Individual Private Retirement Insurances: the effects of socio-demographic characteristics on poverty

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Abstract

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This paper analyses the relationship between annuities contracts holding and poverty among elder households in France. Whereas most of OECD countries have been encouraging private saving for many years to insure the long term sustainabilty of the pension system, in France, individual and professional pension plans are recent. We assume that the risk of poverty among elderly people is expected to increase in case of pension reforms and pension cuts. We study the role of specific private contracts that could reduce the poverty risk during the retirement by providing the households with an annuity. In France, the situation is particular, as people prefer make long term

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investment by contracting a life insurance rather than participate in individual and occupational pension plans.

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1 Introduction

Proposal to increase private retirement savings have recently attracted considerable attention among policy makers. In the context of pension reforms additional private saving is being recommended in order to maintain an appropriate standard of living throughout the entirety of the life cycle. According to OECD (2005), an increased retirement saving is urgently needed, particularly in countries where Pay-As-You-Go (PAYG) benefits are due to decrease. Reforms that have been undertaken in many OECD countries cut benefits and lead to lower pension expenditures. Such major reforms have been introduced in six of the ten OECD countries having the highest public spending on pensions as a percentage of GDP in the 90s : Austria, France, Germany, Italy, Sweden and Finland.

Our main interest is the role of private retirement saving in reducing the poverty risk among the pensioners. In the United Kingdom, the pension spending represented 11.9% of the GDP in 2000 and 10.1 in 2004. In France and in Germany, these expenditures amounted respectively to 12.9 and 13% in 2000 and increased to 13.1 and 13.4% in 2004. To face the significant challenge of increasing public expenditures on pensions, pension reforms encouraging private pension funding are carried out in Germany and France. Pension reforms in the United Kingdom differ from those in most other European countries. Funded pensions have already been largely developed in the United Kingdom. Thus, pension reforms in the UK are more focused on providing adequate pensions for low income earners, who are most affected by the low replacement rate of the first pillar. In Germany, the 2001 reform brought about changes in the first pillar pension levels through the introduction of the sustainability factor in the first pillar pension provision and the development of supplementary pension schemes, notably through the creation of the strong state supported Riester rente. In 2008, 12 million of Riester rente had been contracted, for a population of 35 million Insured. In France, the situation is quite different as funded pensions are more recent : individual and professional pension plans [1] have been introduced only in 2003. The 2003 Pension Reform (Fillon Law of 2003) increased the required contribution period and attempted to homogenize the private and public sector pension regimes. The reform also

1. These private plans are called " Plan d'épargne retraite entreprise " (PERE) and " Plan d'épargne pour la retraite collectif " (PERCO)

strongly pushed for an increase in the importance of the second and third pillar. The introduction of new private savings vehicles encouraged employers to motivate their employees to save for retirement. Important tax benefits were introduced in order to develop the private savings schemes. Company contributions were exempt from taxes and individuals were placed under "unique" tax regimes and personal retirement plans.

In the United Kingdom, in 2005, the at-risk-of-poverty rate of elderly people [2], defined by Eurostat as the share of persons with an equivalized disposable income before social transfers below the risk-of-poverty threshold [3], amounted to 26%. In France and Germany, these rates were 14%. The paper focuses on the effect of insurance annuities on poverty among elder households.
We put forward the hypothesis that risk of poverty among the elderly people is expected to increase in case of pension cuts. Among households, low-income earners and women are particularly vulnerable during their working life and then during their retirement period. We assume that a complementary retirement income source could avoid a strong increase of the poverty risk among the pensioners. Over the past decades, we have been noting that French households are prone to make long-term investment by contracting life annuities. So we focus on the correlation between poverty at retirement and life annuities holding.

Using representative French households' data, we define econometric specifications that permit us to estimate the effects of insurance annuities holding on poverty risk and then the correlation between the probabilities of being poor and to hold annuities. Such a correlation between poverty at retirement and life annuities holding has not been analyzed extensively before. We consider life annuities, more precisely financial contracts that provide a monthly or annual sum to an individual in retirement as long as they live. Life annuities contracts in France are mostly endowment contracts.

