainty), expected consumption does not vary over the life cycle : the consumption C_t at a time t is the sum of the present income, noted Y_t, future incomes plus the present wealth, A_t, divided by the expected number of remaining periods ($T-t$ if the horizon is T):

$$C_t = \frac{A_t + \sum_{k=t}^{T} E_t\left[Y_k\right]}{T-t}.$$

In this very simple framework, it becomes clear that an unanticipated fall of asset prices may impact consumption through two channels. First a direct effect wealth effect results from the changes in asset value A_t. Second, an indirect effect ("confidence channel") may stem from the adaptation of income expectations, $E_t\left[Y_{t+k}\right]$.

pectations about the evolution of their consumption basket (food, transport, health, housing etc.) and *ii)* the subjective probabilities assigned by households to a reduction in their future overall spending. Other valuable input of this *PATER* survey lies in the fact it allows to identify households who experienced a decrease (or increase) in their wealth caused by asset prices variations (and which does not reflect portfolio rebalancing, for instance). It also provides information on both households' expectations and households' *changes in expectations* about asset prices and unemployment risk between 2007 and 2009.

As Hurd and Rohwedder (2010) for American households, we find that French households were more pessimistic in 2009 than before the crisis (in 2007). This changes in expectations have a significant impact on household consumption plans: the pessimistic households are more likely to reduce their consumption. This result confirms the role played by the confidence channel, as a transmission mechanism of the crisis. Our results also show that all expenses are affected by changes in wealth. It seems that changes in financial wealth have stronger effects on more income elastic expenses (culture or clothing) than on less income elastic ones (transportation, health or food). Moreover, there are asymmetries in the reaction to positive *versus* negative financial wealth variations: the quantitative impact of a negative shock of financial wealth is smaller than a positive one.

This paper is organized as follows. In Section 2 the quantitative impact of wealth on consumption is estimated by relying on the French wealth survey (*Enquête Patrimoine*, Insee). Then we focus in section 3 on the recent crisis. We investigate how households adapted their consumption plans using household self-assessed qualitative information about future consumption, changes in wealth and changes in expectations (survey *PATER*). Section 4 concludes.

2 The marginal propensity to consume out of wealth in France: a first micro data based assessment

In order to assess the marginal propensity to consume out of wealth, we follow recent studies based on wealth surveys which also include some questions about consumption (Paiella, 2007, Guiso et al., 2005, or Bover, 2005).[5,6] Indeed, four questions about consumption were introduced in the 2009 wave of the French wealth survey (*Enquête Patrimoine*, Insee) and addressed to a subsample of about 5,000 households.[7] Our paper is thus the first attempt to evaluate wealth effect at the micro level for France.

Most of microdata based studies find significant but low effects of *housing wealth*: an increase of wealth of one euro is followed by an increase of 1.5 to 3 cents in annual consumption (Paiella, 2007, Guiso et al., 2005, and Bover, 2005). For Italy, Paiella (2007) finds a larger marginal propensity to consume out of *financial wealth* (9.2 cents for a one euro increase compared to 2.4 cents for housing wealth), which results in in a global effect of 4.2%. In some other countries financial wealth does not significantly affect consumption: Spain (Bover, 2005), Finland (Sierminska and Takhtamanova, 2007), U.S. (Bostic et al., 2009).

We consider a simple consumption function based on the life-cycle model, as in Guiso et al. (2005), Maki and Palumbo (2001),[8] or Paiella (2007). The

[5] See Browning et al. (2003) about survey methods to deal with consumption questions in general purpose surveys.

[6] Other microeconometric studies consider the impact of local housing price index to assess the impact of wealth variation on consumption (Campbell and Cocco (2007), Attanasio et al. (2009), Contreras and Nichols (2010), or Gan (2010)).

[7] A detailed presentation of the Insee survey is provided in appendix B.1.

[8] Maki and Palumbo (2001) actually consider the ratio of saving on income as the dependent variable.

baseline regression is the following:

$$\frac{C_i}{Y_i} = \beta_0 + \beta_1 \frac{W_i}{Y_i} + \beta_2 X_i + \varepsilon_i \tag{1}$$

where C_i is the amount of the annual expenses of household i, Y_i annual income, W_i household's wealth, Z_i a set of socioeconomic variables, including age of the reference person, size of the household, employment status of the reference person (employed, unemployed, student, retired or inactive).[9] Household consumption C_i is measured through a summary question about the household average monthly spending (excluding rents, durable goods, loans repayment).[10] We consider first the effect of total wealth W_i and then we estimate differentiated marginal propensity to consume out of financial, housing and other wealth for the whole population as well as for sub-samples of renters/homeowners and stockholders/non stockholders. Total wealth as well as financial wealth are given by summary questions.[11] Housing wealth refers to the value of the main residence. Other wealth is the difference between total wealth and the sum of financial wealth and the value of the main residence.[12] Table 1 below provides a summary of the estimated marginal propensity to consume out of wealth. Full results are available in table 5 in the appendix.

[9] Definitions of the variables and summary statistics can be found in appendix B.1.

[10] The survey module about consumption also includes three other questions by type of spending: food at home, food outside and regular bills (water, telephone, internet, electricity, etc). These detailed questions, combined with information based on Household Budget surveys, can be used to compute total consumption. This will be investigated in the near future. At this stage, we rely only on the measure of consumption given by the summary question.

[11] The questions are respectively :

"*In your opinion, if the household had to liquidate all the assets which are owned today, including business wealth, durable goods (furniture, household goods, car...), art objects, jewellery, precious metals. How much money would you get from this sale ?*"

"*May you assess the total amount of all the financial assets of your household ?*"

[12] As a result other wealth includes other real estate and business wealth. In the near future we plan to check for the robustness of our results to definition of the variables, by relying on detailed information about portfolio composition.

Table 1: Marginal propensity to consume out of wealth in cents for a one euro increase in wealth (equation 1)

Variables	All	All	Home-owners	Renters	Stock-holders	Non-stock-holders
MPC out of wealth	0.313***	-	-	-	-	-
	(0.0405)	-	-	-	-	-
MPC out of	-	0.178**	0.129*	0.563**	0.305***	0.143
financial wealth	-	(0.0885)	(0.0781)	(0.278)	(0.102)	(0.176)
MPC out of	-	0.824***	1.314***	-	1.247***	0.706***
housing wealth	-	(0.107)	(0.159)	-	(0.243)	(0.116)
MPC of other	-	0.169***	0.193***	0.141	0.215***	0.172***
wealth	-	(0.0453)	(0.0496)	(0.119)	(0.0716)	(0.0604)
Observations	3074	3074	2073	1001	715	2359
R-squared	0.064	0.080	0.133	0.062	0.146	0.076

Source : Enquête Patrimoine (Insee 2009).
Note: The dependent variable is the ratio of annual expenses to annual income. The RHS variables of interest are: ratio of global wealth to annual income (first column), ratios of financial wealth, of home value and of other wealth to annual income (other columns). The control variables are: number of persons in the household, age, square of age and employment status. The marginal propensity to consume out of wealth is reported in cents for a one euro increase. That is to say that MPC is equal to $100 \times \beta_1$.
Full results are available in Table 5 in the appendix.
*OLS estimations. Robust standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

We obtain low but significant wealth effect: a *one euro increase in total wealth* is associated with an *increase of about 0.3 cents in annual consumption*. This wealth effect is driven both by housing and financial wealth: a one euro increase in housing wealth (respectively in financial wealth) leads to 0.8 cent of additional annual consumption (respectively to 0.2 cent). These results are thus in line with macrodata based evaluations for France that also find low and significant wealth effects (around 0.8 to 1 cent, see Chauvin and Damette, 2010, and Slacalek, 2006). They are also coherent with other micro level analysis that generally find smaller wealth effects than those obtained on aggregate data (see for instance Disney et al., 2010).

These low wealth effects for France can be due to various factors. First, the role of housing wealth as collateral is not widely developed. Indeed, housing assets are not used to guaranty loans with other purposes than acquiring housing assets (such as consumer credits, revolving credits).[13] Moreover, preference for bequest may also explain the weak sensitivity of consumption to housing wealth. Finally, one may suspect that the small impact of financial wealth stems from the limited proportion of stockholders in France (about 20% according to the 2009 *Enquête Patrimoine* (Insee)). Separate estimates of the marginal propensity to consume out of wealth for the subsample of stockholders and of non stockholders (two latest columns of table 1), confirm that the financial wealth effect is significant at only 1% level for stockholders and amounts to about 0.3 cents of annual consumption for a one euro increase in financial wealth.

[13] Such revolving credits were not permitted by French Law before 2006. They remain very uncommon in France.

3 How did consumption plans change during the crisis?

We now turn to our second issue and focus on the effect of the crisis on household consumption. Instead of considering current consumption, we benefit from an original survey (*PATER* survey[14]) conducted in June 2009 which provides information about the *future planned consumption* as reported by households. More precisely, changes in future planned consumption may be assessed relying on two complementary questions dealing with i) the expected evolution of the households' consumption basket and ii) the subjective probabilities assigned by households to a reduction in future spending.[15] This survey also provides interesting information about household expectations regarding asset prices, income and unemployment risk so that it is possible to analyze the respective roles played by changes in wealth and changes in financial expectations as determinants of *future planned consumption* during the crisis. We start by examining how household expectations have changed during the crisis before detailing our empirical strategy.

