Cahiers de recherche

EURIsCO

cahier n° 2003-01

Ageing and trhe demand for life insurance:
An empirical investigation using French panel data

par

Philippe Bernard, Najat El Mekkaoui

Anne Lavigne & Ronan Mahieu

Ageing and the Demand for Life Insurance:
An Empirical Investigation using French Panel Data

Philippe Bernard[1]
Najat El Mekkaoui de Freitas[2]
Anne Lavigne[3]
Ronan Mahieu[4]

December, 2002

Abstract:

The age structure of the French population has been experiencing dramatic changes over the past decades and is likely to do so in a near future. The increasing proportion of elder people may modify the saving behaviour of French households. The level of saving, as well as its composition, may be altered by ageing of the French population. This paper investigates the relationship between age structure and the demand for life insurance products using an econometric estimation of French survey data (*Patrimoine 1998* of the National Institute of Statistics and Economic Studies (*INSEE*)). More precisely, we try to identify the significant demographic, economic and financial factors influencing this demand (age, income, household wealth, marital status, occupational status and education…).

Following a methodology developed in a companion article, this paper begins with a characterisation of household accumulation profile in France. The paper then estimates a Probit model to exhibit the determinants of the probability of life insurance holding, and an ordinary least squares procedure to explain the amount of wealth held in life insurance, according to the previously identified significant variables. The results suggest a robust relationship between demographic structure and the demand for life insurance.

Keywords: life insurance, retirement saving, ageing, portfolio selection

JEL: D91, G11, G22

---

[1] EURIsCO, Université Paris-Dauphine, Place du Maréchal de Lattre de Tassigny, 75775 Paris Cedex 16. Philippe.bernard@dauphine.fr.

[2] EURIsCO, Université Paris-Dauphine, Place du Maréchal de Lattre de Tassigny, 75775 Paris Cedex 16. Najat.El-Mekkaoui@dauphine.fr Corresponding author.

[3] LEO, Université d'Orléans, rue de Blois, 45067 Orléans. Anne.Lavigne@univ-orleans.fr

[4] Direction de la Prévision, Ministère de l'Economie et des Finances, 75572 Paris cedex 12. Ronan.mahieu@dp.finances.gouv.fr

Ageing and the Demand for Life Insurance:
An Empirical Investigation using French Panel Data

1. Introduction

The retirement of the large baby boom cohorts is likely to have many consequences on financial accumulation. What will be the saving behaviour of baby boomers when they reach retirement age? Will they still save for life-cycle purposes as their life-expectancy increases? Will they change the composition of their portfolios, with more risk-free assets? Some projections of the French Institute of Statistics and Economic Studies (*INSEE*) show that population ageing could entail a decline of household savings as the baby boomers retire (Flipo (1999)). Besides, the *Patrimoine 1998* Survey conducted by *INSEE* shows that the demand for life insurance follows a hump-shaped curve, increasing with the age until sixty and declining afterwards.

Our paper tries to clarify the behaviour of life insurance demand along with age, using an econometric estimation of the French survey *Patrimoine 1998* of *INSEE*. More precisely, we try to identify the significant socio-economic and financial factors influencing this demand (in particular age, income, household wealth, marital status, occupational status and education).

What are the life insurance needs? While there is a great bulk of theoretical and empirical literature on saving behaviour, studies dedicated to life insurance are scarce. On the one hand, there is an ambiguity as the life insurance sends back to two different notions, depending on whether the risk concerns the death or the survival of the policyholder. In the first case, the contract is labelled term life insurance, in the second case pure endowment insurance. As far as term life insurance is concerned there are many papers dealing with life insurance adequacy among married American couples approaching retirement (Auerbach and Kotlikoff (1991), Bernheim and al. (1999)). On the other hand, pure endowment insurance contracts are often identified as pure saving contracts, and have not led to specific studies. Moreover, the characteristics of life insurance contracts and the amounts invested in these contracts vary among countries, due to institutional features (taxation) of the social welfare system.