The remainder of the paper is organized as follows. In the second section, we present a brief literature review on life annuities holding and poverty during the retirement. The survey and the data used in this paper are described in Section III. Section IV

2. People aged of 65 and more
3. Set at 60% of the national median equivalised disposable income after social transfers.

describes some facts about poverty and private pension holding in France. Section V presents econometric estimates that combine the relationships between the poverty risk and life annuities holding. The last section offers concluding remarks.

2 Retirement, annuities and poverty : a literature review

According to the OECD, the working populations of different countries need to increase urgently their private savings to provide the retirement consumption. To our best knowledge, the relationship between this need of private savings and the pensioners' poverty has not been treated in the literature. Yaari (1965 [18]) demonstrates that risk aversion is sufficient to encourage households to buy an annuity as protection against life expectancy risk [4]. Auerbach and Kotlikoff (1987) focus on the adequacy and determinants of life insurance among elderly. The authors underline the poverty of elderly non married women. Assuming that many households may fail to buy sufficient life insurance to protect the survivor, they turn out that the elderly households in which the husband's income represents a significant part of total household resources, are inadequately insured. The authors consider pure life insurances, aimed at protecting the survivor of the household. These contracts differ from annuities contracts, providing its holder with an income source during the retirement period. In France, life insurances include also annuities contracts, which are often identified as pure saving contracts, and have not led to specific studies. The characteristics of pure life insurance contracts, annuities or endowment contracts, and the amounts invested in these contracts vary from country to country, due to the institutional features (taxation) of the social welfare system. The pressures that ageing is exerting on public pension systems, particularly Pay-As-You-Go pension systems, constraint the governments to reform pension systems in many OECD countries, and new political measures could impact the level of poverty among the pensioners. The authorities have to restrain the growth of pension spending and to ensure an adequate living standard to a growing number of retirees. Consequently, in the future, private saving could be encouraged to

4. Despite this strong theoretical result, annuity demand remains very low what is known as "the annuity market puzzle".

allow people to avoid being poor after retirement. In response to the need of private savings, France introduced, in 2003, individual and collective pension plans. However, households prefer save for their retirement period by contracting annuities. According to Darmon and Pagenelle (2005 [10]), in 2004, 59% of the French households are holding a life insurance contract, including pure life insurance in case of death, annuities, endowment insurance, and popular saving schemes. Household demographics also influence the precautionary saving behaviour (Attanasio and Weber, 1995 [3] ; Bernheim and al., 1999 [7]). The standard additive model, augmented with demographic variables thus offers a more exhaustive explanation of life-cycle savings. Tax exemptions and a retirement motive (due to the fragile financial soundness of the French pay-as-you-go public pension system) constitute other motives for private pension insurance demand. Using the French Patrimoine survey in 1998, Bernard *et al.* (2002 [4]) show how the demographic structure and the age impact the holding of life insurance or private voluntary pension contracts. The authors test a Probit model to explain the probability of endowment insurance and voluntary retirement savings holding. Households aged of 50 and more hold more contracts than younger households. Whereas complementary pension contracts holding tend to decrease after the age of 60, it is not the case for life insurance contracts. Using the same survey, Arrondel *et al.* (2003 [2]) analyze socio-economic determinant of life insurance holding in France. They conclude that French households without children buy more annuities contracts in order to prepare their retirement, whereas households with children prefer pure life insurance in case of death in order to protect their family. These papers do not take into account the link between the holding of different assets as insurance and retirement contracts and poverty. However earlier papers address the issue of lack of saving : Bernheim et al. (2001 [5]), Hausman and Paquette (1987 [13]), Bernheim (1993 [6]) suggested that workers do not save enough to maintain their consumption level during the retirement. According to Love et al.(2007 [14]), when considering the value of Social Security and Welfare benefits, 12% of households do not have enough wealth to finance the consumption equal to the poverty line. Consequently, we put forward the hypothesis that the poverty can increase during the retirement period. Savings contracts holding and more precisely annuities contracts could reduce this poverty risk. The risk of poverty in Europe has been analysed in the literature in order to identify the poverty determinants. Using the