3.1 Household expectations and the crisis

Bad economic outlook may have two effects on household saving behaviour. First, if individuals are expecting a deterioration of the economic situation characterized by lower asset returns in the future, they also could expect a decrease in their permanent income. Second, bad times, and especially the crisis in 2008-2009, may have also been perceived as characterized by larger risks as regards income and unemployment. This background risk effect is then likely to induce more precautionary saving. Therefore, households are likely to revise their consumption plans by reducing spending when tak-

[14] See the detailed presentation of the survey in appendix C.1.

[15] Similar questions are asked in the American Life Panel. Hurd and Rohwedder (2010) show that expected changes in spending predict well the actual changes.

ing into account these two effects (lower permanent income and reinforced background risks).

Following the developing literature dealing with the measurement of expectations (see Manski, 2004 or Pesaran and Weale, 2006), the *PATER* survey asks households to give their probabilistic expectations concerning several aspects: stock market expectations, income expectations, and perceptions of job insecurity.

Stock market expectations are elicited with the following question*: "Within five years, what is the probability according to you that the stock market (the response has to add up to 100%):*

- will increase by more than 25%?,

- will increase by 10% to 25%,

- will increase less than 10%,

- will be the same as today,

- will decrease by less than 10%,

- will decrease by 10% to 25%,

- will decrease by more than 25%."

Similarly, expectations on income are elicited by asking: *"Within five years, what is the probability according to you that your income (salary, pension) will...*[the same modalities as for stock returns]*"*. Following Pistaferri (2001), this allows us to construct various indicators of households' expectations concerning stocks prices and future income, such as the expected 5-year stock return and the expected income growth rate.[16]

Perceptions of job insecurity is elicited by asking people about the chance that they will lose their job during the next 12 months on a scale from 0 to 10. When combining this information with household current income, a measure of income risk due to unemployment can be computed.

Moreover, as the sample of the *PATER* survey includes a panel of households interviewed both in the 2007 and in the 2009 waves, it makes it possible

[16] See appendix C.2 for detailed information about the construction of the variables.

Table 2: Household expectations in 2007 and in 2009

		2007	2009
Expectations on stock market			
Expected 5-year stock return:	$E_t[\frac{P_{t+5}}{P_t} - 1]$	5.8%	4.5%
Percentage of...	$E_t[\frac{P_{t+5}}{P_t} - 1] < 0$	15.2%	24.1%
	$E_t[\frac{P_{t+5}}{P_t} - 1] = 0$	27.2%	22.6%
	$E_t[\frac{P_{t+5}}{P_t} - 1] > 0$	57.6%	53.3%
Expectations on income			
Expected income growth:	$E_t[\frac{Y_{t+5}}{Y_t} - 1]$	2.8%	1.6%
Percentage of...	$E_t[\frac{Y_{t+5}}{Y_t} - 1] < 0$	19.8%	25.8%
	$E_t[\frac{Y_{t+5}}{Y_t} - 1] = 0$	31.9%	32.8%
	$E_t[\frac{Y_{t+5}}{Y_t} - 1] > 0$	48.3%	41.4%
Expectations on unemployment risk			
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: $p_t Y_t$		837.33	855.41
Measure of risk due to unemployment: $p_t(1-p_t)Y_t^2$		938870.24	1057393.00

Source : PATER survey (2009), subsample of panel respondents (N=903).
Note: The expected 5-year stock return ($E_t[\frac{P_{t+5}}{P_t} - 1]$) 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%-25%, less than 10%, will be the same as today, will decrease by less than 10%, by 10% to 25%, by more than 25%?". The expected income growth ($E_t[\frac{Y_{t+5}}{Y_t} - 1]$) 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, what is your risk to lose your job during the next 12 months ?. [0 means that their is no risk for you to lose your Job and 10 that the risk is large]" We consider the response divided by 10 as a proxy for the probability of unemployment (p_t).

to compare the expectations of the *same* individuals before and during the crisis (see table 2).

According to these measures of expectations, households appeared more pessimistic in 2009 than in the previous wave of the survey in 2007. First, they were anticipating a lower expected 5-year stock return in 2009 (4.5% on average) than in 2007 (5.8%). In particular, the percentage of households expecting *negative* returns on stock markets increased from 15.2% to 24.1% between 2007 and 2009. Expectations on income also became more pessimistic: the expected income growth rate decreased from 2.8% to 1.6% between 2007 and 2009 and the proportion of households expecting a positive income growth decreased by 7 percentage points (from 48.3% to 41.4%). Concerning the perception of unemployment risk, our measures do not show a significant change between 2007 and 2009 as the average subjective probability to lose job was around 35% both in 2007 and 2009.[17]

To conclude this section, we find that during the crisis households changed their expectations and became more pessimistic as regards future stock returns and income.[18] The following section aims now at examining how households adapted their consumption plans in this context.

3.2 Modelling the determinants of changes in consumption plans

This empirical analysis is closely related to Disney et al. (2010) who obtain significant effects of changes in expectations and of capital gains on consumption. However, instead of considering actual consumption reported in successive panel waves to measure changes in consumption as they did, we explain households' self-assessed changes in consumption plans. These

[17] Even if these measures do not directly take into account unemployment benefits, they are good measures of unemployment risk, since unemployment benefits are proportionnal to income.

[18] This is also consistent with the Monthly Consumer Confidence Index computed by Insee (see figure 2 in the appendix).

modifications of consumption plans are proxied relying on two complementary questions that can be used to assess i) the subjective probabilities assigned by households to the event of spending less in the future, ii) the expected evolution of the households' consumption basket.

The subjective probabilities of spending plans

Let us consider a latent variable y_i^* characterizing the opinion of household i about his probability to reduce spending in the near future. Following the literature about wealth effect, an empirical model defining the subjective probabilities to modify spending plans can be written as:

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

with[19] ΔW_{Fi} financial wealth variation, ΔW_{Hi} housing wealth variation, ΔY_i income variation, ΔE_i changes in expectations, Z_i control variables such as time horizon and socio-demographic variables (number of children, marital status) and ε_i a random term normally distributed across observations.

The latent variable y_i^* is unobserved. However, 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 12 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 $(j = 1, ..., 4)$ unknown threshold values such as $\mu_j < \mu_{j+1}$. Thus,

[19] See the construction of the variables in appendix *C.2.*

this model can be estimated as a standard ordered probit with unknown thresholds.

The expected evolution of the consumption basket

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

$$\Delta C^{e*}_{i,k} = \pi_{0,k} + \pi_{F1,k}\Delta W_{Fi} + \pi_{H1,k}\Delta W_{Hi} + \pi_{2,k}\Delta Y_i + \pi_{3,k}\Delta E_i + \pi_{4,k}Z_i + \omega_{ik} \quad (3)$$

Similarly to equation 2, the explanatory variables are: ΔW_{Fi} financial wealth variation, ΔW_{Hi} housing wealth variation, ΔY_i income variation, ΔE_i changes in expectations and Z_i control variables such as time horizon and socio-demographic variables (number of children, marital status).

ω_{ik} is a random term such as:

$$\omega_i \sim \mathcal{N}_k\left(0, \Sigma\right)$$

While the latent dependent variable $\Delta C^{e*}_{i,k}$ is not directly measured, it can be elicited with the following question: "*Personally, do you think that the turmoil affects or will affect each of the following expenses*[20]*: 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

[20] The list of considered spending is the following: food, house refurbishment, transport (public transport, car maintenance), textile (clothes, shoes), health, technological product (TV, computer, mobile phone, etc.) and cultural goods (books, DVD, theater, cinema, tourism).

in consumption plans:

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

Taking into account correlations between error terms ω_i for a given individual, leads us to estimate the consumption basket model (equation 3) as a multivariate probit.[21]

Results for both equations (equations 2 and 3) are presented below.

3.3 Results on consumption plans

The main results concerning the subjective probabilities to reduce spending (equation 2) are presented in table 4 below (for full results, see table 6 in the appendix). Those on the detailed consumption basket (equation 3) are displayed in table 7 in appendix. Table 3 displays the marginal effects for both equations.

Due to missing values for some explanatory variables (especially expectation variables), the sample is reduced from 3,468 observations to 1,681 when using the panel component and to 903 when introducing expectations about stock market. Additional regressions on the restricted sample lead to similar results as for the full sample. These robustness checks are available in Table 8 in appendix .

3.3.1 Wealth effects

These regressions confirm the significant wealth effect on consumption during the crisis which is driven by housing and financial wealth. Indeed, when

[21] Our estimation are obtained using the module *mvprobit* 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 estimations did not vary too much depending on the seed.

examining the subjective probabilities of spending less, we find that households who suffered losses in housing assets are about +5.1 percentage points more likely to declare having high or medium probability to decrease their consumption than those with stable housing wealth, everything else being equal.[22,23] Similarly those who suffered losses in financial assets are +3.2 percentage points more likely to plan to spend less.[24] On the contrary, households experiencing an increase in their asset values over the last years are less likely to think about reducing consumption: this difference amounts to −13.5 percentage points in the likelihood to probably reduce consumption for an increase in financial asset value (respectively −6.2 percentage points for an increase in housing wealth).