Therefore, life insurance demand entails many motives, some shared by all insurance products, others being more specific. The certainty-equivalence model underlines three motives, the life-cycle, the intertemporal substitution, and the bequest motives (see Browning and Lusardi (1996)). However, as the certainty-equivalent model assumes a quadratic utility function, it cannot capture the precautionary motive. This is the reason why the "standard additive model" emerged since it allows for an adequate treatment of uncertainty, particularly of uncertainty on future incomes (Caroll (1992), Irvine and Wang (2001)). The existence of liquidity constraints strengthens the need for precautionary saving (Deaton (1991)). The composition of households (size of the household, number of children, participation of the spouse to labour force….) also influences the household's precautionary saving behaviour (Attanasio and Weber (1995), Bernheim and al. (1999)). The standard additive model, augmented with demographic variables thus offers a more exhaustive explanation of life-cycle saving.

Eventually, tax exemptions and a retirement motive (due to the fragile financial soundness of the French pay-as-you-go public pension system) may constitute other motives for life insurance demand.

The paper is organised as follows. Section 2 is devoted to a brief presentation of the *Patrimoine 1998* Survey and a basic characterisation of household accumulation profile. Following a methodology developed in a companion article (El Mekkaoui and al. (2001)), the econometric issues are discussed in section 3: explanatory variables, estimation procedures (Probit and ordinary least squares). Section 4 is devoted to the empirical results. Section 5 concludes.

2. The *Patrimoine 1998* Survey: presentation and basic statistics

2.1. The *Patrimoine 1998* Survey

The most comprehensive and recent information on French households' financial behaviour is provided by the *Patrimoine 1998* Survey, which has been conducted by *INSEE* between October 14, 1997 and January 16, 1998 on the metropolitan territory, among 10 207 households.

The *Patrimoine 1998* Survey provides a large number of information about French households: financial and non financial wealth, income, age, occupation, education, household composition, marital status, labour force participation (employee, unemployed or retired) and so on. There are other useful information on households' indebtedness for housing, and other loans.

The *Patrimoine 98* Survey also indicates the current and past situation of the head of household regarding unemployment and disease, both in the short run and the long run. Information about the composition of assets, as well as the amount of the various categories of assets is also available.

2.2. Insurance in the *Patrimoine 1998* Survey

Over the past ten years, France has experienced an increase in long term saving. As was shown by previous surveys such as *Actifs financiers* in 1992 and *Budget de Famille* in 1984 and 1995, the *Patrimoine 1998* Survey reveals a tendency for older households to have a higher saving rate on the one hand, and a sharp increase in the demand for pure endowment life insurance and retirement saving on the other hand. In 1992, 39.5 % of households held pure endowment life insurance contracts and retirement saving. In 1998, the holding rate reached 45.9 %.

The growth of life insurance is particularly sensitive among old households. Indeed, *Patrimoine 1998* Survey shows that life insurance and retirement saving increase with age until 60 and decrease afterwards (See table 1). However, this increase may be partially attributed to a wealth effect (See table 2).

Table 1: Age-Asset Profiles of French Households (average values; assets as percent of financial wealth)

	17-25	26-35	36-49	50-59	60-69	70-
Total wealth (euros)	10 640	50 980	112 591	170 953	139 710	139 544
Financial wealth (% total wealth)	73	37	30	38	39	56
Current accounts	20	17	14	11	9	6
Capped interest saving plans	28	20	15	11	16	13
Mutual funds	3	2	2	6	3	4
Employee saving plans	1	4	3	2	0	0
House purchase saving plans	24	20	13	9	8	4
Securities	10	20	32	40	41	56
Life insurance and retirement saving	14	17	21	23	23	17
Number of households	507	1 889	2 863	1 791	1 563	1 537

Source: *Patrimoine 1998* Survey, Insee.

Table 2: Wealth-Asset Profiles of French Households (average values; assets as percent of financial wealth)

10^3 euros	0-7.6	7.62 - 38.1	38.1 - 76.2	76.2 - 152.4	152.4 - 228.7	228.7 - 304.9	304.9 - 762.2	762.2 -
Total wealth (euros)	2 435	18 768	58 324	110 439	184 648	262 957	437 844	1 703 162
Financial wealth (% total wealth)	92	86	34	24	28	32	41	70
Current accounts	36	21	16	16	14	10	9	3
Capped interest saving plans	41	33	29	26	20	17	9	2
Mutual funds	0	1	2	2	3	3	2	7
Employee saving plans	3	3	2	2	2	1	1	0
House purchase saving plans	8	19	20	14	12	11	8	1
Securities	1	5	11	16	23	32	47	74
Life insurance and retirement saving	10	18	20	25	25	26	23	12
Number of households	2 380	1 533	1 209	2 520	1 097	538	731	142

Source: *Patrimoine 1998* Survey, Insee.

