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Life Insurance Demand

Evidence from Italian Households; A Microeconomic View and Gender Issues

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Life insurance demand: evidence from Italian households;

a micro-economic view and gender issue***

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Abstract

The purpose of this study is to estimate the influence of microeconomic determinants for men and women on life insurance purchase decisions. Indeed, only a few papers have tried to justify rigorously the gender-based differences in life insurance ownership. Based on survey data collected by the Bank of Italy in 2012 (the Survey on Income and Households) we estimate the propensity to buy and the willingness to pay for a life insurance contract. We examine the differences between two types of contracts, i.e. traditional life and term life insurance and show that, in all cases, women are less likely to be insured than men. The demand for insurance is highly correlated with income, family structure and employment status. Geographical variables within Italy are significantly affecting the demand too. More importantly, we introduce novel variables related to the financial status of households and their proximity to the financial market, by considering home and stock portfolio ownership. These determinants turn out to be significant and to affect demand almost as much as traditional variables. To study policy implications, we calculate the probabilities of having either life or term insurance, under several scenarios for the determinants of demand. Again, financial market proximity plays a key role.

Keywords
Life Insurance, Household life insurance demand, Microeconomics, Gender issues, Italy

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Life insurance demand: evidence from Italian households; a micro-economic view and gender issue

1. Introduction: motivation

A MetLife survey of intergenerational differences[1] finds life insurance coverage to be higher for men than for women and looks at some of the specific differences between women and men across three generations, confirming some of the trends observed previously in empirical studies.[2] Statistically speaking, women are less likely than men to insure their lives, either through an employer or paid for individually (83% vs. 76% of women). According to the Life Insurance and Market Research Association,[3] women typically have only 69% of the life cover that men have.

Differences in life insurance premium expenditures among households are of interest because of their implications regarding the life insurance industry and regulators. From December 2012, a ruling from the European Court of Justice is enforced which mean it is no longer legal for insurers to base premium costs solely on gender differences. However, few attempts have been made in the past to analyze the relationship between variables associated with life insurance consumption and expenditures by women compared to men. Empirical research has focused either on macro determinants drawing on time series or cross-section of countries,[4] or on micro-data from surveys on households, consumers or population to investigate insurance demand from a microeconomic perspective.[5]

Although the earliest surveys analyzing the determinants of household life insurance demand go back to Kreinin et al.[6] and Hammond et al.[7], only one paper to our knowledge has considered the gender-based differences in life insurance ownership.[8] Almost all studies confirm that women are more risk averse than men. This finding remains true even when controlling for the effects of other

[1] Metlife (2012), Women's Views on Family Financial Obligations: A Survey of Intergenerational Findings of Baby Boomers and Generations X and Y, MetLife Mature Market Institute, NY: New-York, 2012(February).
[2] Auerbach and Kotlikoff (1991) find that somewhere between 30 and 40% of middle age American wives in need of life insurance protection are poorly insured.
[3] LIMRA (2010).
[4] See Outreville (2013) for a survey.
[5] See Zietz (2003) for a survey.
[6] Kreinin et al. (1957).
[7] Hammond et al. (1967).
[8] Gandolfi and Miners (1996).

individual characteristics such as age, education, family status and wealth.[9] Jianakoplos and Bernasek[10] look for evidence of gender differences in financial risk taking. They use data from the Federal Reserve's Survey of Consumer Finances and estimate relative risk aversion by gender. They find that single women were relatively more risk averse than single men and married couples. The proportion held in risky assets increase with wealth (DRRA) but for single women the effect is significantly smaller than for single men and married couples. Other studies have explored gender differences in risk aversion in the context of consumer decisions. Hersch[11] finds that, on average, women made safer choices than men did in a number of risky consumer decision. This is not verified for life insurance demand.

The purpose of this study is estimate the influence of microeconomic determinants for men and women on the life insurance purchases decisions. The data is based on the Survey on Income and Households (SHIW) collected by the bank of Italy in 2012. The same survey was used by Guiso and Paiella[12] to examine the individual attitudes toward risk. The survey also investigates both the general demand for life insurance and the demand by women and distinguishes between different types of life insurance contracts, i.e. life contracts in case of survival of the consumer and life contract only in case of death (term insurance). The importance of the Italian life insurance market, comparatively well developed by European standards, makes this study relevant for comparison with other OECD countries.

We show that women are less likely to be insured than men. The demand for insurance is highly correlated with income, family structure and employment status. Geographical variables within Italy are significantly affecting the demand. We introduce new variables related to the proximity to the financial market of households, namely home and stock portfolio ownership. These variables can also be considered as proxies for risk aversion, since they testify diversification. Other variables are not significant determinants of the demand for life insurance.

The outline of the paper is as follows. Section 2 reviews the existing literature. Section 3 presents the data and the related descriptive statistics. Section 4 is devoted to the empirical analysis of the willingness to buy a life insurance contract. We present the estimation strategy, followed by the

[9] See Outreville (2014).
[10] Jianakoplos and Bernasek (1998).
[11] Hersch (1996).
[12] Guiso and Paiella (2006 and 2008).

estimation results. Section 5 studies the willingness to pay for a life insurance contract. We estimate the determinants of the level of demand, namely the amount of premiums paid. Section 6 uses the predictions on which investors are more likely to buy specific types of insurance to draw policy implications.