Heterogeneity along the wealth distribution

By interacting households' wealth (decomposed by quartile) with the qualitative variables reflecting wealth increase/decrease (ΔW_{Fi} and ΔW_{Hi}), we find that the impact of wealth changes on consumption is decreasing with wealth: households in the bottom of the wealth distribution are more likely to reduce consumption when facing losses.[25] For instance, in case of negative shocks on financial wealth, the probability to decrease consumption rises by +14.4 percentage points for households belonging to the second quartile of the wealth distribution while it increases only by +7.5 percentage points for

[22] Marginal effect of facing a decrease in housing value on the probability to reduce spending is computed as:

$$E\left[\Pr(y_i \geqslant 3|\text{housing value decreased}) - \Pr(y_i \geqslant 3|\text{housing value remained stable})\right]$$

In other words, for each individual, equation 2 is used to compute the difference between i) the probability that the consumption will be reduced with medium or high probability (conditional on the fact that the housing value would have decreased) and ii) the same probability conditional on the fact that the housing value would have remained stable. Then the marginal effect is the mean of this difference accross the population.

[23] If not specified, the coefficients of the results presented in this section are significant at 1% level (see tables 4 and 6).

[24] The coefficient of this result is significant at 10% level.

[25] These results are available from the authors upon request.

households in the third quartile of wealth distribution (everything else being equal).[26] This wealth effect is even non significant for households in the last quartile of wealth distribution. These differences can be partly explained by the heterogeneity in the precautionary saving behavior: wealthy people save less in proportion than others for precautionary motives.

Heterogeneity across the type of spending

Households' expenses are not uniformly impacted by wealth variations. The figures 3 and 4 (in appendix) provide a summary of the housing and financial wealth effect on each expenses. For a given category of expenses, the quantitative impact of housing and financial wealth variations may differ: financial wealth gains impact all category of expenses in the same manner, except food, refurbishment and transportation, while housing wealth reduction has no significant effect on clothing and on cultural expenses.

Asymmetries for gains versus losses

The quantitative impact of a negative shock of financial wealth is smaller than a positive one (+3.2 versus −13.5 percentage points on the average probability to reduce consumption). Negative shocks on financial wealth mainly increase the probability to reduce expenses on food (+5.7 percentage points), transportation (+5.6 percentage points) and health (+5.7 percentage points). In case of positive variation of financial wealth, the probability to limit consumption during the crisis is more reduced for the following expenses: clothing (−10.2 percentage points), technological products (−10.2 percentage points) and culture (−11.5 percentage points).

[26] The computation of the marginal effects of interaction variables take into account the remarks of Ai and Norton (2003).

Table 3: Marginal effects on consumption plans (equations 2 and 3)

		Variations of financial assets			Variations of housing assets		
		Decrease	Stable	Increase	Decrease	Stable	Increase
Equation 2: Subjective probability to reduce spending							
Total spending	Average probability		67.2%			68.5%	
	Marginal Effects	+3.2	Ref.	-13.5	+5.1	Ref.	-6.2
Equation 3: Expected evolution of the consumption basket							
Food	Average probability		59.6%			61.8%	
	Marginal Effects	+5.7	Ref.	-5.2	+8.9	Ref.	-3.7
Refurbishment	Average probability		74.0%			78.3%	
	Marginal Effects	+3.9	Ref.	-2.5	+6.0	Ref.	-4.9
Transportation	Average probability		38.7%			44.0%	
	Marginal Effects	+5.6	Ref.	-4.7	+4.8	Ref.	-6.0
Clothing	Average probability		68.6%			71.5%	
	Marginal Effects	+5.7	Ref.	-10.7	+3.7	Ref.	-5.4
Health	Average probability		42.8%			45.8%	
	Marginal Effects	+4.7	Ref.	-7.6	+7.1	Ref.	-6.9
Techn. prod.	Average probability		66.1%			68.5%	
	Marginal Effects	+5.1	Ref.	-10.2	+6.4	Ref.	-4.2
Cult. prod.	Average probability		74.5%			76.8%	
	Marginal Effects	+4.5	Ref.	-11.5	-0.4	Ref.	-4.6

Source : PATER Survey (2009).

Note: Marginal effects in percentage points and average estimated probabilities computed from the regressions displayed in tables 4 and 7. Below we describe the results of the first and second columns.

Equation 2 (probability to reduce spending): Marginal effect of facing losses in financial wealth: $E[Pr(y_i \geq 3|\textit{losses in financial wealth}) - Pr(y_i \geq 3|\textit{losses in financial wealth})]$. *Lecture: Given that the financial assets value remained stable, the average probability of having medium or high probability to reduce consumption is 67.2%. If the household suffered losses in financial asset, this probability increased by 3.2 percentage points.*

Equation 3 (evolution of the consumption basket): Standard marginal effects for a probit model. Lecture: Given that the financial assets value remained stable, the average probability to reduce food consumption is 59.6%. If the household suffered losses in financial asset, this probability increased by 5.7 percentage points.

Table 4: 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	Decrease	0.093 *	0.050	0.135 *	0.075	0.038	0.145
	Stable	Ref.		Ref.		Ref.	
	Increase	-0.362 ***	0.077	-0.335 ***	0.115	-0.467 **	0.189
	Not concerned	0.131 **	0.059	0.227 **	0.093	0.209	0.178
	No reply	0.269 *	0.145	0.069	0.229		
Variation of housing assets	Decrease	0.154 ***	0.053	0.192 **	0.077	0.145	0.108
	Stable	Ref.		Ref.		Ref.	
	Increase	-0.171 ***	0.037	-0.135 ***	0.051	-0.090	0.070
	Not concerned	0.093 **	0.039	0.060	0.059	-0.095	0.087
	No reply	-0.037	0.073	-0.083	0.104	0.064	0.162
Increase in stock market expectations		- - -		- - -		-0.011 ***	0.003
Increase of expected loss of income due to unemployment		- - -		6.1E-05	4.2E-05	2.4E-05	5.5E-05
Increase in risk of unemployment		- - -		-4.6E-08	3.0E-08	-4.2E-08	3.9E-08
Variation of income	Decrease	- - -		-0.026	0.105	-0.034	0.141
	Stable	- - -		Ref.		Ref.	
	Increase	- - -		-0.049	0.166	0.012	0.241
N		3468		1681		903	
Log-likelihood		-3951.7		-1908.1		-1016.2	
Pseudo-R2		5.7%		5.5%		8.8%	

Source : PATER Survey (2009).

Note: The dependent variable is the subjective ordered probability to reduce spending. The variables of interest are financial assets and home value variations, changes in unemployment expectations and in stock market expectations (for regressions II and II). The control variables are: number of children in the household, age, marital status and employment status crossed with past unemployment.

Full results are available in table 6 in the appendix and sample definition is provided in appendix C.3.

*Ordered probit with unknown threshold. Standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

3.3.2 Expectations

Consumption plans are significantly impacted by changes in households' expectations, especially concerning stock markets: consistently with the permanent income hypothesis, households expecting a recovery of stock market prices are also less likely to reduce their consumption. Concerning background risks, we do not obtain significant effect of unemployment risk (as measured by the variation of income variance between 2007 and 2009) on consumption plans. However, being currently unemployed but also, to a lesser extend, past unemployment periods increase the probability to reduce consumption. This may reflect heterogeneity in precautionary saving behavior due to differences in the exposure to unemployment risk.

Another striking result is the fact that the estimated coefficients of wealth effects are not dramatically affected by the introduction of households' expectations as explanatory variables (second and third columns of table 4).[27]

All in all, it can be concluded that asset prices variation impacts household consumption through capital gains or losses and through the confidence channel. In other words, this empirical analysis of the determinants of consumption plans confirms the existence of a wealth effect on consumption in France, especially during the crisis, which can be attributed both to changes in asset value and to modifications of households' expectations.

4 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 re-emerged:

[27] The loss of significativity of some coefficients is due to the reduction of the sample size rather than the introduction of the expectation variables. Indeed, estimates based on subsample II and subsample III without introducing the expectation variables leads to similar results (see table 8 in appendix).

do unanticipated changes in wealth affect consumption? The aim of this paper was to provide some new empirical results on this issue.

First, the paper provides for the first time microdata based evaluation of wealth effect for France based on the French wealth survey (Enquête Patrimoine, Insee). We find a low but significant wealth effect on consumption, both for housing and financial wealth, confirming what was previously found on aggregate data. A one euro increase in total wealth is associated with a 0.3 cents increase in annual consumption. As expected, the financial wealth effect is significant only for stockholders.

Second, we focus on the recent crisis and study how households have adapted their consumption plans, by relying on an original French household survey (*PATER* survey). When comparing self-assessed expectations for the same individuals in 2007 and in 2009, we find that households are more pessimistic about the economic outlook in 2009, especially as regards their future income and the expected returns of the stock market.