2.3. Classification of life insurance products listed in the *Patrimoine 1998* Survey

The *Patrimoine 1998* Survey distinguishes 5 types of insurance contracts (see Appendix 1 for definitions):

- pure life insurance (i.e. term, or whole-life, policy providing payments to beneficiaries if death occurs during the contract, nothing being paid in case of survival of the insured, except group insurance contracts backing mortgage loans, or contracts subscribed within firms to cover death or disability at work);

- pure endowment insurance, annuities and endowment insurance (i.e. mix of term life insurance and term annuity);

- popular saving plans (in French *Plans d'Epargne Populaire - PEP*), which are tax exempted saving plans provided that the amount invested is kept during at least 5 years); banks and insurance companies can supply these *PEP*; when a pure endowment insurance contract is nested in a *PEP*, the *PEP* is considered as an insurance vehicle;

- voluntary supplementary retirement saving and occupational compulsory retirement saving. Voluntary supplementary retirement saving is close to the "pension saving plan" (UK) or the 401(k) pension plan (US). Occupational compulsory retirement saving refers to pension plans offered by large firms, or pension plans designed for self-employed.

In our econometric investigation, we have only dealt with endowment insurance and retirement saving since we were interested in the "saving" behaviour of the elderly (pure life insurance having no saving component). We have thus aggregated pure endowment insurance, annuities, and *PEP* on the one hand, and labelled such an aggregate "endowment insurance". On the other hand, we have excluded occupational compulsory retirement saving (by definition individuals cannot freely choose to hold such products). We have thus only considered voluntary supplementary retirement savings, labelled "voluntary retirement savings" for simplicity.

3. Econometric issues

This section presents the different exogenous variables and methods used to estimate the demand for endowment insurance and voluntary retirement saving.

3.1. The exogenous variables

Our regressions use the following exogenous variables: household financial wealth, income, squared income, age, occupational status (working or retired agent), household composition (single, couple, number of children, lone-parent) and education. For the age variable, we have considered age groups, with a five-year interval, from seventeen to eighty-five and over.

The introduction of financial wealth as an exogenous variable might induce an endogeneity bias as the level and the composition of financial wealth have similar determinants. Therefore we have computed an instrumental variables estimator for financial wealth. The instrumental variables are income, age, household composition and educational level.

We have also introduced a dummy variable indicating whether households are indebted, or not, to finance the purchase of a principal or secondary residence. Indeed, housing wealth may provide a good vehicle for consumption at retirement, and home ownership may negatively affect the demand for endowment insurance and retirement saving if it is considered as a partial substitute for precautionary saving. The existence of a mortgage might affect both the level and the structure of financial saving: a mortgage is generally associated with a compulsory life insurance contract in case of death.

Finally, we wanted to capture the fact that endowment insurance has benefited from a tax exemption until recent years. We have not been able to construct a variable indicating if a household has an insurance contract in order to benefit from a tax exemption. We have nevertheless introduced a dummy variable, indicating whether a household is a potential income taxpayer or not. With the annual income declared in the survey and the household composition, we have determined the income tax rate of the household during 1997. If the income tax rate is positive, our taxation dummy equals 1, and 0 if not[5]. This variable takes into account a fiscal optimization behaviour which is not the case of a variable indicating if a

---

[5] In France, only half the population pays a positive income tax.

household is effectively taxed. Indeed, a household may subscribe to an endowment insurance contract in order to be tax exempted. Some households who do not pay *ex post* income tax are *ex ante* sensitive to fiscal incentives. Our "taxation dummy" considers the existence of such fiscal incentives.

