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JEL Classification: C81, D12, D14, D31
Keywords: saving rate, consumption, permanent income, precautionary savings, unemployment

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By allocating one portion of their disposable income to savings and the other to consumption, households make a trade-off with direct implications at macro-economic level. If the propensity to save is stronger among wealthy households, a consumption-based recovery policy will be more effective if it targets low incomes. Other issues, such as tax measures aimed at encouraging saving (life insurance, Livret A savings accounts) or the relevant tax base (labour vs consumption, income vs wealth), depend on the trade-off between consumption and savings. Furthermore, the measurement of precautionary savings is crucial, especially to understand the implications of a rise in unemployment at the time of a shock such as the crisis of 2008. If the rise in unemployment affects all households indiscriminately and if wealthy households have a stronger precautionary motive than others, then the recession will be more severe. The fall in aggregate demand increases the unemployment rate, which increases precautionary savings, triggering a vicious circle.

Traditionally, lifecycle and permanent income models, from Modigliani & Brumberg (1954) and Friedman (1957), provided one of the first theoretical frameworks for examining saving behaviour. These models have been enriched by the theory of precautionary savings – already mentioned by Keynes (1936), then modelled by Leland (1968), Sandmo (1970) and Drèze & Modigliani (1972) – which shows that savings also play a role as insurance against the hazards affecting the household. Thus, households not only save to compensate for a decline in future income, during retirement for example, but also to insure against other kinds of income risks, especially the risk of an unforeseen fall in income.

When seeking to assess this precautionary behaviour, the main difficulty is finding a correct measurement of the income risk. Some authors (Skinner, 1988) use the socio-professional category (SPC) as a proxy for this risk. The approach may then lead to an underestimation of the proportion of precautionary savings, if the most risk-averse people choose their profession in accordance with that risk aversion. Another approach is to use, on panel data, the variance of past income as a measurement of the risk (Carroll & Samwick, 1997). However, it is possible that this "objective" measurement of the risk does not correspond to the household's feelings. The most convincing approach is to use subjective data collected by surveys, on changes in income or the probability of unemployment (Guiso *et al*., 1992; Lusardi, 1997; Lusardi, 1998; Arrondel, 2002; Carroll *et al*., 2003; Arrondel, 2008).

This article first seeks to empirically test the homogeneity of saving rates in accordance with income level, then to demonstrate the existence of income-related precautionary saving behaviour and attempt to quantify it, using the 2010-2011 Insee Household Budget Survey (*enquête Budget de famille*). The precautionary motive is understood through a subjective measurement: the probability of unemployment for the coming year, as reported during the survey by the household reference person (for him/herself and his/her partner). The originality of this article lies in the quantification of the precautionary motive to analyse the annual saving rate (in flux), while most of the existing work analyses wealth accumulation (in stock).

It transpires that savings behaviour appears to be fairly homogeneous over the lifecycle, except for the 20% of households with the highest incomes, who save more as a proportion of their permanent income. Moreover, the precautionary motive for saving exists among all French households: the savings surplus due to income risk is estimated to be 6.4%, while the proportion of precautionary wealth due to income risk represents 6.3% of overall wealth. The precautionary motive appears to differ, with the households in the third and fourth income quintiles[1] being those that accumulated the most precautionary savings.

1. Savings, Income and Uncertainty in the Literature

Friedman's (1957) original permanent income model assumed perfect anticipation of future income. This assumption has proved to be too restrictive and the analytical framework has been gradually enriched. In particular, the introduction of uncertainty has made it possible to highlight precautionary behaviour: since future labour income is uncertain, consumption (and therefore savings) depends not only on expectations but also on the variance of expected income.

1. In order to maintain a lighter style, the term "households in the n^{th} *income quintile" means households with income between the* $(n-1)^{th}$ *and the* n^{th} *income quintiles.*

1.1. Savings, Permanent Income and the Precautionary Motive

Friedman's (1957) model predicts that the saving rate in each period does not depend on permanent income (for the formal calculation see Garbinti & Lamarche, 2014), but only on the interest rate r, current preference δ and replacement rate at retirement. Note that this is only valid where k, r and δ are not dependent on permanent income. There are, however, multiple arguments in favour of relaxing this hypothesis (differentiated interest rates according to permanent income level, differentiated replacement rate between wealthy and poorer households, etc.). In addition, this model assumes perfect anticipation of future income.

However, uncertainty over income will also have an effect on the saving rate, and the scale of that effect depends on the curvature of the consumer utility function. Where marginal utility is not linear, i.e. when consumers are cautious[2], consumption is postponed for the future and savings today increase. A special case is that of a CARA (constant absolute risk aversion) utility function developed by Caballero (1990), which establishes a simple relationship between savings and income uncertainty.[3] In this model, the consumer chooses, in each period, the consumption that maximises its utility function $U(C) = -\frac{1}{\theta} exp(-\theta C)$ where θ represents the absolute risk aversion coefficient $\left(\theta = -\frac{U''}{U'}\right)$. It is assumed that consumers live for T years, that the interest rate is equal to the rate of preference for the present and that income follows a random path, subject to variance shocks σ^2. The resolution of the consumer agenda shows that consumption, and therefore savings, are a function of the income uncertainty σ^2, age and risk aversion of the individual θ. In this simplified representation, uncertainty over income reduces current consumption and increases saving.

Note that another formalisation of precautionary saving behaviour, with or without liquidity constraints, has been proposed by Deaton (1991) and Carroll (1992), based on an isoelastic utility function CRRA (constant relative risk aversion). The precautionary motive also appears as a determining factor of consumption and saving, but a simple linear form cannot be derived.

1.2. The Importance of Precautionary Savings in the Literature: A Lack of Consensus

The examination of the precautionary motive in saving behaviour has been a prominent feature in the recent literature and numerous works have sought to quantify its importance (Browning & Lusardi, 1996, for a comparative analysis).

On the "theoretical" side, there are calibrations of lifecycle models that take into account income uncertainty. These models, which take into account the effects of interest rates and imperfect capital markets, derive a form of consumption from the inter-temporal maximisation of the utility. They then calibrate this consumption function from the data (Skinner, 1988; Caballero, 1991; Hubbard *et al.*, 1994; Krusell & Smith, 1994; Cagetti, 2003; Gourinchas & Parker, 2002). Estimates of wealth accumulation related to income risk vary widely, between 0.7% (Krusell & Smith, 1994) and 50% (Skinner, 1988; Hubbard *et al.*, 1994) of total wealth.

On the "empirical" side, estimation work on micro-data suggests an accumulation of precautionary wealth of between 1% and 20% of total wealth, estimates that may seem more "reasonable" (Guiso *et al.*, 1992; Lusardi, 1997; Arrondel & Calvo Pardo, 2008).

It is difficult to compare the results with each other due to differences in concepts and fields of study: country, definition of wealth (financial or total), definition of savings (with or without durable goods), method of construction of risk variables (subjective or objective assessment of future income, objective or subjective probability of occurrence of unemployment) and populations studied (total, active, employed or self-employed, etc.). Arrondel & Calvo Pardo (2008) thus identify 21 measurements of precautionary savings in the recent literature.

2. Contrary to intuition, risk aversion ($U'' < 0$) is not sufficient to explain protective behaviour in respect of risk, specifically precautionary savings. In order to observe precautionary behaviour, prudence ($U''' > 0$) on the part of consumers must be assumed (Kimball, 1990).