Then, we estimate the impact of wealth changes on the probability to modify consumption plans as measured by two complementary proxies: subjective probabilities to consume less and the self-assessed changes in plans for future consumption detailed by type of spending. We control for household expectations on their future income as well as on the evolution of stock market prices.

We find a significant wealth effect on consumption plans during the crisis driven both by the changes in housing and financial wealth. Households who suffered losses in their financial or housing wealth are between +3 and +5 percentage points more likely to think about reducing consumption in the future than those whose asset value remained stable, everything else being equal. 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. Moreover, we

find asymmetries in the reaction to positive *versus* negative financial wealth variations.

Expectations are also a significant determinant of the probability to modify consumption plans. Indeed, the crisis changed dramatically the households' expectations and we find the pessimistic households more likely to reduce their consumption. This result confirms the existence of another channel, in addition to the direct wealth effect, by which the crisis is transmitted to the households, the confidence channel.

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Appendix

A Additional results

Table 5: Marginal propensity to consume out of wealth - equation 1 (full results)

Variables	All	All	Home-owners	Renters	Stock-holders	Non-stock-holders
Wealth/income	0.00307***	-	-	-	-	-
	(0.000385)	-	-	-	-	-
Financial	-	0.00178**	0.00129*	0.00563**	0.00305***	0.00143
wealth/income	-	(0.000885)	(0.000781)	(0.00278)	(0.00102)	(0.00176)
Housing	-	0.00824***	0.0131***	-	0.0125***	0.00706***
wealth/income	-	(0.00107)	(0.00159)	-	(0.00243)	(0.00116)
Other wealth/income	-	0.00169***	0.00193***	0.00141	0.00215***	0.00172***
	-	(0.000453)	(0.000496)	(0.00119)	(0.000716)	(0.000604)
Number of persons	0.00493	0.00456	0.0182***	0.00486	0.00870	0.00591
	(0.00381)	(0.00381)	(0.00484)	(0.00647)	(0.00832)	(0.00425)
Age of the household	0.00181	0.000630	0.00428*	0.00573**	0.0106***	-0.000534
head	(0.00178)	(0.00177)	(0.00236)	(0.00278)	(0.00404)	(0.00197)
Age^2 (10^{-5})	-1.04e-05	-1.17e-06	-2.57e-05	-4.76e-05*	-9.90e-05***	1.69e-05
	(1.70e-05)	(1.68e-05)	(2.20e-05)	(2.72e-05)	(3.67e-05)	(1.89e-05)
Employed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Student	0.309***	0.313***	-	0.288***	0.103**	0.316***
	(0.0622)	(0.0623)	-	(0.0632)	(0.0429)	(0.0634)
Unemployed	0.113***	0.107***	0.0542	0.0851***	-0.00415	0.106***
	(0.0249)	(0.0245)	(0.0383)	(0.0315)	(0.0827)	(0.0255)
Retired	0.0307**	0.0265*	0.0278	0.0107	0.0549*	0.0117
	(0.0154)	(0.0152)	(0.0174)	(0.0301)	(0.0292)	(0.0176)
Inactive	0.128***	0.120***	0.0748	0.0868*	0.264	0.0842**
	(0.0407)	(0.0417)	(0.0669)	(0.0473)	(0.202)	(0.0356)
Other status	0.153***	0.155***	0.133**	0.115**	-0.0322	0.154***
	(0.0445)	(0.0435)	(0.0646)	(0.0575)	(0.159)	(0.0434)
Constant	0.331***	0.353***	0.141**	0.278***	0.0332	0.378***
	(0.0456)	(0.0453)	(0.0659)	(0.0667)	(0.111)	(0.0494)
Observations	3074	3074	2073	1001	715	2359
R-squared	0.064	0.080	0.133	0.062	0.146	0.076

Source : Enquête Patrimoine (Insee 2009).
*Note: The dependent variable is the ratio of annual expenses to annual income. The marginal propensity to consume out of wealth is reported in euro for a one euro increase. OLS estimations. Robust standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

Table 6: Probability to reduce total consumption in the twelve coming months - Full results (equation 2, ordered probit)

		Regression I		Regression II		Regression III	
		Estim.	SE	Estim.	SE	Estim.	SE
Variation of financial assets	Decrease	0.093 *	0.050	0.135 *	0.075	0.038	0.145
	Stable	Ref.		Ref.		Ref.	
	Increase	-0.362 ***	0.077	-0.335 ***	0.115	-0.467 **	0.189
	Not concerned	0.131 **	0.059	0.227 **	0.093	0.209	0.178
	No reply	0.269 *	0.145	0.069	0.229		
Variation of housing assets	Decrease	0.154 ***	0.053	0.192 **	0.077	0.145	0.108
	Stable	Ref.		Ref.		Ref.	
	Increase	-0.171 ***	0.037	-0.135 ***	0.051	-0.090	0.070
	Not concerned	0.093 **	0.039	0.060	0.059	-0.095	0.087
	No reply	-0.037	0.073	-0.083	0.104	0.064	0.162
Increase in stock market expectations		- - -		- - -		-0.011 ***	0.003
Increase of expected loss of income due to unemployment		- - -		6.1E-05	4.2E-05	2.4E-05	5.5E-05
Increase in risk of unemployment		- - -		-4.6E-08	3.0E-08	-4.2E-08	3.9E-08
Variation of income	Decrease	- - -		-0.026	0.105	-0.034	0.141
	Stable	- - -		Ref.		Ref.	
	Increase	- - -		-0.049	0.166	0.012	0.241
Age	Less than 25	0.045	0.074	0.062	0.208	-0.038	0.285
	25-34	Ref.		Ref.		Ref.	
	35-44	0.057	0.056	0.055	0.094	0.039	0.126
	45-54	-0.020	0.051	0.099	0.074	0.210 **	0.101
	55-64	0.020	0.046	0.031	0.069	-0.082	0.097
	65-74	0.008	0.068	-0.092	0.103	-0.103	0.146
	More than 74	-0.095	0.078	-0.154	0.120	-0.101	0.176

Continuation on next page...

Table 6 - continued : Probability to reduce total consumption in the twelve coming months (equation 2, ordered probit)

		Regression I		Regression II		Regression III	
		Estim.	SE	Estim.	SE	Estim.	SE
Marital status	Married	Ref.		Ref.		Ref.	
	Single	-0.077 *	0.046	-0.075	0.067	-0.098	0.095
	Divorced	0.101 *	0.057	0.086	0.076	0.165	0.113
	In a relationship	-0.016	0.054	-0.063	0.082	-0.016	0.114
	Widow	0.027	0.066	0.124	0.095	0.001	0.145
Number of children		0.056 **	0.024	0.055	0.034	0.009	0.047
Unemployed and...	unemployed once previously	0.432 ***	0.167	0.403	0.324	0.979 **	0.442
	unemployed several times previously	0.459 ***	0.131	0.486 *	0.253	1.295 ***	0.462
	never been unemployed	0.486 **	0.189	0.692 **	0.342	0.875 *	0.468
Employed and...	unemployed once previously	0.044	0.043	0.258	0.280	-0.036	0.059
	unemployed several times previously	0.143 ***	0.046	0.349	0.281	0.197 ***	0.070
	never been unemployed	Ref.		Ref.		Ref.	
	no reponse	-0.065	0.086	-0.712	0.828	- -	-
Retired		0.030	0.079	0.161	0.110	0.132	0.145
Inactive		-0.006	0.076	0.065	0.118	0.020	0.166
Intercept	Intercept1	-0.986 ***	0.066	-1.341 ***	0.290	-1.054 ***	0.173
	Intercept2	0.529 ***	0.065	0.201	0.289	0.513 ***	0.171
	Intercept3	1.555 ***	0.069	1.249 ***	0.291	1.605 ***	0.177
N		3468		1681		903	
Log-likelihood		-3951.7		-1908.1		-1016.2	
Pseudo-R2		5.7%		5.5%		8.8%	

Source : PATER Survey (2009).

Note: The dependent variable is the subjective probability to reduce spending. The variables of interest are financial assets and housing assets variations, changes in unemployment expectations and in stock market expectations (for regressions II and II). The control variables are: number of children in the household, age, marital status and employment status crossed with past unemployment.

The samples selection is described in appendix C.3. For robustness checks of the results based on sample II (N=1681) and sample III (N=903) see Table 8 in this appendix.