3.2. Estimation methods

In a first step, we have tested a Probit model explaining the probability of "endowment insurance and voluntary retirement savings" holding. We have then split our dependent variable into "endowment insurance" on the one hand, and "voluntary retirement savings" on the other hand, and run a Probit model on each variable. Finally, we have estimated an ordinary least squares model to capture the significant determinants of the amount of endowment insurance holdings. We have isolated households that possess endowment insurance products and have regressed their holdings in endowment insurance on the significant variables of the Probit estimation. Since this procedure introduces a truncation in our sample, we have introduced the inverse Mills ratio in the set of regressors.

4. Regression results

4.1. The demand for endowment insurance and voluntary retirement saving

Age effect

The "age" variable refers to the age of the head of the household. The reference age group is 55-59, because it precedes the legal retirement age (which is 60 in France, to be entitled to full pay-as-you-go pension benefits). The results of the Probit estimation show a hump-shaped profile in the demand for endowment insurance and voluntary retirement saving with respect to age: demand increases until 50, reaches a peak between 50 and 64, and then decreases significantly (the 70-74 age group being an exception, a phenomenon for which we have no explanation).

This analysis might be misleading because the motivations to subscribe to endowment insurance may differ from those pertaining to voluntary retirement saving products. Indeed,

our results show that the demand for voluntary retirement saving products sharply declines at 60, because individuals liquidate these products as soon as they retire and do not buy new ones afterwards (See table 5). The coefficient of the 75-84 age group exhibits a very large negative value (1.31), while when the voluntary retirement saving products are aggregated with endowment insurance, the coefficient is indeed negative but inferior in absolute value (0.21), for the same reference age group. On the other hand, the profile of endowment insurance demand shows an upward slope before 50, but no significant decline afterwards (See table 4).

Our results do not exhibit any propensity of pensioners to liquidate their endowment insurance contracts more than the youngest households. We could however argue that the pensioners keep, perhaps by habit, part of their financial wealth in endowment insurance (this would explain the stability of their holding rates), while dissaving the other part for their current consumption. This behaviour would not be surprising if the subscription of such insurance products were to be driven by two motives: income smoothing at retirement and bequest (the tax exemption of transmission of endowment insurance products remaining fairly generous). This assumption can be tested using the amounts held in endowment insurance (for those households that hold such products). As far as we consider only endowment insurance policyholders, there is a selection bias which is overcome by introducing the inverse Mills ratio as an explanatory variable. Our estimates show no decline of the amounts invested in endowment insurance beyond 60. Moreover, the 70-74 age group possesses holdings in endowment insurance significantly larger than the 55-59 reference age group (See Table 6).

These results support the assumption of a bequest motive, rather than an intertemporal saving motive. We should nevertheless be cautious about this conclusion because cross-section data may lead to a bias due to potential cohort effects. Above all, we could argue that the subscribers of endowment insurance may be influenced by the fear, or at least expectation, of less generous public pensions for the coming years (due to the massive retirement of large baby-boom cohorts). Since there is no current sign of declining public pensions, it is not surprising that the current pensioners did not draw from their endowment insurance assets to finance their current consumption. At a longer horizon, say 2010, this risk of a decline in public pension benefits is plausible. In a near future we might expect retirees to repurchase, or end, their endowment insurance contracts more frequently than they do today.

Apart from age, what are the other significant variables that may explain endowment insurance and voluntary supplementary retirement saving demand?

Wealth effect and income effect

As expected, there is a significant wealth effect in endowment insurance and voluntary retirement saving products holding. However, this wealth effect is observed for the less wealthy individuals: households having a financial wealth lower than 45 735 euros have a weaker probability to hold endowment insurance contracts and retirement saving than households whose wealth is between 45 735 and 152 449 euros. On the opposite, holding rates are not significantly different from those of the upper wealth groups.

The annual income also has the expected influence: endowment insurance holdings increase with income, but the marginal propensity to accumulate endowment insurance products decreases with higher levels of income.

The influence of other variables: household composition, level of education and taxation

The household composition has no decisive influence on the behaviour of endowment insurance and voluntary retirement saving holdings. Singles, childless couples or one-child couples have the same behaviour as two-child couples. The only significant difference concerns households with three children and more, who have a lower probability to hold endowment insurance and voluntary retirement saving than the two-children couples. For these large households, this result may be explained by a higher demand for liquid assets (See El Mekkaoui and al. (2001)).