European Household Panel, Cohen Solal and Lelièvre (2002 [9]) identify many factors impacting the risk of monetary poverty : the composition of the household, the sex, the activity rate, and income sources. In Portugal the risk of poverty is high among the retired population as the pension system is more recent than in other countries. At the end of the 90's, half of the retirees living alone were under the threshold of poverty. Private and public pension represented less than 50% of the income in household with at least one pensioner. Incomes from activity represented 44% of the household's income. The retired women, living alone, suffered particularly from the poverty. More recently, Zaidi (2006 [19]) found that Cyprus, Ireland, Spain, Portugal, Greece and the United Kingdom seem to be the countries with the highest poverty risk for the elderly population. In this publication, the author also shows the high risk of poverty of women aged of 75 and more. These finding seems to be correlated with the proportion of widows in this age group. Zaidi underlines the fact that pension systems reforms induce a more restrictive redistribution in favour of low income earners. Consequently, in absence of incentives toward greater savings, the risk of poverty for future elderly cohorts will increase in Europe. Using the micro data from the Bank of Italy Survey of Household Income and Wealth (SHIW), Franco *et al.* (2008 [12]) show that the incidence and the intensity of poverty among retirees in Italy are below those concerning other citizens. To complete a statistical analysis of poverty, the authors estimate a logit model in which the probability of being poor is regressed on several household characteristics. Then, the robustness of their approach is tested by estimating a probit model. A second group of regressions concerns a sub sample of individuals living in a household with a retired head of household. They conclude that the retirees' poverty depends on the age, gender, region and family characteristics of pensioners. According to Franco *et al.* (2008 [12]), the pension reform of 1992 could increase the future risk of poverty for the current young cohorts that suffer from increased job flexibility and that also might earn particularly low wages. They turn out that the aim of poverty reduction should be pursued through other expenditures programs. Some other papers deal with the risk of poverty among specific populations, such as elderly women, and the role of particular social programs (Rupp *et al.*, 2003 [17] ; Davies and Favreault, 2003 [11]). Using a micro-simulation model, Davies and Favreault (2003 [11]) analyze the role of the Supplemental Security Income (SSI) and the Social Security minimum in the

United States in response to the Social Security benefit decreases. They conclude that Social Security minimum benefit would be more efficient in reducing poverty among low income earners. Rupp *et al.* (2003) mobilize the same methodology studying more precisely the case of elder women. They come to the conclusion that a Supplemental Security Income (SSI) reform could make it more target efficient to reduce poverty among elder women. Assuming that the retirement poverty risk of current young cohort is expected to rise because of the pension reforms and the evolution of labour market, our aim is to analyze the poverty risk among retirees and to evaluate the extent to which the poverty and the annuities holding are correlated with each other. Firstly, we estimate a probit model to explain the determinants of poverty among retirees in France. We put into perspective the poverty risk of retirees in France with the last French households' survey available (2004). We consider different socioeconomics characteristics including a dummy variable of annuities holding. Secondly, we focus precisely on the correlation between the poverty risk and the annuities holding. We test a bi-probit model with the poverty risk and the annuities holding as dependant variables. These variables are simultaneously regressed on the household characteristics. Our methodology is inspired of the Franco, Marino and Tommasino's article who applied it to Italian data. The models of Bernard *et al.* investigate also the probability of life insurance holding using a Probit methodology and a previous wave of this households' survey (1998). Following a common methodology to estimate the probability of being poor and of financial products holding, we nevertheless propose to complete the existing literature with a bi-probit model. It allows us to bridge the gap between two fields of research on the retirement economics : the annuities holding and the poverty and to put into perspective the correlation between these two items.