*Ordered probit with unknown threshold. Standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

Table 7: Probabibility to reduce consumption by category of expenses (equation 3, multivariate probit)

		Food	Refurb.	Transport.	Clothing	Health	Techno. Products	Cultural products
Past variation of financial assets	Decrease	0.152***	0.133**	0.152***	0.133**	0.152***	0.133**	0.152***
		(0.0523)	(0.0557)	(0.0523)	(0.0557)	(0.0523)	(0.0557)	(0.0523)
	Stable	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Increase	-0.138	-0.0824	-0.138	-0.0824	-0.138	-0.0824	-0.138
		(0.102)	(0.106)	(0.102)	(0.106)	(0.102)	(0.106)	(0.102)
	Not concerned	0.340***	0.128*	0.340***	0.128*	0.340***	0.128*	0.340***
		(0.0730)	(0.0752)	(0.0730)	(0.0752)	(0.0730)	(0.0752)	(0.0730)
	No reply	0.523**	0.206	0.523**	0.206	0.523**	0.206	0.523**
		(0.225)	(0.223)	(0.225)	(0.223)	(0.225)	(0.223)	(0.225)
Past variation of housing assets	Decrease	0.248***	0.224**	0.248***	0.224**	0.248***	0.224**	0.248***
		(0.0850)	(0.0935)	(0.0850)	(0.0935)	(0.0850)	(0.0935)	(0.0850)
	Stable	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Increase	-0.0974*	-0.163***	-0.0974*	-0.163***	-0.0974*	-0.163***	-0.0974*
		(0.0584)	(0.0624)	(0.0584)	(0.0624)	(0.0584)	(0.0624)	(0.0584)
	Not concerned	0.0837	-0.225***	0.0837	-0.225***	0.0837	-0.225***	0.0837
		(0.0635)	(0.0665)	(0.0635)	(0.0665)	(0.0635)	(0.0665)	(0.0635)
	No reply	0.0560	0.0654	0.0560	0.0654	0.0560	0.0654	0.0560
		(0.115)	(0.123)	(0.115)	(0.123)	(0.115)	(0.123)	(0.115)
Age	Less than 25	-0.0820	-0.208*	-0.0820	-0.208*	-0.0820	-0.208*	-0.0820
		(0.108)	(0.111)	(0.108)	(0.111)	(0.108)	(0.111)	(0.108)
	25-34	-0.176**	0.00735	-0.176**	0.00735	-0.176**	0.00735	-0.176**
		(0.0769)	(0.0836)	(0.0769)	(0.0836)	(0.0769)	(0.0836)	(0.0769)
	35-44	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	45-54	-0.0193	0.0623	-0.0193	0.0623	-0.0193	0.0623	-0.0193
		(0.0757)	(0.0821)	(0.0757)	(0.0821)	(0.0757)	(0.0821)	(0.0757)
	55-64	0.0794	0.0680	0.0794	0.0680	0.0794	0.0680	0.0794
		(0.0951)	(0.1000)	(0.0951)	(0.1000)	(0.0951)	(0.1000)	(0.0951)
	65-74	-0.0786	0.0785	-0.0786	0.0785	-0.0786	0.0785	-0.0786
		(0.126)	(0.131)	(0.126)	(0.131)	(0.126)	(0.131)	(0.126)
	More than 74	-0.147	-0.0512	-0.147	-0.0512	-0.147	-0.0512	-0.147
		(0.136)	(0.141)	(0.136)	(0.141)	(0.136)	(0.141)	(0.136)
Marital status	Married	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Single	-0.178**	-0.102	-0.178**	-0.102	-0.178**	-0.102	-0.178**
		(0.0700)	(0.0729)	(0.0700)	(0.0729)	(0.0700)	(0.0729)	(0.0700)
	Divorced	-0.0407	0.0649	-0.0407	0.0649	-0.0407	0.0649	-0.0407
		(0.0846)	(0.0908)	(0.0846)	(0.0908)	(0.0846)	(0.0908)	(0.0846)
	In a relationship	-0.0144	0.0901	-0.0144	0.0901	-0.0144	0.0901	-0.0144
		(0.0790)	(0.0865)	(0.0790)	(0.0865)	(0.0790)	(0.0865)	(0.0790)
	Widow	0.0940	-0.0317	0.0940	-0.0317	0.0940	-0.0317	0.0940
		(0.0957)	(0.0971)	(0.0957)	(0.0971)	(0.0957)	(0.0971)	(0.0957)

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Table 7 - continued: Probabibility to reduce consumption by category of expenses (equation 3, multivariate probit)

		Food	Refurb.	Transport.	Clothing	Health	Techno. Products	Cultural products
Number of children		-0.0126	0.121***	-0.0126	0.121***	-0.0126	0.121***	-0.0126
		(0.0280)	(0.0312)	(0.0280)	(0.0312)	(0.0280)	(0.0312)	(0.0280)
Unemployed and...	unemployed once previously	0.289	-0.0390	0.289	-0.0390	0.289	-0.0390	0.289
		(0.191)	(0.189)	(0.191)	(0.189)	(0.191)	(0.189)	(0.191)
	unemployed several times previously	0.478***	0.234	0.478***	0.234	0.478***	0.234	0.478***
		(0.167)	(0.168)	(0.167)	(0.168)	(0.167)	(0.168)	(0.167)
	never been unemployed	0.166	-0.0553	0.166	-0.0553	0.166	-0.0553	0.166
		(0.215)	(0.210)	(0.215)	(0.210)	(0.215)	(0.210)	(0.215)
Employed and...	unemployed once previously	0.207***	0.161***	0.207***	0.161***	0.207***	0.161***	0.207***
		(0.0557)	(0.0595)	(0.0557)	(0.0595)	(0.0557)	(0.0595)	(0.0557)
	unemployed several times previously	0.321***	0.255***	0.321***	0.255***	0.321***	0.255***	0.321***
		(0.0653)	(0.0704)	(0.0653)	(0.0704)	(0.0653)	(0.0704)	(0.0653)
	never been unemployed	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	no reponse	0.0870	-0.0816	0.0870	-0.0816	0.0870	-0.0816	0.0870
		(0.137)	(0.139)	(0.137)	(0.139)	(0.137)	(0.139)	(0.137)
Retired		0.184*	0.0251	0.184*	0.0251	0.184*	0.0251	0.184*
		(0.0938)	(0.0964)	(0.0938)	(0.0964)	(0.0938)	(0.0964)	(0.0938)
Inactive		0.105	-0.0397	0.105	-0.0397	0.105	-0.0397	0.105
		(0.0910)	(0.0944)	(0.0910)	(0.0944)	(0.0910)	(0.0944)	(0.0910)
Intercept		0.117	0.576***	0.117	0.576***	0.117	0.576***	0.117
		(0.0883)	(0.0948)	(0.0883)	(0.0948)	(0.0883)	(0.0948)	(0.0883)
N		3468						
Log-likelihood		-10775.8						

Source : PATER Survey (2009).

Note: The dependent variable is a vector of the reductions of consumption for each category of expenses. The variables of interest are financial assets and home value variations. The control variables are: number of children in the household, age, marital status and employment status crossed with past unemployment.

The sample is the same than the regression I and is described in appendix B.2.

*Multivariate probit. Standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

Table 8: 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	0.136 *	0.075	0.039	0.145
	Stable	Ref.		Ref.	
	Increase	-0.341 ***	0.115	-0.461 **	0.188
	Not concerned	0.225 **	0.093	0.218	0.178
	No reply	0.077	0.229	0.404	0.515
Variation of housing assets	Decrease	0.190 **	0.077	0.155	0.107
	Stable	Ref.		Ref.	
	Increase	-0.136 ***	0.051	-0.086	0.070
	Not concerned	0.064	0.059	-0.064	0.086
	No reply	-0.084	0.104	0.011	0.161
Increase in stock market expectations		- - -		- - -	
Increase of expected loss of income due to unemployment		- - -		- - -	
Increase in risk of unemployment		- - -		- - -	
Variation of income	Decrease	- - -		- - -	
	Stable	- - -		- - -	
	Increase	- - -		- - -	
Age	Less than 25	0.072	0.208	-0.054	0.284
	25-34	Ref.		Ref.	
	35-44	0.050	0.093	0.023	0.125
	45-54	0.096	0.074	0.205 **	0.100
	55-64	0.028	0.069	-0.080	0.097
	65-74	-0.090	0.103	-0.089	0.145
	More than 74	-0.150	0.120	-0.066	0.175

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Table 8 - continued : 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
Marital status	Married	Ref.		Ref.	
	Single	-0.074	0.067	-0.089	0.094
	Divorced	0.091	0.075	0.146	0.112
	In a relationship	-0.070	0.081	0.002	0.114
	Widow	0.126	0.095	-0.009	0.144
Number of children		0.055	0.034	0.009	0.047
Unemployed and...	unemployed once previously	0.398	0.324	0.949 **	0.439
	unemployed several times previously	0.472 *	0.252	1.306 ***	0.461
	never been unemployed	0.681 **	0.342	0.858 *	0.467
Employed and...	unemployed once previously	0.257	0.279	0.121	0.145
	unemployed several times previously	0.346	0.281	-0.034	0.058
	never been unemployed	Ref.		Ref.	
	no reponse	-0.709	0.828	- -	-
Retired		0.157	0.109	0.121	0.145
Inactive		0.067	0.118	0.045	0.165
Intercept	Intercept1	-1.342	0.290	-1.053 ***	0.172
	Intercept2	0.197 ***	0.289	0.495 ***	0.169
	Intercept3	1.245 ***	0.291	1.579 ***	0.175
N		1681		903	
Log-likelihood		-1956.0		-1057.7	
Pseudo-R2		5.3%		7.0%	

Source : PATER Survey (2009).