3. This specific case leads to the separation of lifecycle savings from precautionary savings. The absolute prudence coefficient does not depend on overall wealth. The advantage of this CARA function is, nevertheless, that it allows a "simple" and easy to interpret expression of the consumption function.

1.3. Estimating Specific Income Risk: Various Approaches

Several approaches have been developed to attempt to quantify specific income risk. The traditional approach consists of using SPC indicators as a proxy for income variance (Skinner, 1988; Fuchs-Schündeln & Schündeln, 2005). The precaution model is thus tested by comparing the saving rate in accordance with the SPC, and stronger precautionary behaviour is expected for the most at-risk SPCs. Therefore, this measurement may lead to an underestimation of precautionary savings, if the most prudent households choose their SPC in accordance with their risk aversion. Thus, it will be observed that safer SPCs have as much precautionary savings as more at-risk SPCs.

A second method consists of using panel data (Carroll & Samwick, 1997; Kazarosian, 1997; Hurst *et al.*, 2005) to estimate income variance based on past income. Therefore, this approach is hampered by problems relating to errors in income measurement and data availability.

A third approach consists of using subjective measurements of income variance (Guiso *et al.*, 1992; Lusardi, 1997) and/or the probability of unemployment (Lusardi, 1998; Arrondel, 2002; Carroll *et al.*, 2003; Arrondel & Calvo Pardo, 2008), based on questionnaires. This method has the advantage of taking into account the subjective perception of the household reference person and, therefore, represents the best estimate of the prudence coefficient. Indeed, the household will act according to its perception of risk, even if the risk of unemployment or income variability is objectively low.

In the case of France, empirical estimates are mainly based on the work of Arrondel (2002) and Arrondel & Calvo Pardo (2008), using Insee Household Wealth Surveys. The effect of precautionary savings, measured based on variance of income, is found to be positive and statistically significant, but small. In Arrondel (2002), the proportion of precautionary savings[4] would represent 5% of total wealth accumulation, based on the 1997 Household Wealth Survey. In Arrondel & Calvo Pardo (2008), the data from the 2004 Household Wealth Survey provide equally low estimates: when considering the probability of unemployment, across the active population, the precautionary motive represents 2% to 3% of wealth accumulation. For employees, precautionary assets are around 6% to 7% higher than those of the self-employed or farmers.

To study the links between savings and income variability, a different approach is taken from the purely wealth-based approach and the approach based on the flow of savings is preferred. After studying the links between savings and income (current and permanent), the impact of the precautionary motive on the household saving rate is quantified and estimated. The same is done with wealth, making it possible to compare the results with the existing literature.

2. The Household Budget Survey and the Construction of the Saving Rate

2.1. The 2011 Household Budget Survey

The aim of the 2010-2011 Household Budget Survey is to put together the entire household accounts: expenditure, including expenditure unrelated to the consumption of goods and services (taxes, contributions, insurance premiums, inter-household transfers, etc.), non-monetary consumption (food produced for own consumption, benefits in kind provided by the employer) and, lastly, exceptional resources (income, social benefits, sums from other households, inheritance, redundancy payments, lottery wins, etc.). The survey also includes some questions on wealth and savings, the respondent's financial situation and its evolution and the purchase or sale of housing and durable goods during the current year. There are 15,797 observations in the initial sample, representing 28.5 million households.

2.2. Construction of the Saving Rate

To define savings, the starting point is the household budget constraints:

$$A_{t+1} = (1+r)\,A_t + Y_t - C_t$$

where A, r, Y and C represent wealth, real interest rate, disposable income excluding capital income and consumption, respectively. Savings can be defined as in stock or in flux. In stock, it corresponds to the variation in wealth between t and $t+1$: $S_t = A_{t+1} - A_t$; in flux, it corresponds to the unconsumed portion of current income: $S_t = (Y_t + rA_t) - C_t$ where rA_t represents capital income and rA_t represents total disposable income.

4. Precautionary savings are measured using a method inspired by Guiso et al. *(1992), which consists of distributing 100 points between different income development scenarios over the next five years. The amount of wealth (divided by permanent income) is then decreased based on income variance and other exogenous variables.*

The "in flux" definition has been chosen here. Savings are thus constructed as the difference between the disposable income and consumption expenditure of households, and the saving rate is simply the ratio of savings to disposable income. The disposable income of a household is defined as the sum of earned income (net of social security contributions), capital income, transfers from other households and social benefits (including pensions and unemployment benefits), net of direct taxes (on income, housing and property).

Leaving aside individual entrepreneurs, household savings have three components: the acquisition of durable goods, housing savings and financial savings, i.e. the acquisition of cash and securities (shares and bonds). The measurement of savings depends strongly on the definition of wealth. In fact, it is necessary to separate from income the resources derived from the de-accumulation of wealth and to separate from consumption the expenditure related to the acquisition of wealth. A broad definition of the concept of wealth is used, including financial assets, property (housing, land, etc.) and major durable goods (cars, heavy machinery, etc.). The choice is made to exclude income from the sale of financial assets, property and durable goods from disposable income.[5]

Data on earned income, social income and taxes from the 2011 survey have benefited from matches with administrative and social files and are of good quality, even if under-reporting of income has not been totally eliminated. In contrast, capital income continues to be collected on a purely declarative basis, resulting in very significant under-reporting. This under-reporting implies that for households with capital income (the wealthiest households), the calculated saving rate will be underestimated. Furthermore, in contrast to the national accounts, capitalised interest is not taken into account.

Final household consumption is lower in the survey than it is in the national accounts. This difference is primarily conceptual. In the national account, a good or a service provided to a household free of charge may fall within the scope of final consumption, even when it does not fall within the scope of the survey. In addition, consumption is measured in the Household Budget Survey based on diaries in which all expenditure for one or two weeks is recorded, together with any major expenditure on durable goods for the year. Difficulties in extrapolating weekly or bimonthly data over a year, combined with potential omissions, may thus explain the underestimation of household consumption in the survey. Despite these differences, it is possible to compare the breakdown of the amounts of income, consumption and savings obtained from the survey and from the national accounts (see Appendix I, Table A1-1). Although the saving rates obtained, including durable goods, are very similar, the amounts of consumption and disposable income are significantly underestimated in the survey compared to the national accounts.[6] Nevertheless, the decision was made to retain the declarative survey data without adjustment, as the extent of the under-reporting is not necessarily homogeneous across households and income levels. Furthermore, a decision was made to depart from the concept of consumption adopted by the national accounts: purchases of durable goods are not considered to be consumption, but savings.[7] The study's sample consists of 13,393 households.[8]

This provides the saving rate profile (Table 1), and the distribution of saving rates (see Appendix 1, Figure A1-I). The high average (29.3%) is linked to the choice to consider durable goods as savings and not as consumption. The coherence of saving rates with household financial affluence is also verified, finding an effect whereby the saving rate increases with the reported financial affluence of households (see Appendix 1, Table A1-2). The saving rate is always positive, even for those categories that report indebtedness; this is due to the fact that all durable goods are included in savings and, therefore, that the savings variable in this approach is much broader than the savings variable excluding durable goods.

The analysis first focuses on the links between income (current and permanent) and saving rates;

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5. Most empirical studies focus on the saving rate excluding consumption of durable goods. In fact, purchases of durable goods are not renewed every year and it is difficult to determine over how long such goods should be depreciated.

6. The comparison of the Household Budget Survey with the accounts by household category confirms a significant underestimation of the amounts of disposable income and consumption for each category. Yet, the correlation coefficient between consumption expenditure by socio-professional category of the reference person in the national accounts and in the Household Budget Survey is 0.98 (and 0.94 for disposable income), which shows that there is a comparable hierarchy of income and consumption between SPCs in both sources.