3 Survey and measurement issues

To address the issue if the correlation between the poverty risk and the annuities holding among French pensioners, we use the Patrimoine Survey of 2004. The survey was conducted by the French National Institute of Statistics and Economic Studies - Institut National de la Statistique et des Etudes Economiques (INSEE) in 1986, 1992, 1998 and 2004. It concerns a representative sample of the French popula-

tion, consisting in 22821 individuals, which belong to 9692 households. The survey is composed of four questionnaires : the first one includes questions on the households, the second one concerns the personal characteristics of the respondents, while the two others inform on the savings and financial products holding, and the different transfers of capital between ancestors and descendants within the family. This survey particularly informs on the financial and non-financial assets of the household belonging to the selected individual questioned, their income, their age, their professional category, their education/training, their marital situation, and their status (active, inactive, retired). Furthermore, the survey also includes the type of asset held by the household (checking account, savings account, real estate, corporate savings, etc.). Retirement pensions, both state and private (type and amount by range), are also presented. 25% of the respondents are retired, whereas 21.7% of them have a wife -or a husband- also pensioner. 21.4% of the sample is a household with at least one pensioner. 39.3% of the Retired are aged from 60 to 69, 43% from 70 to 79 and 17.7% are aged of 80+. We select a sub sample of 3004 pensioners aged in average of 72. The youngest individual is 60 years old, whereas the oldest one is aged of 98. For each pensioner, we consider personal characteristics and information about the household. We take into account the economies of scale in housing and in the consumption of good and services by controlling for the household composition. Using an equivalence scale, we deflate the household resources by the number of consumption unities in the household : we assign the value of 1 for the first household member, 0.5 to each additional member. This methodology has the advantage to illustrate more precisely the living standard of individuals belonging to household and to allow us examining the well being of pensioners. Indeed, it avoids for instance to consider an individual as a poor one if another member of its households is a high income earner. The income is a variable available in the household'questionnaire. This variable provides ranges of incomes. Consequently, we have to assign each household an income value by using the median of the range. Then, each member of the household is assigned the equivalized value of the income, calculated using the equivalence scale. As it is common to proceed in researches on poverty in developed countries, we use a relative concept of poverty. We define the poverty line as 50% of the median income. The respondents are considered poor if their equivalized income is lower than the half of the median income. Given our methodo-

logy, each member of a household earns the same income : either the entire household is poor or no member is poor. In France, as well as in many countries, pensions are adjusted only to price increases. Consequently by considering a median poverty line, many pensioners can move below this threshold if they live during a long period of retirement. So, we partially capture this effect, even if we use crossed data. The Patrimoine survey is the most adequate dataset to address the issue of annuities holding and poverty in France : indeed, it includes questions on these two aspects. Life insurance holding is precisely described. Three types of life insurance products are distinguished :

- Pure life insurance : 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. The survey only takes into account policies taken out by individuals (group insurance contracts backing mortgage loans, or contracts subscribed within firms to cover death or disability at work are excluded). 52% of households and 27% of surveyed individuals are holding this type of contract.

- Pure endowment insurance, annuities and endowment insurance (i.e. mix of term life insurance and term annuity) : 17% of households and 30% of surveyed people are concerned.

- Popular savings schemes (in French Plans d'Epargne Populaire - PEP), which are tax exempted savings schemes provided that the amount invested is kept during at least 5 years) ; banks and insurance companies can supply these PEPs ; when a pure endowment insurance contract is nested in a PEP, the PEP is considered as an insurance vehicle. 10% of households surveyed and 5% of individuals are holding a PEP.

We take into account the endowment insurance and annuities since we were interested in the saving behaviour of the elderly. Indeed, pure life insurances have no savings component. We aggregate pure endowment insurance, annuities, and PEP, and labelled such an aggregate "annuity contract". We exclude occupational compulsory retirement savings. By definition, individuals cannot freely choose to hold occupational

retirement schemes. Hence, such products are seldom offered by firms in France (only very few large firms do so), the French second pillar pension scheme being managed on a pay-as-go-basis. The holding rate of such products is thus very low (about 2%).

The French pension system

The French retirement system is primarily based on a statutory pay-as-go system financed by social security contributions and taxes. In 2006, the statutory scheme accounted for 98% of total pension expenditure. The State pension scheme is dependent on the sector of activity in which the worker participates and is supplemented by complementary mandatory regimes. The supplementary pension schemes complement the general State regime and are financed on a pay-as-you-go basis. These supplementary benefits are calculated through a point system. The amount of supplementary pension amount is calculated by considering the value of the point and the accumulated amount of points. The 1993 French reform consisted in changing the number of years of service required to receive a full pension (37.5 to 40 years). It came mostly into effect in the beginning of the 21st century. The hope of this reform was to encourage people to retire after the age of 60, extending working lives in both the public and the private sector. In order to achieve this, stronger incentives were introduced. The reform also increased the rate of contributions to old age pensions and proposed a further rise of one year in the number of contribution years.