Note: We run regression I of table 6 on the samples of regression II and III. The dependent variable is the subjective probability to reduce spending. The variables of interest are financial assets and housing assets variations. Changes in unemployment expectations and stock market expectations are ***not*** *included. The control variables are: number of children in the household, age, marital status and employment status crossed with past unemployment.*

The selection of the samples are described in section C.3 of the appendix.

*Ordered probit with unknown threshold. Standard errors in parentheses. * significant at 10%, ** significant at 5% level and *** significant at 1% level.*

B The French wealth survey (*Enquête Patrimoine*, Insee)

B.1 Description of the survey

The French wealth survey is done by the French National Statistical Institute (Insee) every 6 years. This survey is a cross section[28]. In this paper, we use the latest available wave (2009), run on a nationally representative sample of 15,000 households. The *Enquête Patrimoine* provides[29]:

- detailed information on the socioeconomic and demographic situation of the household (education, occupational group, marital status, information concerning the children...), as well as on the biographical and professional evolutions of each spouse (youth, career, unemployment or other interruptions of professional activity);

- detailed data on household's income, on the amount and the composition of wealth (including liabilities and professional assets);

- brief information on the inter-generational transfers received and bequeathed (financial helping out, gifts and inheritance) and more generally on the "history" of household's wealth.

Moreover, few questions about consumption were added in the 2009 for the first time and addressed to a sub-sample of about 5,000 households representative of the French population. This module about consumption includes:

- a summary question about the household average monthly spending (excluding rents, durable goods, loans reimbursement)

- questions about 3 types of spending: food at home, food outside and regular bills (water, telephone, internet, electricity, etc.

These questions, combined with information based on Household Budget

[28] Until now, there is no panel component in the French wealth survey.

[29] The *Enquête Patrimoine* (Insee) provides similar information to the Survey of Consumer Finances (US), the Encuesta Financiera de las Familias (Spain) or the Survey on Household Income and Wealth (Italy). The 2009 *Enquête Patrimoine* is part of the Eurosystem Household Finance and Consumption Survey (HFCN, 2009).

surveys, can be used to compute total consumption. However, at this stage, we rely only on the measure of consumption given by the summary question.

B.2 Econometric sample for marginal propensity to consume out of wealth (equation 1)

Among the 15,006 households of the *Enquête Patrimoine*, questions about consumption were asked to a representative sample of 5,057 households. Among them, 4,519 households answered to questions about total consumption, 4,209 about income and 4,508 about total wealth, so that before imputation the sample is reduced to 3,582 households. We remove those who belong to the two last percentiles of the wealth distribution and the last percentile of the distribution of the dependent variable. Then, we obtain a sample of 3,499 households which is used to estimate the marginal propensity to consume out of total wealth.

Among the households to whom consumption questions were asked, 4,404 answered to the question about financial wealth so that the sample is reduced to 3,262 households. We remove those who belong to the two last percentiles of the wealth distribution and the last percentile of the distribution of the dependent variable. So the marginal propensities to consume out of financial and housing wealth are computed on 3,182 households.

In some regressions we decompose housing wealth into home value and remaining real estate. Then we are reduced to 3,074 households.

Table 9: Descriptive statistics of the variables used to estimate the marginal propensity to consume out of wealth (equation 1)

Variables	N	Mean	SD	Min	Max
Annual expenses	3499	16308.1	14289.9	720	240000
Ratio of expenses to income	3499	47.1%	25.2%	3.3E-03	1.7142857
Global wealth	3499	442289.7	662766.1	1	4200000
Ratio of wealth to income	3499	10.55	14.4	6.0E-05	246.8
Financial wealth	3074	130712.4	418609.42	1	10000000
Ratio of fin wealth to income	3074	2.6	7.4	0.000034	184.1
Home value	3074	180837.8	207911.3	0	2500000
Ratio of home value to income	3074	4.7	5.8	0	63.7
Annual income	3499	49209.6	81147.1	1800	1137336
Number of persons	3499	2.4	1.3	1	10
Age of household head	3499	54.4	16.3	18	99
Employed	3499	55.27%	49.73%	0	1
Student	3499	0.80%	8.91%	0	1
Unemployed	3499	4.34%	20.39%	0	1
Retired	3499	36.32%	48.10%	0	1
Inactive	3499	1.74%	13.09%	0	1
Other status	3499	1.51%	12.22%	0	1

Source : Enquête Patrimoine (Insee 2009).

C The *PATER* survey

C.1 Description of the survey

The *PATER* household survey covers a large range of topics regarding households' saving behaviour (see Arrondel and Masson, 2009). We use the latest waves conducted by TNS-SOFRES in May 2007 and in June 2009.

The *PATER* survey is mainly focused on preferences (risk aversion, time preference, altruism, impatience for the short term). It also covers expectations relative to the general economic environment (housing and stock prices five years ahead, duration of the crisis, etc.) and expectations relative to each individual situation (expected increase/ decrease of income, chances of future job loss, health risk). It includes detailed information on household wealth (financial wealth, housing wealth, debt, portfolio components) and the traditional socio-demographic characteristics (age, household composition, diploma, social status, activity, etc.).

In the 2009 survey, a specific module deals with the perception of the turmoil by the households: the impact of the crisis on their saving and consumption plans, on their job market risk and on their portfolio allocation.

This *PATER* survey can be viewed as a complementary source with the French wealth survey (Enquête Patrimoine) conducted by the French National Statistical Institute (Insee). As stated before, 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 is focused on households' preferences, anticipations, financial literacy, etc.[30] However, the information about households' portfolio given by the *PATER* survey has a good quality (despite it is less precise for the evaluation of the asset value

[30] Due to their different goals, the two surveys also present some methodological differences in terms of data collection (face to face interview for Insee Survey and mail questionnaire for the *PATER* survey) and sampling design (especially concerning the oversampling of the wealthy).

than in the Insee survey), as it gives similar households' portfolio composition (see table 10 in appendix).

The paper questionnaire of the *PATER* survey has been sent to a sample of 5,000 households representative of the French population. The response rate is high so that the final sample consists of 3783 households. When excluding the missing values of the variables used to study the wealth effect, we are left with 3,468 households in the 2009 wave.

Table 10: Comparison of the two French surveys: Percentage of households owning financial assets

	Enquête Patrimoine (2009)	*PATER* survey (2009)
Livret A or *livret bleu*	68.2	68.9
Any savings account	85.0	76.6
Home savings scheme	31.2	42.1
Stocks	12.2	20.0
Bonds, stocks or mutual funds	19.3	24.3
Life insurance or life annuity	41.8	42.2
Life insurance, life annuity or retirement saving	48.3	49.0
Epargne salariale	15.1	16.1
No financial asset	7.9	13.6
Number of observations	15006	3743

Source : Enquête Patrimoine (Insee 2009) and PATER survey (2009).
Note : According to the French wealth survey (Enquête Patrimoine), 68.3 households own either a livret A or a livret bleu (which are tax-deferred saving accounts). The PATER survey provides similar figure for this financial asset (68.9%). Weighted samples representative of French households. Home savings scheme is a tax-deferred saving account which makes home ownership easier. Epargne salariale is a voluntary occupational pension plan.

C.2 Variables for consumption plans analysis (equations 2 and 3)

Future Consumption:

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

- $\Delta C^*_{i,k}$, the expected variation of consumption for the item k of the consumption basket of household i. The 2009 *PATER* survey asks whether the respondents are expecting to modify their consumption plans for detailed items of their consumption basket: food, house refurbishment, transport (public transport, car maintenance), textile (clothes, shoes), health, technological product (TV, computer, mobile phone, etc.) and cultural goods (books, DVD, 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:

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

- y_i, a qualitative variable reflecting the opinion of household i about his 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 12 coming months concerning the amount of your expenses: I will reduce my spending with a (high, medium, low, very low) probability*" (see table 11 for descriptive statistics).

Table 11: Percentage of respondents whose total expenses are expected to be affected by the turmoil in the twelve coming months

	Reducing total consumption
High probability	14.7
Medium probability	47.4
Low probability	22.8
Very low probability	6.5
Not concerned	4.9
Do not know	3.6

Source : PATER survey (2009).
Note : 6.5% of French households declare that they will reduce their total expenses with very low probability in the twelve coming months, because of the financial crisis. Weighted sample representative of French households.

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 disentangle between wealth changes caused by prices evolution and those due to portfolio reallocation.

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

$$\Delta W_{Fi} = \begin{cases} 1 & \text{if negative variation of financial wealth} \\ 2 & \text{if stable financial wealth} \\ 3 & \text{if positive variation of financial wealth} \\ 4 & \text{if no financial wealth} \\ 5 & \text{if don't know answer} \end{cases}$$

A **negative** variation of financial wealth ($\Delta W_{Fi} = 1$) is defined when the respondent selects the first of the two answers:

"*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".

A **positive** variation of financial wealth ($\Delta W_{Fi} = 3$) is defined by considering the answer to the following question:

"*If the amount of your financial assets increased over the last two years, would you say that it is because... (3 possible answers):*

- the value of your financial assets increase (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 a positive variation of financial wealth if the respondent selects the first of the two possibilities (increase in the value or realized gains).