As far as education is concerned, the more educated, the higher the holding of endowment insurance and voluntary retirement saving. These saving products appear to be better known, or understood, by more educated agents, maybe because they require a greater financial expertise than close substitutes (such as liquid assets, mutual funds,…), especially with the emergence of unit-linked contracts (see Appendix 1) invested in securities. Finally, when households expect an increase of direct income taxation, their holding of endowment insurance and voluntary retirement saving products tends to increase.

On the other hand, the other independent variables (such as occupational status and all the dummy variables related to precautionary saving) are not significant (and thus have not been reported in the tables).

4.2. Comparison between endowment insurance and voluntary retirement saving demand

Endowment insurance demand

We now turn to endowment insurance demand. Other things being equal, households under 50 have a lower propensity to hold endowment insurance products than household aged 50 and over. The demand for endowment insurance is thus increasing (and not hump-shaped), and the oldest households have no propensity to liquidate their endowment insurance assets at old ages. Besides, mortgage is positively related to endowment insurance demand, which was not case when we considered endowment insurance and voluntary retirement saving altogether. Our contention is that indebted households wish to diversify their portfolios on the one hand, and to accumulate precautionary saving against default risks on their mortgages on the other hand.

The other variables (wealth, income, household composition, educational level and taxation) have the same influence as in the preceeding regression which considered the aggregation of endowment insurance and voluntary retirement saving products.

Voluntary retirement saving

Only 8% of households declare to hold a pension plan. The demand for voluntary retirement saving products exhibits a very marked life-cycle profile. Households under 40 have a lower probability to hold a pension plan than the 55-59 age group chosen as reference, but behaviour between 40 and 65 is more ambiguous. Indeed, the 40-50 age group has a weaker propensity to hold voluntary retirement saving products, but the difference is less significant than with the youngest households. Over 65, we found significantly smaller holding rates.

Financial wealth, income and the taxation dummy have the same influence as in the previous regression. On the contrary, household composition and mortgage are no longer significant, which suggests that there is indeed a precautionary role for endowment insurance which is not relevant for pension plans. Finally, the educational level has a slightly different influence from what was previously observed: heads of household with no degree have a

lower probability to hold retirement saving plans than head of households having a primary education; on the other hand, higher education (undergraduate and graduate university level) increases the propensity to have a pension plan but this influence is less significant than previously observed.

4.3. The estimation of endowment insurance wealth

The estimation of endowment insurance wealth partially confirms the previous conclusions.

When considering the age variable, individuals aged under 30 possess a smaller amount of endowment insurance products than the 55-59 reference age group. On the other hand, those aged from 70 to 85 hold a significantly higher amount than the reference age group. These conclusions are consistent with the background risks assumption, the oldest individuals saving to cover other risks than pure life risk. Indeed, there is a significant decline in endowment insurance holding beyond 85.

The wealth effects perceived on the holding rates are revealed differently. As far as holding rates were concerned, the wealth effects operate for the poorest households: households with a financial wealth inferior to 45 735 euros have a lower probability to hold endowment insurance than richer households. On the other hand, when considering the amounts hold, wealth effects operate for the richest households: households with a financial wealth above 457 347 euros hold a endowment insurance wealth significantly higher than poorer households.

The income effects, as well as the educational level, have the same influence as previously observed. More precisely, while a university degree increases the probability to hold the endowment insurance with respect to the other degrees, a positive effect of education on the amount held in endowment insurance products is also detected for lower degrees.

Finally, two interesting results must be noted. The household composition, as well as the taxation dummy, do not affect endowment insurance holding. For the taxation dummy, this result may be explained by the upper limit of tax exemptions (tax exemptions on returns and capital gains on endowment insurance contracts are limited to 4573.5 euros per individual, or 9147 euros for couples). The interpretation is similar for household composition, since tax exemptions are linked to household composition and marital status:

except singles who hold larger amounts of endowment insurance products, other households have the same amount as the reference household (i.e. two-child couple).