7. In fact, purchases of durable goods are not renewed every year and it is difficult to determine over how long such goods should be depreciated.

8. "Atypical" households likely to confound the analysis are excluded from the sample: households where the reference person is a member of the clergy, a student, unemployed having never worked or inactive other than retired (1,615 households out of the original 15,797 households are excluded). Also excluded are households with negative disposable after-tax income (174 households). The distribution of the 1% of households with the lowest saving rates (below -115% of disposable income) and the 1% of households with the highest saving rates (above 88% of disposable income) is truncated.

then income uncertainty is introduced to measure the extent of precautionary savings, and then the extent of precautionary wealth.

3. Results

3.1. Savings, Current Income and the Permanent Income

3.1.1 Savings and Current Income

The first step consists in verifying the well-established fact in the literature, according to which the saving rate increases with the level of current income. Ordinary least square (OLS) regressions and median regressions are estimated. Indeed, due to the presence of dispersed distribution of saving rates, the median is robust with extreme values, in contrast to the average. The model is as follows:

$$s_C = \frac{S}{Y^C} = f\left(Y^C\right) + X\beta + \epsilon$$

where s_C is the current saving rate, S is the amount of savings, Y^C is current income, X is the set of explanatory variables (average age of the household in age groups[9], detailed household type, gender of the reference person, urban or rural household, period of illness, inheritance) and ε is the residual. The function f is either the breakdown into quintiles of Y^C or the identity function (in this case the saving rate is regressed on current income). Both the average and median regressions are estimated (Table 2). The reference household is a household formed by a couple of two working people with a child or children, with an average age between 40 and 49, urban and who have not had a period of illness or received an inheritance.

Let us first consider regressions (ii) and (iv). It is observed that the saving rate (average and median) increases with the current income quintile, which is similar to the result predicted by the literature. Thus, the average saving rate of the reference households in the second, third, fourth and fifth income quintiles is 3.3%, 15.4%, 24.2% and 36.7%, respectively. For any given quintile, the saving rate of the quintile above is always higher. The result is similar when considering median regressions: all other things being equal, the median saving rate of any given quintile is always higher than the median saving rate of the quintile below. The saving rate is also continuously regressed on current income (regressions (i) and (iii)), which is equivalent to testing for non-linear aspects between savings and current income. The income coefficient is positive and significant in both regressions: thus, the average and median saving rates increase with current income. For a household with a median level of disposable income and a median saving rate, a 1% increase in disposable income increases household savings by 1.5%.[10] Therefore, savings increase more than proportionally to income and are equated to a "luxury good".

The hierarchy of saving rates is in line with the results of Boissinot (2003) on the 2000-2001

9. The average age of the household is defined as the age of the reference person for single persons, and as the average of the age of the reference person and the age of the partner for couples.

10. As the median income of the sample is €25,800, a 1% increase raises the median income by an additional €258. From regression (iii), this increases the saving rate by 0.14 points (5.4 × 0.0258). Thus, the median saving rate rises from 29.7% to 29.84%, while income rises from €25,800 to €26,058. Initial savings increase from €7,662.60 to €7,775.40, i.e. an increase of 1.5%.

Table 1 – **Saving rate in the Household Budget Survey**

(In billions of current euros)

Disposable income, excluding imputed rents (*a*)	846.7
Total final consumption, excluding imputed rents	695.2
of which *non- and semi-durable goods* (*b*)	*598.8*
investment in durable goods (*c*)	*96.4*
Savings, excluding durable goods (*a*−*b*−*c*)	151.5
Saving rate, excluding durable goods ((*a*−*b*−*c*)/*a*)	17.9%
Savings, including durable goods (*a*−*b*)	247.9
Saving rate, including durable goods ((*a*−*b*)/*a*)	29.3%

Sources and Coverage: Insee, Household Budget Survey 2011. Households excluding the 1% at the extremes of the saving rate range and households where the reference person is a member of the clergy, a student, unemployed having never worked or inactive other than retired.

Household Budget Survey or of Antonin (2009). However, the 42-point differential between the extreme median saving rates is less than the 60-point differential obtained by Garbinti & Lamarche (2014) on the 2010 Household Wealth Survey, but this difference can be explained in part by the choice to exclude the extreme saving rate percentiles from the base. The specification most similar to the one used here is that of Bozio *et al.* (2013) who, using English data for 2007-2009, find a differential of 50 points between the medians of the extreme quintiles, controlling for age and family structure.

The lifecycle models predict an increase in the saving rate until retirement age and then subsequent de-accumulation. As with Dynan *et al.* (2004), saving behaviour is difficult to interpret as a function of age, especially given that, as the data are cross-sectional, the estimates mix age and generation effects. The effect of age is not clear except for the 60-69 age group, which shows a significantly lower saving rate than the other age groups in all regressions, and the over-70s who save more. The latter result can be explained by a mortality differential, i.e. a higher probability of survival for the richest households, which continue to have high saving rates later in life (Bommier *et al.*, 2005). In addition, a desire for the inter-generational transfer of wealth may also explain the persistence of a high saving rate (see

Table 2 – **Mean and median regressions of the saving rate on current income**

	Mean regression		Median regression	
	(i)	(ii)	(iii)	(iv)
Constant	1.9* (1.1)	-9.4*** (1.2)	7.6*** (1.6)	-1.2 (1.7)
Current income (10^4)	5.4*** (0.2)		5.4*** (0.3)	
Current income in quintiles				
Q1		ref.		ref.
Q2		12.7*** (0.9)		10.2*** (1.5)
Q3		24.8*** (1.0)		22.6*** (1.4)
Q4		33.6*** (1.1)		30.7*** (1.4)
Q5		46.1*** (1.1)		41.6*** (1.4)
Average age of the household[(a)]				
Aged under 30	-3.2*** (1.2)	2.3** (1.2)	-3.7** (1.8)	-3.5** (1.6)
Aged 30 to 39	0.8 (1.0)	0.6 (1.0)	-0.8 (1.2)	-0.3 (1.2)
Aged 40 to 49	ref.	ref.	ref.	ref.
Aged 50 to 59	0.5 (1.0)	0.9 (1.0)	-0.6 (1.3)	-0.5 (1.3)
Aged 60 to 69	-4.9*** (1.5)	-5.1*** (1.5)	-6.7*** (2.3)	-7.7*** (2.1)
Aged 70 and over	4.8*** (1.7)	6.5*** (1.7)	1.8 (2.4)	2.8* (2.3)
Number of observations	13,393	13,393	13,393	13,393

(a) The age of the reference person for single persons, the average of the age of the reference person and the age of the partner for couples.
Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively. The standard deviations are shown in brackets. The following control variables were introduced in the regressions: household type, gender of the reference person, urban/rural, illness and inheritance. The reference household is a couple of two working people with a child or children, with an average age between 40 and 49, urban and who have not had a period of illness or received an inheritance.
Sources and Coverage: Insee, Household Budget Survey, 2011. Households excluding the 1% at the extremes of the saving rate range and households where the reference person is a member of the clergy, a student, unemployed having never worked or inactive other than retired.

Kotlikoff & Summers[11], 1981). The 20-29 age group has a significantly lower saving rate than the others, which may be linked to their low income at the beginning of their career and a more chaotic integration into the labour market. The atypical profile of saving rates is not very surprising given the extent to which empirical literature differs on this subject. Garbinti & Lamarche (2014) show that the youngest and oldest people save significantly more, but without controlling for family structure. Bozio *et al.* (2013), who control for family structure, find that older households have a higher saving rate, even at the oldest ages.