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

$$\Delta W_{Hi} = \begin{cases} 1 & \text{if negative variation of housing wealth} \\ 2 & \text{if stable housing wealth} \\ 3 & \text{if positive variation of housing wealth} \\ 4 & \text{if renters} \\ 5 & \text{don't know answer} \end{cases}$$

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

Income: 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 reduce significantly the econometric sample. That is why we also consider other proxies to account for modifications in household income: a dummy variable with 9 modalities reflecting the current employed/unemployed status as well as past unemployment periods.

Expectations: ΔE_i

The adaptation of households' financial expectations between 2007 and 2009 is taken into account by considering expectations about labour income as well as expectations about stock prices.

Labor income expectations: two measures are considered,

- changes in the average loss of income due to unemployment (permanent income effect): $p_t Y_t - p_{t-1} Y_{t-1}$ where p_t is the subjective probability of unemployment[31], Y_t the current income[32], t refers to 2009 survey and $t-1$ to the 2007 survey. We can consider that this proxy also takes into account unemployment benefits, since they are almost proportional to income.

[31] The survey asks about household risk to fall into unemployment on a scale from 0 to 10. We consider the response divided by 10 as a proxy for the probability of unemployment, p_t.

[32] As 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. uppest) interval, we take the upper (resp. lower) bound.

- increase in unemployment risk (background risk effect): proxied by the variation of variance income between 2007 and 2009, $p_t(1-p_t)Y_t^2 - p_{t-1}(1-p_{t-1})Y_{t-1}^2$.

Stock market expectations: difference in expected mean of stock return as assessed by respondent in the 2007 and 2009 waves.

This variable is computed using questions about the subjective distribution of stock return anticipation *"Within five years, what is the probability according to you that the stock market:*

- will increase by more than 25%?,

- will increase by 10% to 25%,

- will increase less than 10%,

- will be the same as today,

- will decrease by less than 10%,

- will decrease by 10% to 25%,

- will decrease by more than 25%".

(the response has to add up to 100%)

We call q_1 to q_7 the respective answers to these questions. τ_j is the lower bound of the interval of the jth question ($\tau_1 = 25\%$, $\tau_2 = 10\%$, $\tau_3 = 0\%$, $\tau_4 = 0\%$, $\tau_5 = -10\%$, $\tau_6 = -25\%$). We set the upper bound of the return distribution to $\tau_0 = 50\%$ and the lower bound to $\tau_7 = -50\%$. Following Pistaferri (2001), we can compute the expected stock return, which is:

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

C.3 Econometric sample for consumption plans analysis (equations 2 and 3)

Among the 3,783 households of the survey, 3,468 answers to the question about subjective probability to decrease consumption. They make up the sample of regression I. If we introduce variables of the previous wave in

2007, we are reduced to 2,241 households. Furthermore, 1,681 households gave the subjective probability of unemployment for the two waves. So the regression II is run on these households. Among them, only 903 households gave subjective expectations about future stock return. They make up the sample of the regression III.

Table 12: Descriptive statistics for empirical analysis based on the Pater survey (equations 2 and 3)

Variables		Reg I	Reg II	Reg III
Probability to reduce expenses: y_i	High probability	16.03	14.40	12.85
	Medium probability	51.90	51.93	50.5
	Low probability	24.91	26.23	28.46
	Very low probability	7.15	7.44	8.19
Variation of financial assets	Decrease	28.40	31.77	34
	Stable	53.00	52.17	54.15
	Increase	5.02	4.82	4.76
	Not concerned	12.49	10.35	6.76
	No reply	1.10	0.89	0.33
Variation of housing assets	Decrease	9.92	9.70	9.63
	Stable	26.59	28.55	27.91
	Increase	29.21	34.21	38.87
	Not concerned	29.90	22.96	20.16
	No reply	4.38	4.58	3.43
Increase in stock market expectations		-	-	-1.29
Increase of expected loss of income due to unemployment		-	24.18	18.08
Increase in risk of unemployment		-	104782.93	118522.76
Variation of income	Decrease	-	7.50	7.97
	Stable	-	89.77	89.59
	Increase	-	2.74	2.44
N		3468	1681	903

Source : PATER Survey (2009).

Note: The selection of the samples is described in the section C.3 of the appendix.

Table 12 - continued : Descriptive statistics for empirical analysis based on the PATER survey (equations 2 and 3)

Variables		Reg I	Reg II	Reg III
Age	Less than 25	8.22	1.37	1.44
	25-34	15.37	10.47	11.07
	35-44	17.91	21.48	22.92
	45-54	17.91	22.19	23.15
	55-64	17.94	23.20	23.70
	65-74	14.13	14.46	12.40
	More than 74	8.54	6.84	5.32
Marital status	Married	51.01	56.45	58.80
	In a relationship	10.76	9.10	8.97
	Single	22.98	17.91	18.94
	Divorced	8.28	10.23	8.42
	Widow	6.98	6.31	4.87
Number of children	0	64.19	60.32	58.36
	1	14.33	15.35	16.06
	2	14.65	16.78	17.61
	3	5.74	6.48	6.98
	more than 3	1.10	1.07	1.00
Unemployed and...	unemployed once previously	1.38	0.71	0.78
	unemployed several times previously	2.51	1.31	0.89
	never been unemployed	1.07	0.65	0.66
Employed and...	unemployed once previously	16.35	18.50	20.71
	unemployed several times previously	11.56	11.84	10.96
	never been unemployed	25.75	27.42	29.79
	no reponse	0.03	0.00	0.00
Retired		26.67	30.21	26.71
Inactive		11.60	5.91	5.32
N		3468	1681	903

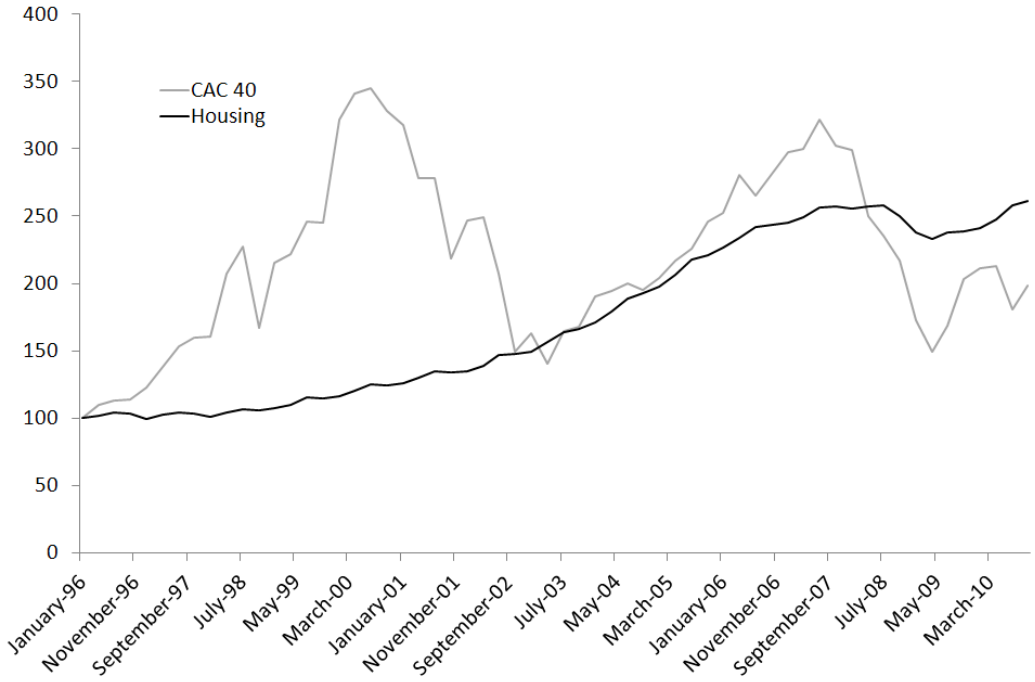
Source : PATER Survey (2009).