Conclusion

Our empirical investigation of the determinants of endowment insurance and retirement saving in France suggests that there is a strong evidence for an age effect. The holding rate of endowment insurance and voluntary retirement saving products follows a typical life-cycle pattern. When disaggregating endowment insurance and retirement saving, the conclusions are slightly different. The households over 50 have a higher propensity to hold endowment insurance than the youngest ones (and a higher amount held other things being equal) but there is no decline in endowment insurance holding at very old ages, whereas voluntary retirement saving increases up to 50, and decreases beyond 60. These results are consistent with the intuition, since endowment insurance may partially cover background risks. The principal limit of our investigation must be underlined. Our econometric estimations being based on instantaneous survey data, a distinction between age effect and cohort effect is impossible.

Appendix 1 : Insurance contracts – some definitions

Pure life insurance (term or whole-life)

Insurance policies taken out by individuals, through an employer or association or when contracting a loan, which guarantee the payment of a lump-sum benefit in the event of death prior to the term of the policy (term life) or at any time (whole-life), regardless of the cause of death. This type of coverage may be supplemented by bodily injury coverage that offers increased benefits in the event of accidental death or additional benefits in the event of long-term or occupational disability due to sickness or accident.

Pure endowment insurance

Insurance policies, taken out directly by individuals or through an employer or association, which build up savings that are subsequently paid out in the form of a lump-sum benefit or annuity if the insured outlives the term of the policy. They are based on the principle of using part of the premium to purchase life insurance and investing the rest over a defined term. These policies are usually combined with counter-insurance to cover the event of death.

Annuity

Periodic payment made to a beneficiary during the duration of a designated life (the policyholder, the beneficiary and the insured are often the same person). An annuity may be paid either whole-life (life annuity) or temporary.

Unit-linked contract

A life insurance policy in which the amounts of benefits and premiums are not expressed in euros but in units of an investment vehicle, such as shares of a mutual fund or a real estate partnership. Contract benefits fluctuate with the market values of the underlying investment instrument, such as stock prices for equities or appraisal values for real estate assets.

Appendix 2 : Econometric results

Table 3: Demand for endowment insurance and voluntary retirement saving: Probit estimates

		Coefficient	Pr>χ2
Constant		-0.94***	0,0001
Financial wealth (instrumented variable)	Under 45 735 euros	-0,18***	0,0009
	45 735 to 152 449 euros	*Ref*	
	152 449 to 457 347 euros	-0,04	0,5262
	Over 457 347 euros	-0,04	0,8143
Annual income		0,38***	0,0001
Squared annual income		-0,03***	0,0001
Age	17 – 24	-0,51***	0,0001
	25 – 29	-0,36***	0,0001
	30 – 34	-0,31***	0,0001
	35 – 39	-0,26***	0,0011
	40 – 44	-0,27***	0,0006
	45 – 49	-0,17**	0,0229
	50 – 54	-0,05	0,4803
	55 – 59	*Ref*	
	60 – 64	-0,03	0,6548
	65 - 69	-0,18**	0,0265
	70 - 74	-0,08	0,3250
	75 – 84	-0,21**	0,0148
	85 and over	-0,28**	0,0496
Composition of household	Single	0,04	0,4763
	Couple – no child	0,06	0,2419
	Couple - 1 child	-0,01	0,8928
	Couple - 2 children	*Ref*	
	Couple - 3 children and more	-0,17***	0,0100
	Lone parent household	-0,12*	0,0890
	Other cases	-0,22**	0,0221
Level of education	No degree	-0,18***	0,0008
	Primary school	*Ref*	
	Technical degree	0,09	0,1096
	Secondary school	0,08	0,1849
	College degree	0,03	0,5818
	Undergraduate	0,18***	0,0048
	Graduate	0,21***	0,0050
Taxation dummy		0,23***	0,0021
Mortgage		0,08	0,2072
Number of observations		7653	

Note: among 7653 households that hold insurance products (see appendix 1), 2673 hold endowment insurance and voluntary retirement saving.
* Significant at 10 % level, ** significant at 5 % level, *** significant at 1 % level.