3.1.2 Savings and Permanent Income

According to Friedman (1957), permanent income is the constant income stream which, discounted over an infinite time horizon, is equal to the sum of discounted expected results. More intelligibly, Carroll describes it as the level of labour income that the household would receive in the absence of any transitory shock affecting income. Empirically, this description is rather crude: it would exclude households that face a transitory variation in their income. By only using those households reporting a stable ("normal") evolution of their income for the current year in the sample, current income could be equated with permanent income. This method, applied to the Household Budget Survey data, does not yield conclusive results. In addition to this method, two main methods of estimation can be highlighted. The first uses an instrument to approximate permanent income: level of education, history of the household's employment situation, socio-professional category, consumption of non-durable goods, etc. The second identifies permanent income as the discounted sum of income received over the entire lifecycle, according to the method used by Dicks-Mireaux & King (1982), improved by Lollivier & Verger (1999).

Garbinti & Lamarche (2014) show that the use of the method that involves reconstructing a permanent income over the lifecycle only changes the results marginally and does not change the hierarchy of saving rates between quintiles, compared to the instrumental method. Therefore, the first method has been chosen. The instrument must be correlated with permanent income, must have an effect on savings only through permanent income and must not be related to transitory shocks affecting income. As with Dynan *et al*. (2004) and Bozio *et al*. (2013), the decision is made to use the highest qualification obtained[12], which seems a stable component of an individual's human capital and is not linked to transitory income shocks. This instrument is not perfect: indeed, the level of eduction may be positively correlated with a taste for saving (Mayer, 1972), a lesser preference for the present, or may have an effect of its own on the ability to anticipate retirement. In addition, it is correlated with improved financial literacy (Lusardi, 1999). Nevertheless, the conclusions remain valid, even if a more general link between savings and educational attainment is found, which is not entirely attributable to the income effect. An alternative specification is also made using the socio-professional category as an instrument of permanent income.

The aim is to estimate the following relationship:

$$s_C = \frac{S}{Y^C} = f\left(Y^P\right) + X\beta + \epsilon \qquad (1)$$

where s_C is the current saving rate, S and Y^C represent current savings and current income, Y^P represents permanent household income, and X are control variables that directly affect the saving rate (average age, household type, gender of the reference person, urban or rural, period of illness, inheritance).

As with Dynan *et al.* (2004), a two-stage procedure is used. In the first stage, the current household income is regressed on an instrument, i.e. the highest qualification of the reference person and their potential partner (grouped into eight categories), and based on the control variables, making it possible to obtain a predicted value for permanent income Y^P (Table A2-3 in Appendix 2). In the second stage, the predicted values for permanent income (continuous or quintile variable), are used as the regressor in equation (1) above, which is estimated by mean and median regressions. Where Y^P is a continuous variable, the relationship is estimated using the double least square method; when quintiles are introduced to test the non-linearity of the relationship, a bootstrap is done to calculate the mean errors.

11. For Kotlikoff & Summers (1981), inter-generational transfers of wealth are the most important explanation for savings. Whereas lifecycle households seek to eventually consume all resources received, dynastic households transfer resources to their children, as these transfers are of some use to them (see the work of Barro & Becker, 1988, on dynastic altruism).

12. Another possibility is to use the socio-professional category, but this is a less stable component because of occupational mobility.

In advance, in order to exclude households with large fluctuations in income from the sample, 1,658 households that have had a large increase or decrease in their income over the past year are excluded, bringing the number of observations to 11,735 households.

The estimated coefficients for the continuous permanent income variable in Table 3 are low but positive; therefore, the saving rates increase as permanent income increases. Compared to current income, using an instrument has the effect of smoothing saving rates: the coefficients for the permanent income variable are lower than those for the current income variable. Thus, for a median permanent income and a median saving rate, a 1% increase in permanent income increases household savings by 1.2% (compared with 1.7% for current income). With regard to age, a significant drop in the saving rate is observed for the 60-69 age group, together with an increase in the saving rate between 30 and 60, except in the 40-49 age group.

Table 3 – **Regression of the mean saving rate (as a %) on permanent income (instrument: educational attainment)**

	Total households (excluding self-employed)		Households (excluding self-employed) for which the reference person is active	
	(i)	(ii)	(iii)	(iv)
Constant	20.9***	24.6***	16.5***	21.6***
	(2.2)	(2.1)	(2.6)	(2.4)
Permanent income (10^4)	1.2***		1.3***	
	(0.4)		(0.4)	
Permanent income				
Q1		ref.		ref.
Q2		-1.9		-1.0
		(1.2)		(1.4)
Q3		0.0		-0.2
		(1.4)		(1.8)
Q4		0.4		-0.1
		(1.6)		(1.9)
Q5		3.2**		2.2*
		(1.7)		(1.4)
Top 5%		6.8***		6.8***
		(2.0)		(2.0)
Average age of the household[(a)]				
Aged under 30	-5.2***	-5.6***	-5.9***	-6.7***
	(1.3)	(1.4)	(1.3)	(1.3)
Aged 30 to 39	-0.1	-0.3	-0.3	-0.5
	(1.11)	(1.13)	(1.06)	(1.09)
Aged 40 to 49	ref.	ref.	ref.	ref.
Aged 50 to 59	2.3**	2.1*	2.0*	2.2*
	(1.1)	(1.2)	(1.1)	(1.2)
Aged 60 to 69	-1.3	-1.6	-6.3***	-5.9***
	(1.3)	(1.3)	(2.2)	(2.3)
Aged 70 and over	6.2***	5.6***	5.5	7.7
	(1.3)	(1.3)	(9.9)	(10.1)
Number of observations	10,840	10,840	7,205	7,205

(a) The age of the reference person for single persons, the average of the age of the reference person and the age of the partner for couples.
Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively. The standard deviations are shown in brackets. The following control variables were introduced in the regressions: household type, gender of the reference person, urban/rural, illness and inheritance. The reference household is a couple of two working people with a child or children, with an average age between 40 and 49, urban and who have not had a period of illness or received an inheritance.
Sources and Coverage: Insee, Household Budget Survey 2011. Households excluding the 1% at the extremes of the saving rate range and households where the reference person is a member of the clergy, a student, unemployed having never worked or inactive other than retired.

In the literature, it is mainly the hypothesis that the better-off save a larger proportion of their permanent income that seems to emerge from the empirical work, though certain studies support Friedman's view (Gustman & Steinmeier, 1998; Venti & Wise, 2000). In the Household Budget data, only the highest permanent income quintile has a significantly higher saving rate (and again, the significance is at the 10% threshold). This result is corroborated by the direct study of the impact of an educational attainment on the saving rate (cf. the direct regression of the saving rate on educational attainment in Table A2-2 in Appendix 2): only graduates of higher education (more than two years of higher education) have a significantly higher saving rate than non-graduates. It is difficult to draw conclusions since a significantly higher saving rate is observed only for incomes in the top 20%. This is also observed by Bozio *et al.* (2013) on British and American data. According to the Household Budget data, the difference in the saving rate, controlling for age and type of household, is fairly low, from 4 to 7 percentage points depending on the specification (4 points for Bozio *et al.*, 2013). For Garbinti & Lamarche (2014), or Dynan *et al.* (2004), the effect is more pronounced, with an increasing hierarchy of saving rates across income quintiles, whereas on these data it is only observed for the highest incomes.