4 Poverty and annuities holding among French pensioners

The average income for the household pensioners decreases with very old pensioners, age 80 years and more. We observe also a significant gap among the professional categories. Indeed, income in families headed by a retiree executive reaches 26756 euros against 9842 for retiree farmer and 11476 for retiree blue collar workers (See Table 1). The standard of living vary also significantly in relation to family composition : for couples with children, the equivalized annual income reaches 15728 euros against 13333 for couples without children. There is also a large income difference related to the leaving area : household retirees with the lowest income leave in the towns around

Paris and in the west of France. The richest retired households leave in Paris. The income gap varies also between households with personal loan and those without. For the former, the annual per unity consumption income reaches in average 18492 euros against 15149 euros for the latter. Lastly, the household income is higher for homeowner and individual holding individual annuities. Poverty rate vary significantly with age : it reaches almost 18% for pensioners aged of 80 years old and more compared to the youngest pensioners aged of 60-69 (See 1). We observe that the poverty rate is related to the professional category. Indeed, the poverty rate is much higher for self-independent pensioners compared to the other professional categories. For the farmer retirees, the poverty rate reaches 29% against 3,8% for executive pensioners and 6,4% for white collar pensioners. There is also a large difference in the poverty rates across the country. The highest poverty rate among household of pensioners is found in the West of France : the ratio reaches more than 19%, which is high compared to those leaving in Paris (8,38%) and in the East region of France (4,86%). Homeowners and annuities holders suffer less from poverty than other households : the poverty rate reaches 9% for homeowners against almost 20% for not homeowner and 7.8% for those having annuities against 14.8% for those without annuities. Not surprisingly, having personal loan reduce the poverty risk : the rate reaches 13.2% against 5.4% for households without debt. It is less probable for poor households to get a personal loan from the banking system. Let's now observe the characteristics of people having annuities. Over the past years, France has experienced an increase in long term savings. As revealed by previous French surveys such as Actifs financiers in 1992 and Patrimoine in 1998, the Patrimoine survey in 2004 highlights a tendency for older households to have a higher saving rate leading to a sharp increase in the demand for annuities and retirement savings. In 1992, 39.5% of households held annuities contracts. In 1998, the holding rate reached 45.9% and in 2004, 59%. The growth of annuities and retirement savings is particularly sensitive among elder households. Indeed, we observe that the life insurance and retirement savings holding increases with age until 70 and decreases afterwards (See Table 1). However, this increase may be partially attributed to a wealth effect. Indeed, if we consider the professional category, the holding rate is higher among the executives pensioners (53%) compared to blue collars pensioners (24%). The holding ratio is also higher for homeowners (40%) and pensioners

living in Paris (44%). We do not observe a big difference for those having or not a loan (respectively 36%) and with or without children (respectively 31% and 36If we compare the poverty rate between households' homeowner without annuities with not homeowners but having annuities, we observe that pensioner's households face quite similar poverty rate (10.6% and 10.3%). Having annuities and/or being homeowners seem protect households' pensioners against the poverty (See Table 2).

TABLE 1 – Average income, poverty rates and annuity holding rates in France, 2004

Characteristics of the households head	Mean Income per consumption unity in the household, in euros per year	Poverty rates	Annuity holding rates
60-69 years old	16399	10.9%	36%
70-79 years old	15025	11.3%	37%
80 years old+	14882	17.7%	31%
Farmer	9842	28.8%	39%
Shopkeeper	16673	14.6%	40%
Executives	26756	3.8%	53
White Collars	16496	6.4%	38%
Employee	12616	14.4%	30%
Blue Collars	11476	14%	24%
Homeowner	16609	9%	40%
Not homeowner	13056	19.9%	27%
Household holding an annuity	18131	7.8%	-
Household without annuity	14096	14.7%	-
Living in Paris	21194	8.4%	44%
Living in the "bassin parisien"	13202	13.8%	31%
Living in the south	15234	13.8%	26%
Living in the west	13511	19.3%	35%
Living in the east	14401	4.9%	37%
Living in the north	14317	11.3%	37%
Personal loan	18492	5.4%	36%
No personal loan	15149	13.2%	36%
Children	13333	15.25%	31%
No child	15728	12%	36%