Table 13: Litterature Review: microdata based estimates of wealth effect on consumption

Article	Country	Dependent variable	Explanatory variable	Measure	Results
Bover (2005)	Spain	Level of consumption	Level of housing wealth	MPC	2% for financial wealth
Guiso et al. (2005)	Italy	Ratio of consumption to income	ratio of capital gains on housing to income	MPC	3.5% for homeowners
Juster, Lupton, Smith, and Stafford (Juster et al.)	US	Level of active saving	Level of capital gains on housing and stock	MPC	3% for housing and 19% for stock
Campbell and Cocco (2007)	UK	Variation of the logarithm of consumption	Variation of the logatrithm of local housing prices	Elasticity	1.2% for housing
Paiella (2007)	Italy	Ratio of consumption to income	ratio of wealth to income	MPC	4.2% for the whole wealth, 9.2% for financial wealth and 2,4% for housing wealth
Attanasio et al. (2009)	UK	The logarithm of consumption	The logarithm of local housing prices	Elasticity	0.21% for young households, 0.13% for middle-aged households and 0.04% for old households
Bostic et al. (2009)	US	The logarithm of consumption	The logarithm of wealth	Elasticity	0.02% for housing value and 0.05% for financial wealth
Contreras and Nichols (2010)	US	Variation of the logarithm of consumption	Variation of the logatrithm of housing value	Elasticity	0.05% for housing value
Gan (2010)	Hong-Kong	Variation of the logarithm of consumption	Variation of the logatrithm of housing value	Elasticity	0.17% for housing value

D Figures

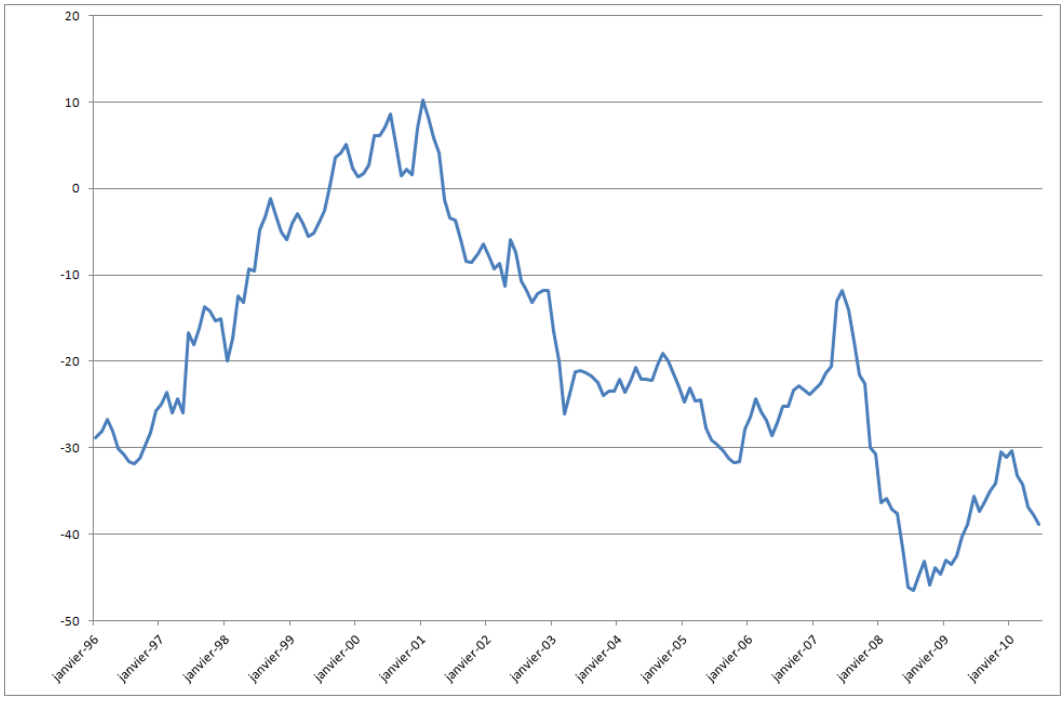
Figure 1: Evolution of the stock market (CAC 40 index) and the housing market during the 2000s



Source: Euronext and Insee

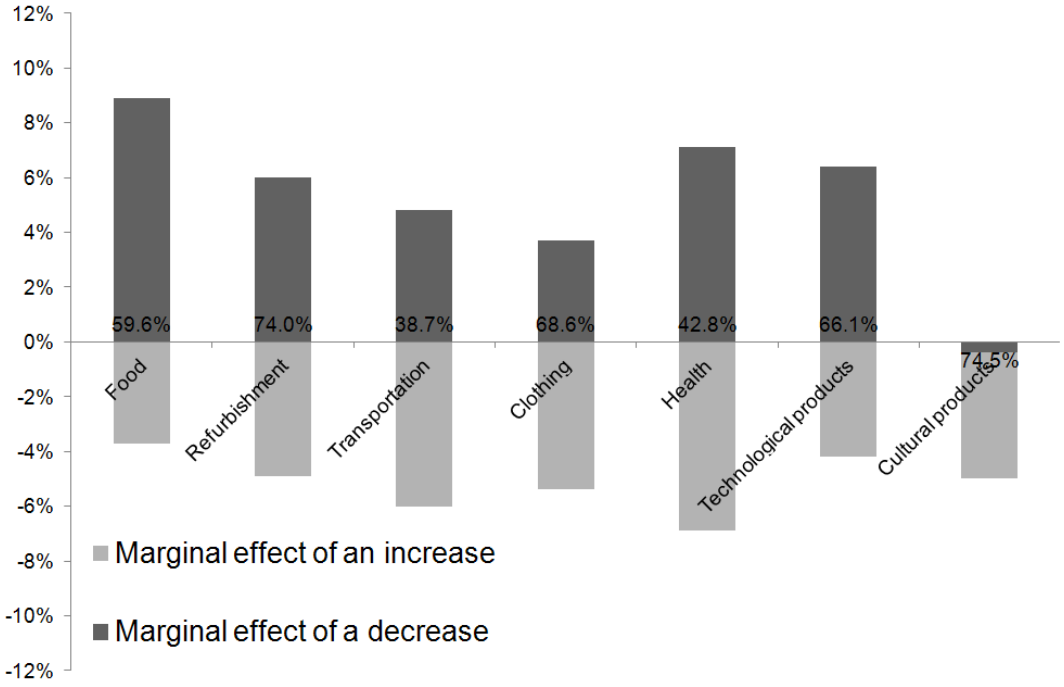
Note: The period begins on the 1st January 1996 and finishes on the 1st October 2010. The two indexes are set to 100 on the 1st January 1996 and are based on quarterly data. CAC 40 is the index of the 40 biggest French market capitalizations provided by Euronext. The housing market is represented by the price of second-hand dwellings index published by Insee.

Figure 2: Summary Consumer Confidence Indicator (Balance, WD-SA)



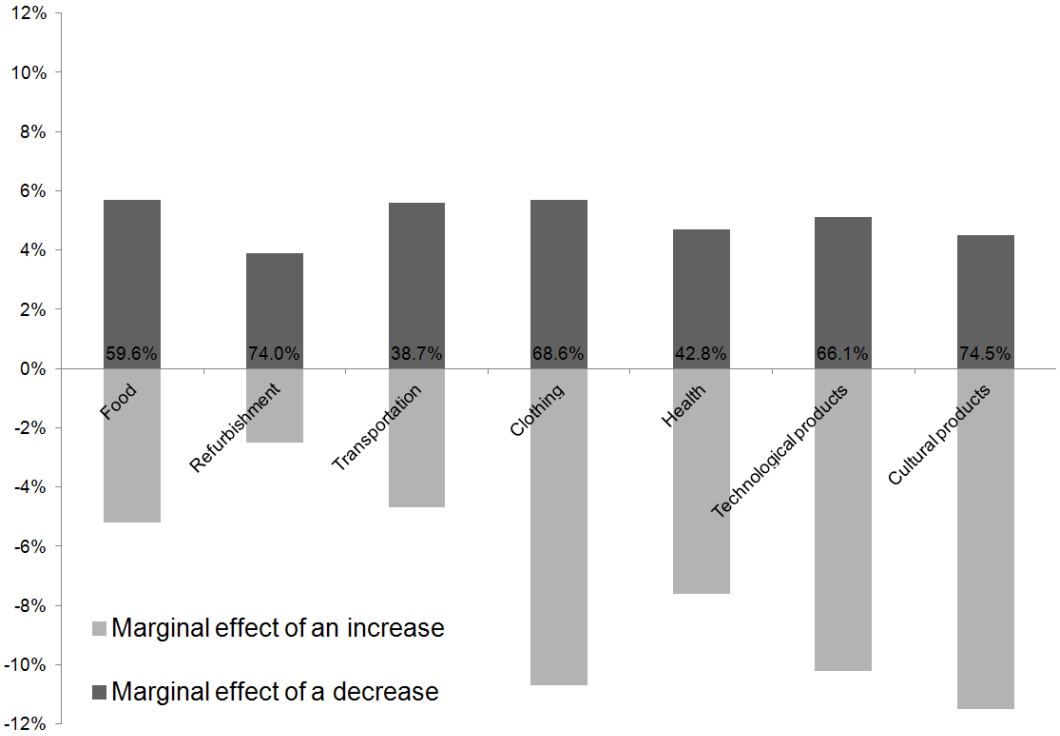
Source:Insee-Survey, Monthly consumer confidence index

Figure 3: Marginal effect of housing wealth variations on the probability to reduce consumption by category of expenses, in percentage points (equation 3)



Source : PATER survey (2009)- Computation based on estimation results displayed in table 6. Note: The average estimated probability to reduce food consumption amounts to 59.6%. For respondents experiencing a decrease (respectively an increase) in housing wealth, this probability is increased by 8 percentage points (respectiveley decreased by about 4 percentage points).

Figure 4: Marginal effect of financial wealth variations on the probability to reduce consumption by category of expenses, in percentage points (equation 3)



Source : PATER survey (2009)- Computation based on estimation results displayed in table 6. Note: The average estimated probability to reduce food consumption amounts to 59.6%. For respondents experiencing a decrease (respectively an increase) in financial wealth, this probability is increased by about 6 percentage points (respectiveley decreased by about 5 percentage points).