Permanent income is found to explain only a small part of saving behaviour. Other factors influence household behaviour, in particular income uncertainty: it is proposed that the model be supplemented by integrating it. To that end, the focus here is on active households: the concept of precautionary savings is in fact analysed through the risk of unemployment, i.e. for active households (8,082 households, compared with 11,735 for all households).

3.2. The Precautionary Motive and Savings

Households not only save to compensate for lower future incomes, but also to guard against uncertainty. To measure this uncertainty, the current saving rate is again regressed on permanent income (instrumented by the educational attainment), age, number of children, marital status, nationality and gender of the reference person, place of residence (urban or rural), the existence of periods of illness and receipt of inheritance, as well as on two variables from the surveys: (1) a variable describing the household reference person's perception of changes in his or her standard of living over the next 12 months; (2) the variance of future income calculated based on the probability of unemployment (Table 4). The survey includes a variable indicating the risk of unemployment over the next 12 months perceived by the reference person and his/her partner. The method of Lusardi (1998) is used and a quantitative value is assigned to the probability of unemployment of the reference person: $p_{PR} = 0$ for zero risk, $p_{PR} = 0.3$ for a low risk, $p_{PR} = 0.5$ for a medium risk, $p_{PR} = 0.7$ for a high risk and $p_{PR} = 0.9$ for a near certainty.[13] For single-earner households, the variance in future income, $y_{t+1,}$ is calculated based on the formula: $Var_{a,PR}\left(y_{t+1}\right) = p_{PR}\left(1-p_{PR}\right)\left(1-a\right)^2 y_t^2$, where a represents the income replacement rate in the event of unemployment. For couples in which both partners work, the formula is refined to take into account the probability of unemployment of the partner p_{CJ}. x represents the proportion of household income provided by the income of the reference person, the following is defined: $Var_{a,couple}\left(y_{t+1}\right) = \left[x \times p_{PR}\left(1-p_{PR}\right) + \left(1-x\right) p_{CJ}\left(1-p_{CJ}\right)\right]\left(1-a\right)^2 y_t^2$. In France, the mean replacement rate at the beginning of the compensation period is 67% and the dispersal of the replacement rate is particularly low for different test cases (Dhont-Peltrault, 2017). This makes it possible to make an approximation and assign the same replacement rate to all households. In this case, $\left(1-a\right)^2$ it is a constant, and the econometric estimates are not sensitive to the value of a (Lusardi, 1998); $a=0$ is fixed for the sake of simplicity.

Again, the saving rate increases with permanent income (Table 5). The saving rate is significantly lower for single people and single-parent families. In contrast, childless couples have a higher saving rate. People living in rural areas also save more than people living in urban areas. People who receive an inheritance save less; whereas they paradoxically accumulate more wealth (see Table 6 below): indeed, the saving rate is measured by excluding gifts or inheritances received, whereas the measurement of wealth takes them into account. Therefore, consumption is likely to increase due to this exceptional influx of money (and thus savings fall). Households with an average age of 60-69 are the only ones that register a saving rate that is statistically lower than the other age groups in both regressions,

13. To test the robustness of the estimate, alternative quantifications of the probability of unemployment are considered. Table A2-4 in Appendix 2 shows that surplus savings are virtually unchanged in the different variants tested.

whereas the effect is not significant for over-70s. However, this result is difficult to interpret insofar as it only concerns households that are still active, which are very few in number after the age of 70.

As for income risk, expecting an improvement in one's current income is correlated with a significantly lower saving rate (13.4 points on average), but the reverse is not verified. Moreover, the higher the variance of income (calculated based on the probability of unemployment), the more the saving rate rises: even though the coefficient is low, it is significant at the 1% threshold. Comparing the savings surplus in a situation of income uncertainty *vs* a situation of income certainty, regression 5 implies that, for the sample average, the savings surplus would be 6.4%.[14] Given that the average saving rate excluding durable goods is 24.3% across the sample, precautionary savings account for 1.6% of disposable income, which is a fairly marginal proportion. In other words, for an average current income[15], the savings surplus linked to uncertainty amounts to €560 per year. It should be noted that an endogeneity bias cannot be ruled out if there are risk-averse households that value both having a stable income and high savings and, in contrast, "riskophile" households that have a taste for risky income and save little. In this case, the income variance coefficient will be underestimated, even though excluding the self-employed from the sample allows greater homogeneity of risk aversion across the study population.

Furthermore, based on regression 5, it is possible to calculate the "maximum" extent of precautionary savings, in the hypothetical case in which all households have the maximum amount of income uncertainty.[16] In this extreme

14. *I.e.* s_i, *the saving rate in situations of uncertainty and* s_0, *the saving rate if income variance is zero. Noting that* b *is the estimated coefficient of the* income variance *variable, this gives:*

$$\frac{s_i - s_0}{s_i} = \frac{b\frac{\sigma^2}{Y^P}}{\frac{1}{n}\sum(s_i)}$$

15. *Average current income across the sample is €36,121.*
16. *This maximum uncertainty is obtained by setting the probability of unemployment* p = *0.5. The mean income variance then increases from 4,876 to 8,950 and the saving rate increases by 2.5 points, depending on the regression.*

Table 4 – **Income risk measures**

Risk of unemployment for the reference person over the next 12 months (as a % of the total)	
Zero risk	45.6
Low risk	36.0
Medium risk	12.6
High risk	4.0
Near certainty	1.8
Number of observations	5,613
Risk of unemployment for the partner (if any) over the next 12 months (as a % of the total)	
Zero risk	50.8
Low risk	29.8
Medium risk	12.1
High risk	5.0
Near certainty	2.3
Number of observations	2,426
Change in household standard of living over the next five years (as a % of the total)	
Will improve a lot	6.1
Will improve a little	27.1
Will remain the same	36.5
Will worsen a little	22.9
Will worsen a lot	7.5
Number of observations	5,408

Sources and Coverage: Insee, Household Budget Survey 2011. Households for which the reference person is active.

situation, precautionary savings represent 2.9% of disposable income, compared with 1.6% in the average uncertainty situation observed in the survey. Depending on the methodology adopted, this means that whatever the probability of unemployment, the proportion of precautionary savings is between 0 and 2.9% of disposable income.

These empirical results are interesting, but it is difficult to compare them with the literature. Indeed, over the last twenty years or so, the majority of articles dedicated to estimating the precautionary motive focus on measuring the proportion of wealth related to the precautionary motive. According to Deaton (1991) and Carroll (1992), the characteristic of savers in the "buffer stock" model is that they want to achieve a target of wealth relative to income, with the size of that target being at least partly a function of income uncertainty. In order to be able to compare the results with the existing empirical literature, the next section contains an assessment of the proportion of wealth accumulated due to the precautionary motive using the Household Budget Survey data.