Source : Author's calculations, *Patrimoine Survey*, 2003-2004

TABLE 2 – Homeowners' and annuity holders' poverty rates

	Poverty rates
Households homeowner, holding an annuity	7%
Households holding an annuity, but not homeowner	10.6%
Households homeowner, wihtout annuity	10.3%
Households wihtout an annuity, and not homeowner	23.4%

Source : Author's calculations, *Patrimoine Survey*, 2003-2004

5 Poverty, annuities, and socio-demographic characteristics : an econometric analysis

In this section, we intend to verify to what extent our statistical observations are robust to an econometric estimation. We test the relationship between poverty, respondents' pension annuities holding and socio-demographics characteristics. We look more closely to the determinants of poverty among retirees and the role of annuities holding.

We take into account the standard socioeconomics determinants used in the literature analyzing poverty, in the one hand and annuity holding, in the other hand : gender, marital status (married or single, widowed, divorced), professional categories (blue collars, white collars, employees, self-employed), age and life expectancy, area of living, nationality (french and foreigner) are considered.

According to Mitchell *et al.* (1999[15]), as risk aversion increases, individuals are willing to pay more for annuities. Women being more risk averse than men, we hypothesize that they are more likely to choose annuities.

According to the life cycle hypothesis (Modigliani and Brumberg, 1954[16] ; Ando and Modigliani, 1963[1]) and in order to capture the old age effect, we consider age groups, with a ten-year interval, from sixty to eighty old and over.

Property investments may provide a good vehicle for consumption at retirement. We

consider a dummy variable indicating if the household are homeowners or not. Home ownership may negatively affect the demand for endowment insurance and retirement savings if it is considered as a partial substitute for precautionary savings.
We take also into account a dummy variable indicating whether households contracted a personal loan or not.
Professional categories might capture a wealth effect and could be considered as a proxy of income and education.
Bloom *et al.* (2003[8]) argued that higher life expectancy should lead to an increase of precautionary savings. To analyze the longevity effect, the life expectancy at the age of sixty five is considered. We also consider the living area.

As a first exercise, we test a Probit model explaining the probability of being poor. In the second step, we construct a bi-Probit model with the double regression : one with the probability to be poor and the other one, with the probability to choose an annuity in order to estimate de correlation between risk of poverty and annuity holding among retirees.

The probit model may be formulated as :

$$Prob(poor_i = 1) = X_i + u_i u_i \sim N(0,1) \tag{1}$$

With X_i the vector of explanatory variables for each individual i of our sample.

Then a Bi-probit model considering the level of poverty simultaneously with the individual pension insurance holding is estimated. It may be expressed as :

$$Prob(poor_i = 1) = X_i\, b_i + u_i \tag{2}$$

$$Prob(annuity_i = 1) = X_i\, d_i + \nu_i \tag{3}$$

$$\begin{pmatrix} u \\ v \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, V\right)$$

The equations 2 and 3 are estimated simultaneously. The error terms follow a multivariate normal distribution, where V represents the residual covariance matrix, with ρ as the correlation coefficient of the residual u and ν.

$$V = \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}$$

The coefficients as well as the probability estimates obtained from the probit model by the maximum likelihood method have satisfactory asymptotic properties.

Results

Most of the explanatory variables impact significantly the probability of being poor. The following ones, with a positive coefficient, increase the poverty risk among the pensioners :

- to be a woman, compared to men
- to be a farmer or a shopkeeper compared to an employee,
- to be aged of 80 years and more compared to individuals aged from 70 to 79,
- to be from an other nationality than a French one,
- to live in the west or the south of France, compared to Parisian.

On the contrary :

- being an executive,
- coming from the East of France,
- being homeowner or annuities holder,
- having a personal loan,
- being married, divorced or widowed compared to single people decrease significantly the risk of being poor.