Table 4: Demand for endowment insurance (Probit estimates)

		Coefficient	Pr>χ2
Constant		-0.94***	0,0001
Financial wealth (instrumented variable)	Under 45 735 euros	-0,19***	0,0007
	45 735 to 152 449 euros	*Ref*	
	152 449 to 457 347 euros	0,03	0,6540
	Over 457 347 euros	0,23	0,1841
Annual income		0,31***	0,0001
Squared annual income		-0,02***	0,0001
Age	17 – 24	-0,42***	0,0012
	25 – 29	-0,26***	0,0034
	30 – 34	-0,21***	0,0097
	35 – 39	-0,22***	0,0063
	40 – 44	-0,34***	0,0001
	45 – 49	-0,17**	0,0259
	50 – 54	-0,06	0,4520
	55 – 59	*Ref.*	
	60 – 64	-0,01	0,9095
	65 - 69	-0,03	0,6886
	70 - 74	0,04	0,5943
	75 – 84	-0,05	0,5095
	85 and over	-0,15	0,2804
Composition of household	Single	0,02	0,6965
	Couple – no child	0,03	0,6185
	Couple - 1 child	-0,02	0,7267
	Couple - 2 children	*Ref*	
	Couple - 3 children and more	-0,19***	0,0063
	Lone parent household	-0,17**	0,0224
	Other cases	-0,21**	0,0273
Level of education	No degree	-0,17***	0,0021
	Primary school	*Ref*	
	Technical degree	0,08	0,1412
	Secondary school	0,03	0,6190
	College degree	-0,03	0,6351
	Undergraduate	0,13**	0,0468
	Graduate	0,17**	0,0259
Taxation dummy		0,22***	0,0049
Mortgage		0,14**	0,0270
Number of observations		7653	

Note: among 7653 households that have insurance products (see appendix 1), 2339 hold pure endowment insurance.
* Significant at 10 % level, ** significant at 5 % level, *** significant at 1 % level.

Table 5: Demand for voluntary supplementary retirement saving: Probit estimates

		Coefficient	Pr>χ2
Constant		-2,20***	0,0001
Financial wealth (instrumented variable)	Under 45 735 euros	-0,01	0,8548
	45 735 to 152 449 euros	*Ref*	
	152 449 to 457 347 euros	-0,18**	0,0517
	Over 457 347 euros	-0,71***	0,0048
Annual income		0,46***	0,0001
Squared annual income		-0,03***	0,0001
Age	17 – 24	-0,67***	0,0023
	25 – 29	-0,56***	0,0001
	30 – 34	-0,44***	0,0001
	35 – 39	-0,33***	0,0022
	40 – 44	-0,17*	0,0985
	45 – 49	- 0,21**	0,0245
	50 – 54	-0,13	0,1519
	55 – 59	*Ref.*	
	60 – 64	-0,20**	0,0559
	65 - 69	-1,51***	0,0001
	70 - 74	-1,10***	0,0001
	75 – 84	-1,31***	0,0001
	85 and over	-5,60	0,9989
Composition of household	Single	0,09	0,3097
	Couple – no child	0,05	0,4961
	Couple - 1 child	0,07	0,3619
	Couple - 2 children	*Ref*	
	Couple - 3 children and more	-0,02	0,7831
	Lone parent household	0,08	0,4499
	Other cases	-0,09	0,4981
Level of education	No degree	-0,19*	0,0624
	Primary school	*Ref*	
	Technical degree	0,02	0,8031
	Secondary school	0,17*	0,0838
	College degree	0,17*	0,0839
	Undergraduate	0,18*	0,0722
	Graduate	0,22**	0,0446
Taxation dummy		0,29**	0,0452
Mortgage		-0,06	0,4504
Number of observations		7653	

Note: among 7653 households that have insurance products (see appendix 1), 586 hold voluntary supplementary retirement saving products
* Significant at 10 % level, ** significant at 5 % level, *** significant at 1 % level.