Table 5 – **Precautionary saving (measurement of risk: income variance)**

	Coefficient	Standard error	Mean
Constant	13.9***	(2.9)	1.00
Permanent income (10^4)	1.3***	(0.5)	36,447
Income variance (10^4)	3.2***	(0.4)	4,876
Standard of living in 5 years			
Will improve a lot	-13.4***	(2.0)	0.05
Will improve a little	-1.4	(1.2)	0.26
Will remain the same	ref.	ref.	ref.
Will worsen a little	-0.3	(1.2)	0.22
Will worsen a lot	-2.4	(1.8)	0.07
Do not know	-3.7*	(2.0)	0.06
The household's reference person is a woman (reference man)	-0.4	(1.0)	0.34
Average age of the household			
Aged 20-29	-4.1***	(1.5)	0.18
Aged 30-39	0.6	(1.2)	0.28
Aged 40-49	ref.	ref.	ref.
Aged 50-59	2.0	(1.3)	0.22
Aged 60-69	-6.6**	(2.7)	0.03
Aged over 70	-1.8	(14.6)	0.00
Type of household			
Single person	-4.1***	(1.6)	0.25
Single-parent family	-11.1***	(1.9)	0.10
Couple without children	5.0***	(1.3)	0.20
Couple with children	ref.	ref.	ref.
Other type of household	-1.4	(3.0)	0.02
Lives in a rural area	6.1***	(1.1)	0.20
Inheritances and gifts received	-6.1***	(2.4)	0.04
Illness or disability	6.9***	(1.9)	0.94
R2	0.07		
Number of observations	5,613		

Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively. A two-stage least squares method is used to estimate permanent income and then the saving rate. The mean saving rate is 24.0%.
Sources: Insee, Household Budget Survey, 2011.

3.3. Wealth and the Precautionary Motive

Although income uncertainty increases the saving rate, it also increases accumulated wealth. In principle, savings and wealth are connected by the inter-temporal budget constraint and calculating the impact of income uncertainty on savings and wealth accumulation should be equivalent. However, given the differences in the calculation of savings (difference between disposable income and consumption) and wealth (sum of assets held), the impacts may be differentiated (Guiso *et al.*, 1992).

The measure the proportion of wealth related to the precautionary motive, an equation based on lifecycle theory is estimated (Dicks-Mireaux & King, 1982):

$$\ln \frac{A}{Y^P} = f\left(age, \frac{\sigma^2}{Y^P}, X \right) + \epsilon \qquad (2)$$

where A / Y^P is the ratio of wealth to permanent household income, $\frac{\sigma^2}{Y^P}$ is the subjective variance in future income relative to permanent income, X is the set of other household characteristics and ε is the error term. Permanent income can be included in the variables X if preferences are not homothetic (Masson & Arrondel, 1989).[17]

The equation for wealth is estimated based on the household wealth resulting from the Household Budget Survey. As for the amount of assets, the survey is rather crude. Gross wealth is reported and entered in 15 brackets. This variable is made continuous by simulating a residue from a uniform law, for each household, which is added to the lower limit of the reported wealth bracket.[18] The comparative distribution of the variable obtained in this manner and the amount of wealth resulting from the 2010 Insee Household Wealth Survey reveals slight differences (see Figure A1-II in Appendix 1). The average household wealth resulting from the Household Budget Survey is €253,000, compared to €259,000 with the Household Wealth Survey. On average, wealth represents 4.6 times the household permanent income for the 20% of households with the lowest incomes, compared to 8 times the household permanent income for the 20% with the highest incomes.

The wealth equation is estimated using the population whose reference person is active, excluding the self-employed. The wealth/income ratio is regressed on the logarithm of permanent income instrumented by educational attainment, on the principle explanatory variables (household type, average age group of the household, nationality and gender of the reference person, receipt of sickness or disability benefits, receipt of inheritances or gifts, residential area and social category), on the probability of unemployment and on the variance of income (Table 6). The positive coefficient for the permanent income variable shows that wealth increases more than proportionally to the lifecycle resources. The wealth-permanent income ratio is found to increase with age, reaching a peak for the over-70s: therefore, no de-accumulation is seen at the oldest ages.[19] One explanation is that only households with an active reference person are retained in the sample. These elderly households that continue working have particular characteristics that could explain lower de-accumulation of wealth than for the rest of the population. Furthermore, households that have received an inheritance or a gift accumulate more wealth. Households in rural areas are also richer in terms of wealth (with an average wealth of €244,000, compared to €212,000 for urban households), which can be explained by the greater number of property owners in rural areas than in large towns: only 22.0% of rural households are tenants, compared to 50.4% of urban households.

Furthermore, households for which the standard of living will improve save significantly less than others, but the reverse is not verified. The effect of income uncertainty on wealth is statistically significant. A comparison is made between accumulated wealth in a situation of uncertainty W_i (where $\frac{\sigma^2}{Y^P} > 0$) and accumulated wealth when income W_0 is certain (where $\sigma^2 = 0$): it represents 6.3% of the total accumulated wealth[20], with b representing the estimated coefficient of the income variance in the regression. These percentages are comparable to the estimates that can be found in the literature (Guiso *et al.*, 1992; Lusardi, 1997; Lusardi, 1998; Arrondel, 2002; Arrondel & Calvo Pardo, 2008). In relation to the 2010 Household Wealth Survey, Arrondel

17. *In this case, proportionality between wealth and permanent income is no longer assured, in contrast to the standard lifecycle theory.*
18. *With the exception of the highest wealth percentile, simulated based on an exponential law.*
19. *It should be noted that the identical regression in which the age groups are replaced by the age and age-squared variables shows that age has a positive impact on wealth accumulation, but that age squared has a small and significant impact on wealth accumulation.*
20. *According to equation (2),* $\frac{W_0}{W_i} = \frac{1}{e^{b\frac{\sigma^2}{Y^P}}}$, *therefore* $\frac{W_i - W_0}{W_i} = 1 - \frac{1}{e^{b\frac{\sigma^2}{Y^P}}}$

& Calvo Pardo (2008) find a coefficient of 2.4% for non-pensioner households and 7.5% if the non-pensioner population is truncated at the two extremes of wealth, without excluding the self-employed.[21]

To determine whether households with the lowest incomes accumulate a higher proportion of precautionary wealth than others, five different regressions are carried out for each of the five permanent income quintiles, with the same explanatory variables as in regression 6 and the coefficients affecting income variance are examined (Table 7). Households in the intermediate and upper quintiles (third and fourth quintiles) are found to have the highest precautionary wealth, measured by the probability of unemployment (relative to a certain situation). All quintiles accumulate precautionary wealth, representing between 6.2% and 16.2% of their total wealth. There is an inverted U-shaped curve: the poorest 40% of households and the richest 20% of households are thought to accumulate less precautionary savings, while households in the middle-income quintiles are thought to have

21. The first difference stems from a difference in the population studied; another difference stems from the fact that Arrondel & Calvo Pardo choose to consider only the probability of unemployment of the reference person in their measurement of precautionary savings, even for couples.

Table 6 – **Precautionary wealth (measurement of risk: income variance)**

	Coefficient	Standard error	Mean
Constant	-15.4***	(1.0)	1.0
Log (Y^P)	1.6***	(0.1)	10.4
Income variance (10^5)	1.3***	(0.2)	4,876
Standard of living in 5 years			
Will improve a lot	-0.4***	(0.1)	0.1
Will improve a little	-0.3***	(0.1)	0.3
Will remain the same	ref.	ref.	ref.
Will worsen a little	-0.1	(0.1)	0.2
Will worsen a lot	-0.1	(0.1)	0.1
Do not know	-0.5	(0.1)	0.1
The household's reference person is a woman (reference man)	0.1*	(0.0)	0.3
Average age of the household			
Aged 20-29	-0.8***	(0.1)	0.2
Aged 30-39	-0.3***	(0.1)	0.3
Aged 40-49	ref.	ref.	ref.
Aged 50-59	0.2**	(0.1)	0.2
Aged 60-69	0.3**	(0.1)	0.0
Aged over 70	1.6**	(0.7)	0.0
Type of household			
Single person	0.7***	(0.1)	0.3
Single-parent family	-0.2*	(0.1)	0.1
Couple without children	0.2**	(0.1)	0.2
Couple with children	ref.	ref.	ref.
Other type of household	-0.4***	(0.1)	0.0
Lives in a rural area	0.5***	(0.1)	0.2
Inheritances and gifts received	0.3**	(0.1)	0.0
Illness or disability	-0.1	(0.1)	0.9
R2	0.24		
Number of observations	5,613		

Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively. The mean of the dependent variable is 0.9.
Sources: Insee Household Budget Survey, 2011.