The reference age group is 70-79. The legal retirement age is 60 in France, to be entitled to full pay-as-you-go pension benefits. The results of the Probit estimation show the probability of being poor is large and significant at 80 years old, such as being a woman : the statistic calculated above seem robust and the econometric analysis confirms what different papers revealed in the literature. The risk of poverty is particularly high for elder women (Cohen Solal and Lelièvre, 2002 [9] ; Zaidi, 2006 [19]). However, although the coefficient for divorced and widowed individual is statistically

significant and negative, the probability of being poor is higher for single individuals than for other marital status.

As expected, for white collar and executives, there is a significant wealth effect. The probability of being poor for white collar and executives is very weak contrary for blue collar, employees and farmer.

The effect of holding life insurance on the poverty level is statistically significant. The household having annuities are above the poverty line. Auerbach and Kotlikoff (1987) turned out that life insurances could protect the survivor in a couple. Here we complete this conclusion : we assert that life insurances as savings vehicle, annuities contracts, allow reducing the poverty risk among pensioners.

Being owner of his house also allows avoiding the risk of poverty. As explained above, the coefficient of this variable is statistically significant and negative. It is also the case for the variable of personal loan : indebted people tend to be less poor than people without personal loan. We could be surprised by this result. However, we argue that people with personal loan are offered the possibility to contract this loan. On the opposite, the poorest people are more credit constrained.

People of foreign nationality tend to be poorer than French ones. In the same time, the living area seems to be significant : living in the West or South part of the country tends to increase the risk of poverty compared to Paris, whereas people living in the East part know a less probability of being poor. One more time, these econometric evidences confirm the statistical results calculated above.

The existing literature puts into perspective different socio-economic determinants of life insurance holding in France. In the bi-probit model, five explanatory variables have a positive and statistically significant coefficient :

- to be a farmer, a shopkeeper, an executive or white collar worker increases the probability to hold an annuities contract,
- to be homeowner also.

On the opposite, to be a blue collar worker decreases the probability of being an annuities holder. Six other independent variables have a significant negative impact on

the probability to hold an annuities contract :

- to be aged of 80 and more,
- to live in the stubborn of Paris, in the south and the west areas of France,
- to have a personal loan.

Belonging to a specific social category impact the probability of having a life insurance and then to be under the poverty line. Blue collar workers tend to hold less life insurance contracts than employees, whereas, the other categories hold more contract than them.
The probability to have a life insurance is significant and negative for foreign people, compared to French people. Areas where people know a higher risk of poverty are also very significant in this regression. People living in the South or in the East of France tend to have a less high probability to hold a life insurance, compared to the Parisians. The biprobit and the probit models allow us to turn out that the east and the sudden parts of France concentrate more poor people without any annuities contracts.
Being aged of 80 and more decreases the probability of holding annuities. This impact is statistically significant and negative. Statistically, we observe that poverty risk is higher for women. Indeed, women living longer than men, this age result could be due to their lower life insurance holding. Otherwise, as expected, the correlation between annuities holding and the poverty risk among the retirees is very strong. The relationship is negative : the annuities holding is positively correlated with the probability to avoid being below the poverty line.

6 Conclusion

By using micro data, from a household's survey on income and wealth, gathered by the French statistical office, we provide an empirical analysis of the characteristics that allow the retired households to avoid the poverty. Simultaneously we put into perspective the determinants of the participation in the voluntary annuity market in France. We study the economic conditions of pensioners in France and show they vary with age, gender, area and family characteristics. Some groups present high poverty

risks : women, single, self-employed, foreigner and people living in the west and south of France. In our study, we complete the conclusion of Auerbach and Kotlikoff (1987) who turned out that life insurance could protect the survivor in a couple, by demonstrating that an annuity contract allows reducing the poverty risk among household pensioners. This evidence strongly suggests that supplementary retirement income sources have to be developped to improve the poor retired households' standart of living in France, especially for elder women, blue-collar workers, foreigners and self-employed households. Private insurance saving could complement efficiently the low level of State pension. The social life-insurance programs providing the elder households with an additional income could be developed in most countries where pension reforms are going to induce a low level of pension income.