Table 6: Estimation of amounts held in endowment insurance (OLS)

		Coefficient	Pr>χ2
Constant		0.29	0.1401
Financial wealth (instrumented variable)	Under 45 735 euros	-0.06	0.1803
	45 735 to 152 449 euros	*Ref*	
	152 449 to 457 347 euros	0.03	0.5517
	Over 457 347 euros	0.30**	0.0370
Annual income		0.20***	0.0002
Squared annual income		-0.01***	0.0040
Age	17 – 24	-0.22**	0.0237
	25 – 29	-0.14**	0.0323
	30 – 34	-0.07	0.2428
	35 – 39	-0.10*	0.0808
	40 – 44	-0.13*	0.0577
	45 – 49	-0.01	0.8494
	50 – 54	0.05	0.3649
	55 – 59	*Ref*	
	60 – 64	0.06	0.2353
	65 – 69	0.08	0.1267
	70 – 74	0.15***	0.0065
	75 – 84	0.15***	0.0094
	85 and over	0.04	0.6153
Composition of household	Single	0.09**	0.0225
	Couple – no child	0.06	0.1365
	Couple - 1 child	0.02	0.5741
	Couple - 2 children	*Ref*	
	Couple - 3 children and more	-0.08	0.1293
	Lone parent household	-0.03	0.5232
	Other cases	0.14**	0.0351
Level of education	No degree	-0.05	0.2806
	Primary school	*Ref*	
	Technical degree	0.08**	0.0349
	Secondary school	0.07*	0.0822
	College degree	0.12***	0.0048
	Undergraduate	0.08*	0.0706
	Graduate	0.13**	0.0141
Taxation dummy		0.07	0.2979
Mortgage		0.15***	0.0007
Inverse Mills ratio		-1.65**	0.0277
Number of observations		2339	

* Significant at 10 % level,** Significant at 5 % level, *** Significant at 1 % level

REFERENCES

Ando, A. and F. Modigliani (1963) The Life Cycle Hypothesis of Saving : Aggregate Implications and Tests , American Economic Review, 53 (March) : 55-64.

Arrondel, L. and A. Masson (1996) Gestion du risque et comportements patrimoniaux , Economie et Statistique, n°296-297 : 63-89.

Attanasio, O.P. and G. Weber (1995) Is Consumption Growth Consistent With Intertemporel Optimisation? Evidence from the Consumer Expenditure Survey, Journal of Political Economy, 103(6) : 1121-1157.

Auerbach, A.J. and L.J. Kotlikoff (1987) Life insurance of the Elderly: Its Adequacy and Determinants, in Work, Health, and Income among Elderly, Burtless G. (ed.), The Brookings Institution, Washington D.C.

Auerbach, A.J. and Kotlikoff L.J., (1991) The Adequacy of Life Insurance Purchases, Journal of Financial Intermediation (June) : 215-241.

Bernheim, D.B., L. Forni, J. Gokhale and L.J. Kotlikoff (1999) The Adequacy of Life Insurance: Evidence from the Health and Retirement Survey, NBER WP n°7372.

Browning, M. and A. Lusardi (1996) Household Saving : Micro Theories and Micro Facts, Journal of Economic Literature, 34(4) : 1797-1855.

Caroll, C.D. (1992) The Buffer-Stock Theory of Savings: Some Macroeconomic Evidence, Brooking Papers on Economic Activity, 2 : 61-156.

De Barry, C., D. Eneau and J.M. Hourriez (1996) Les aides financières entre les ménages, Insee Première, n°441.

Deaton, A. (1991) Saving and Liquidity Constraints, Econometrica, 59 : 1221-1248.

El Mekkaoui, N., A. Lavigne and R. Mahieu (2001) La détention d'actifs risqués selon l'âge : une analyse économétrique, Revue d'économie politique (March) : 59-78.

Flipo, A. (1999) Démographie et taux d'épargne des ménages : une analyse prospective, Note Insée n°13/G211, juin.

Insee, (1998) Enquête Patrimoine, Insee.

Irvine, I. and S. Wang (2001) Saving Behavior and Wealth Accumulation in a Pure Life Cycle Model with Income Uncertainty, European Economic Review, 45 : 233-258.

Loisy, C. (1999) L'épargne des ménages de 1984 à 1995 : disparité et diversité, Economie et statistique, n°324-325 : 113-132.

Richard, S. (1975) Optimal Consumption, Portfolio, and Life Insurance Rules for an Uncertain Lived Individual in a Continuous-Time Model , Journal of Financial Economics, 2 : 187-204.

Szpiro, D. (1995) La diffusion des produits financiers auprès des ménages en France, Economie et statistique, 281 : 41-68.