Table 7 – **Permanent income and precautionary wealth quintiles (measurement of risk: income variance)**

	Coefficient	Standard error	Mean	Effect as a %
Q1	2.60E-05	1.20E-05	3,196	7.9
Q2	1.70E-05	4.10E-06	3,974	6.6
Q3	4.60E-05	7.30E-06	3,823	16.2
Q4	2.40E-05	4.80E-06	5,236	12.0
Q5	8.00E-06	1.70E-06	8,053	6.2

Notes: Estimate of coefficient *b* in the equation (2), for each permanent income quintile.
Sources: Insee Household Budget Survey, 2011.

precautionary wealth greater than 12% of their total wealth. It can be assumed that the reasons for low precautionary savings are different between the bottom two permanent income quintiles and the highest one. For the lower quintiles, a "hand-to-mouth" form of behaviour can be observed, with households facing difficulty in accumulating wealth, while for the 20% of households with the highest incomes, the greater ability to find employment allows a "calmer" view of the risk of unemployment. This result differs from the finding by Carroll *et al.* (2003) on US data, which highlighted a surplus of precautionary savings for middle- and high-income households.

* *
*

Two important results emerge from this article. First, the saving rate of the richest households increases with permanent income, which shows that they save more over their lifecycles than other households. Then, this article makes it possible to confirm the existence of a precautionary motive linked to income risk and to quantify it. Thus, in France, the annual savings surplus due to income uncertainty for the year 2010 would be 6.4%, or 1.6% of gross disposable income – around €560 per year. In the case of maximum income uncertainty, the calculations show that precautionary savings would account for 2.9% of disposable income, or 9% of total savings. In terms of stock, accumulated precautionary wealth would be low and represent 6.3% of total household wealth, with a more marked effect for households in the third and fourth income distribution quartiles.

These results need to be confirmed and taken further. Thus, ideally, it should be possible to apply income variance, which can partly capture risk aversion. One idea would be to test an objective, not subjective, indicator of the probability of unemployment by having more detailed data on the type of employment contract and employment held. Finally, it would be worth extending this study to other countries, to compare the extent of precautionary savings and to determine to what degree labour market flexibility influences this precautionary behaviour. □

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APPENDICES

APPENDIX 1

CONSTRUCTION OF VARIABLES

Table A1-1 – **Comparison between the National accounts and the Household Budget Survey**

(In billions of euros)

Aggregates	National accounts	Household Budget Survey
Earned income		
Gross wages and salaries	1,068.0	
Taxes on wages and salaries	-82.8	
Social security contributions from wages and salaries	-400.4	
Wages and salaries, net of deductions	584.8	552.6
Mixed income of the self-employed	120.4	
Income tax for the self-employed	-9.2	
Social security contributions of non-salaried workers	-13.2	
Mixed income of the self-employed, net of deductions	98.0	54.8
Balance of earned income	682.8	607.4
Income from property		
Operating surplus	166.2	133.3
Balance of income from land and subsoil assets	0.6	0.6
Balance of property income	166.8	133.9
Financial income		
Financial income	134.4	18.1
Interest paid	-22.7	0.0
Balance of financial income	111.7	18.1
Social income and transferred income		
Benefits other than social transfers in kind	424.2	333.4
Other current transfers received	61.9	27.6
Other current transfers paid	-60.0	-78.6
Balance of social income	426.1	282.4
Taxes (to be deducted)		
Income tax	-65.9	-49.4
Other current taxes	-20.3	-29.7
Total taxes	-86.3	-79.1
Gross disposable income	1,301.1	962.7
Individual final consumption expenditure(1)	1,094.6	811.2
Gross savings	206.5	151.5
Gross saving rate as a %	15.9	15.7

(1) For comparison purposes, consumer expenditure includes the consumption of durable goods.
Sources: 2010 and 2011 National Accounts; Insee, Household Budget Survey 2011.

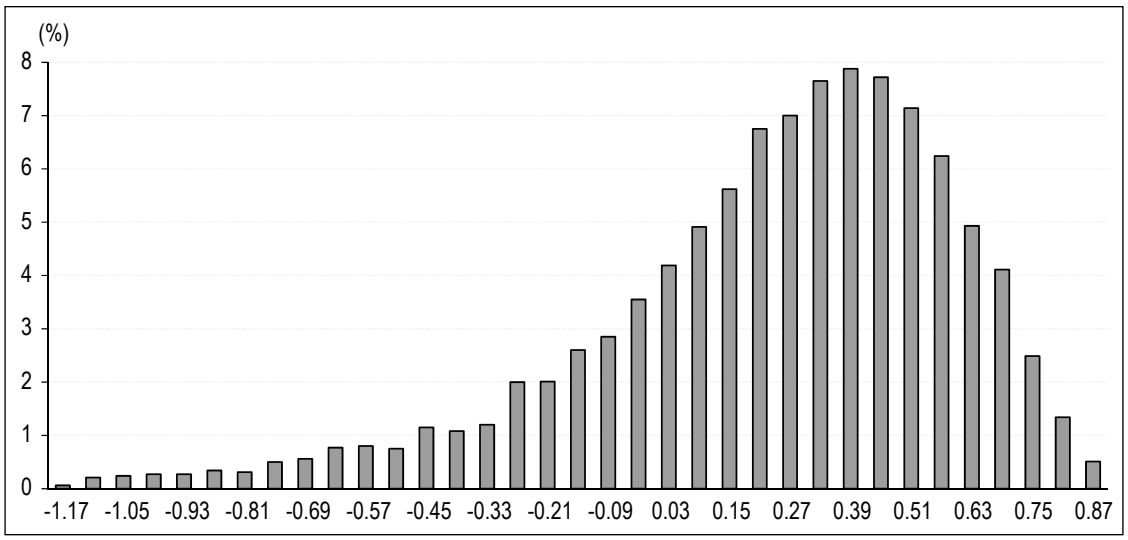
Table A1-2 – **Saving rate, including durable goods, by reported household financial affluence**

(%)

Household budget situation	Saving rate
1 - You are comfortable	32.3
2 - It is going well	27.4
3 - It is okay, but you have to be careful	21.8
4 - You struggle to make ends meet	16.7
5 - You cannot make ends meet without getting into debt	13.6