For instance, in Germany, the introduction of the Riester-Rente in 2001 increased considerably the level of private savings for retirement. The Riester-Rente is a supplementary capital-based strongly State-supported private pension scheme. It was introduced in order to compensate for the reductions in the pension level of the statutory pension scheme. It takes into account the person's revenue and the family size, and is available to the private and public sector equally. The Riester-Rente is considered to be part of the third pillar ; however it could equally be considered part of the second pillar as individuals may ask for a Riester-Rente contract from their employers, the latter able to benefit from tax deductions.

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7 Appendix

TABLE 3 – Results of the Probit : Probability of being poor

	Probability of being poor	
Woman	0.569***	(3.45)
Man	*Reference*	
Farmer	0.809****	(6.58)
Shopkeeper	0.326**	(2.19)
Executives	-0.305**	(-1.97)
White Collars	-0.157	(-1.24)
Employee	*Reference*	
Blue Collars	0.043	(0.49)
60-69 years old	0.074	0.99
70-79 years old	*Reference*	
80 years old+	0.181**	2.1
French natonality		
Other natonality	0.859****	(5.62)
Living in the "bassin parisien"	0.115	(1.29)
Living in Paris	*Reference*	
Living in the south	0.177*	(1.81)
Living in the east	-0.495***	(-3.23)
Living in the west	0.318***	(3.31)
Living in the north	0.0003	(-0.01)
Homeownership	-0.338****	(-4.9)
Annuity holding	-0.263****	(-3.29)
Life Expectancy	-0.027	(-1.61)
Personal loan	-0.317**	(-2.52)

Children	0.11	(0.96)
No child	*Reference*	
Married	-0.431****	(-3.48)
Divorced	-0.321**	(-2.28)
Widowed	-0.563****	(-4.68)
Single	*Reference*	
Cons	-0.345	(-1.15)
N=3004		
LR Chi2(22)=310.75		
Log Likelihood=-963.7		

Légende : $^{*}p < 0.1$,** $p < 0.05$,*** $p < 0.001$

TABLE 4 – Results of the Bi-probit

	Probability of being poor		Probability of annuity holding	
Woman	0.557***	(3.39)	0.094	(0.74)
Man	*Reference*		*Reference*	
Farmer	0.786****	(6.43)	0.195*	(1.84)
Shopkeeper	0.301***	(2.03)	0.243***	(2.02)
Executives	-0.355***	(-3.31)	0.561****	(5.06)
White Collars				
Employee	*Reference*		*Reference*	
Blue Collars	0.062	(0.71)	-0.247***	(-3.45)
60-69 years old	0.077	(1.03)	-0.35	(-0.63)
70-79 years old	*Reference*		*Reference*	
80 years old+	0.194***	2.26	-0.427***	(-2.56)
French natonality			*Reference*	
Other natonality	0.883****	(5.79)	-0.427***	(-2.56)
Living in the "bassin parisien"	0.131	(1.47)	-0.178***	(-2.55)
Living in Paris	*Reference*		*Reference*	
Living in the south	0.207***	(2.18)	-0.426****	(-5.67)
Living in the east	-0.487***	(-3.19)	-0.048	(-0.53)
Living in the west	0.328***	(3.42)	-0.134*	(-1.73)
Living in the north	0.001	(0.01)	-0.018	(-0.18)
Property of the housing	-0.359****	(-5.24)	0.272****	(4.84)
Life Expectancy	-0.026	(-1.53)	-0.014	(-1.06)
Personal loan	-0.3***	(-2.4)	-0.15*	(-1.95)

Children	0.116	(1.01)	-0.083	(-0.89)
No child	*Reference*		*Reference*	
Married	-0.423***	(-3.43)	-0.049	(-0.47)
Divorced	-0.31***	(-2.21)	-0.087	(-0.72)
Widowed	-0.553****	(-4.61)	-0.063	(-0.62)
Single	*Reference*		*Reference*	
Cons	-0.453****	(-1.53)	-0.189	(-0.82)
Correlation	-0.163*** (-3.74)			
N=3004				
LR Chi2(42)=442.33				
Log Likelihood=-2818.7				

Légende : $^{*}p < 0.1$,** $p < 0.05$,*** $p < 0.001$