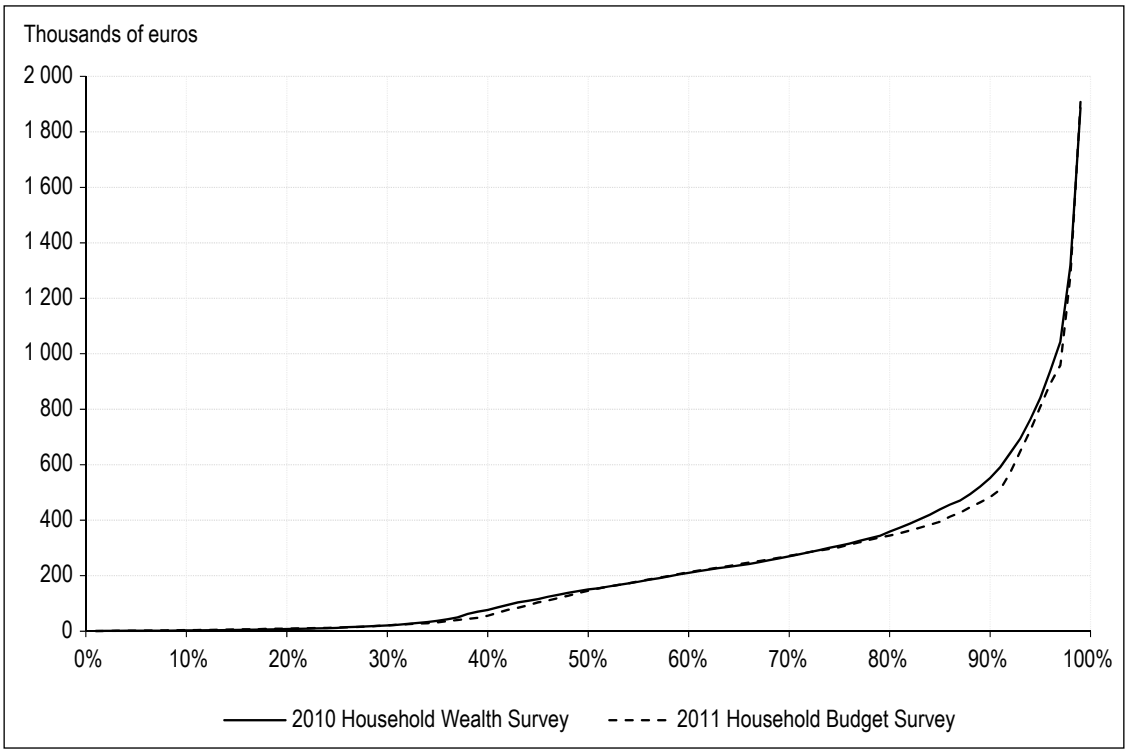
Sources: Insee, Household Budget Survey 2011.

Figure A1-I – **Weighted distribution of saving rates over the truncated sample**



Sources and Coverage: Insee, Household Budget Survey 2011. Households excluding the 1% at the extremes of the saving rate range and households where the reference person is a member of the clergy, a student, unemployed having never worked or inactive other than retired.

Figure A1-II – **Distribution of the "Gross Wealth" variable in the 2011 Household Budget Survey and the 2010 Household Wealth Survey**



Notes: the distribution is shown up to the 99th percentile.
Sources: Insee, Household Budget Survey 2011 and Household Wealth Survey 2010.

APPENDIX 2

DESCRIPTIVE STATISTICS AND REGRESSIONS

Table A2-1 – **Disposable income, consumption and saving rates**

(In current euros)

Disposable income quintiles	Q1	Q2	Q3	Q4	Q5	Total
Median disposable income	12,280	18,748	26,218	36,113	54,555	26,218
Mean disposable income	11,777	18,852	26,276	36,355	63,776	31,405
Median consumption	9,827	14,901	18,647	24,041	32,423	18,570
Mean consumption	10,710	15,851	19,850	25,414	35,717	21,507
Median saving rate (%)	20.0	20.5	28.9	33.4	40.6	29.2
Mean saving rate (%)	9.1	15.9	24.5	30.1	44.0	31.5

Sources: Insee, Household Budget Survey 2011.

Table A2-2 – **Direct regression of the saving rate on higher educational attainment**

	Current income	Standard deviation
Constant	35.4***	(1.2)
Educational qualification of the RP		
2 or 3 years of university	3.6***	(1.1)
BTS, DUT, 1 year of university	-1.3	(1.2)
Bac, CAP, BEP, Vocational diploma	-1.0	(0.9)
BEPC, CEP	-2.3	(1.4)
Unqualified	ref.	ref.
Educational qualification of the partner		
2 or 3 years of university	2.2*	(1.3)
BTS, DUT, 1 year of university	-0.4	(1.3)
Bac, CAP, BEP, Vocational diploma	-2.3**	(1.0)
BEPC, CEP	-4.9***	(1.5)
Unqualified	ref.	ref.
Number of observations	11,780	

Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively. The following control variables were introduced in the regressions: mean age, household type, gender of the reference person, urban/rural, illness and inheritance. Reference household: a couple of two working people with children, with an average age between 40 and 49, urban and who have not had a period of illness or received an inheritance.
Sources: Insee, Household Budget Survey 2011.

Table A2-3 – **Regression of current income on educational attainment (1st stage)**

	Current income	Standard deviation
Constant	31.1***	(1.9)
Average age of the household		
Aged under 30	-11.8***	(0.7)
Aged 30 to 39	-5.3***	(0.6)
Aged 40 to 49	ref.	ref.
Aged 50 to 59	1.5**	(0.6)
Aged 60 to 69	-1.4**	(0.7)
Aged over 70	-2.8***	(0.7)
Nationality of RP		
French	ref.	ref.
Non-French	-3.6***	(0.8)
Gender of RP		
Male	ref.	ref.
Female	-1.5***	(0.4)
Educational qualification of the RP		
2 or 3 years of university	20.0***	(0.7)
BTS, DUT, Bac + 2 years of vocational higher education	10.7***	(0.7)
1 year of university	9.5***	(1.6)
General Bac, higher diploma	9.2***	(0.8)
Pro. or tech. Bac	7.6***	(0.8)
CAP, BEP, Vocational diploma	3.4***	(0.6)
BEPC	4.3***	(0.8)
Certificate of studies	1.0	(0.7)
Unqualified	ref.	ref.
Educational qualification of the partner		
2 or 3 years of university	23.4***	(1.9)
BTS, DUT, Bac + 2 years of vocational higher education	13.7***	(1.9)
1 year of university	11.0***	(2.7)
General Bac, higher diploma	9.1***	(2.0)
Pro. or tech. Bac	8.3***	(2.0)
CAP, BEP, Vocational diploma	6.0***	(1.9)
BEPC	5.9***	(2.0)
Certificate of studies	3.1	(2.0)
Unqualified	0.9	(1.9)
No partner	ref.	ref.
Type of household		
Single person	-14.1***	(1.9)
Single-parent family	-8.3***	(1.9)
Couple without children	-7.9***	(0.5)
Couple with children	ref.	ref.
Other type of household	-0.8	(1.6)
Number of observations	11,780	
R^2	0.37	

Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively.
Sources: Insee, Household Budget Survey 2011.

Table A2-4 – **Alternative quantifications of the probability of unemployment**

Probability of unemployment	Base estimate	Variant 1	Variant 2	Variant 3	Variant 4
1 - No, there is no risk	0	0	0	0	0
2 - It is possible, but the risk is low	0.3	0.5	0.1	0.2	0.2
3 - It is possible and the risk is medium	0.5	0.5	0.5	0.4	0.5
4 - It is possible and the risk is high	0.7	0.5	0.8	0.6	0.8
5 - Yes, it is virtually inevitable	0.9	0.9	0.9	0.8	1
Coefficient of income variance	3.2***	2.7***	3.8***	3.9***	3.9***
Saving surplus (as a %)	6.4	6.3	6.5	6.6	6.3

Notes: ***, **, * significant at the 1%, 5% and 10% thresholds respectively.
Sources: Insee, Household Budget Survey 2011.