2. Literature review: the conceptual framework

Nearly all theoretical and empirical work on the demand for life insurance takes Yaari[13] and Hakansson[14] as a starting point. The demand for life insurance is considered within the context of the consumer's lifetime allocation process. Within this framework, the demand for life insurance corresponds to a person's desire to bequeath funds to dependents and provide income for retirement and is a function of wealth (or total assets), expected income over an individual's lifetime, the level of interest rates, the cost of life insurance policies, and the assumed subjective discount rate for current over future consumption. Lewis[15] extends this framework by explicitly incorporating the preferences of the dependents and beneficiaries into the model. He defines his model in the micro-economic perspective of the beneficiaries.

In the standard consumer approach, it is assumed that there is an income stream $Yt, Yt+1, \ldots, Yt+T$ where t represents the times at which the consumer's decisions are to be made and $t + T$ represents his maximum possible attained age. This income steam is split between a consumption plan (C) and a bequest plan (W) according to utility functions maximizing the total utility of the consumer:
$U = a(\cdot)\, g(Ct) + b(\cdot)\, h(Wt)$, with
$a(\cdot)$ and $b(\cdot)$ being the consumers' subjective discount for consumption and wealth and assuming that each utility-maximizing household has the same degree of relative risk aversion.

A macro-economic demand function for insurance derived from the maximization of the utility function of the consumer should depend on total assets (A), the income stream (Y), the price of insurance (Pi), a vector of interest rates (R), a vector of consumer price indices (P), and the consumers' subjective discount for consumption $a(\cdot)$ and wealth $b(\cdot)$.[16]

[13] Yaari (1964 and 1965).
[14] Hakansson (1969).
[15] Lewis (1989).
[16] Outreville (2013).

From a micro-economic perspective, assuming the interest rates and prices are the same for all households, what matters are the micro-economic determinants explaining the consumer's subjective decisions for consumption and savings (life insurance demand). Consumer's subjective apprehension and risk behavior is related to many factors that could be regrouped under socioeconomic (income, wealth), demographic (age, family size, location), and cultural (education, religion) variables. Based on Mayers and Smith's classical economic utility model,[17] Showers and Shotick[18] derive a demand function for insurance that only depends on household's characteristics, holding constant the unit price of insurance coverage, the price and quantity of all other alternative assets and the variance in wealth. The model is used to analyze the impact of household characteristics on the demand for insurance.

Almost all past research dealing with panel or survey data in the United States has focused on life insurance purchasing behavior as a function of income and various demographic and socioeconomic variables.[19] In macroeconomic studies, income level significantly affects the demand for insurance in all studies.[20] The bequest motive is an important determinant of life insurance demand as shown in Inkman and Michaelides.[21] Previously, Hurd[22] finds that bequest intention is not strong for the US market, while others challenge this view.[23]

Evidence on the effect of unemployment on demand is limited, and only a few studies have identified the relationship between the two variables directly.[24] Results suggest that unemployment has a negative influence on the demand for life insurance.[25] On the other hand, the type of occupation significantly affects the decision to purchase insurance.[26]

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[17] Mayers and Smith (1983).
[18] Showers and Shotick (1994).
[19] Hammond et al. (1967), Duker (1969), Berekson (1972), Andersen and Nevin (1975), Ferber and Lee (1980), Burnett and Palmer (1984), Miller (1985), Fitzgerald (1987), Auerbach and Kotlikoff (1989), Bernheim (1991), Showers and Shotick (1994).
[20] The personal disposable income has generally been measured as a variant of current GDP, or GDP per capita, which can be weakly presumed to provide a proxy for permanent income (Outreville, 2013). See also survey studies (Zeitz, 2003; Hussels et al., 2005).
[21] Inkman and Michaelides (2012).
[22] Hurd (1987).
[23] Bernheim (1991), Kopczuk and Lupton (2007) and De Nardi (2004).
[24] Mantis and Farmer (1968); Lenten and Rulli (2006).
[25] It is important to notice that studies dealing with life insurance lapse rates (the inverse of life insurance purchases) in the context of the emergency fund hypothesis have consistently found a positive relation between lapse rates and unemployment (Outreville, 1990; Kuo et al., 2003; Liebenberg et al., 2012, Fier and Liebenberg, 2013).
[26] Anderson and Nevin (1975); Ferber and Lee (1980); Gandolfi and Miners (1996).

Economies with a higher share of urban to total population are expected to have higher levels of life insurance consumption because urbanization simplifies the distribution of these products. This variable has generally been neglected in empirical research and results are not conclusive. However, recent papers looking at life insurance demand in Asian countries use this variable as a measure of the change in social structure find a positive relationship.[27]

The probability of holding life insurance falls with age. One would expect, other things being equal, that fewer purchases would be made as the age of the insured increases because life insurance premiums increase with age and because older age implies a lower need for insurance protection. This is consistent with the effect predicted by the bequest motive hypothesis.[28] However, if contracts are fairly priced at all ages, one could make the same decision between buying or not buying a fair contract independently of age. Many studies find that age is not a significant determinant of life insurance purchases.[29] In these survey studies, the family structure has shown different results depending on the measure, i.e. the family size or the dependency ratio. All cross-country studies find that a young dependency ratio is positively correlated with life insurance demand.[30] However, Beck and Webb[31] argue that the effect is rather ambiguous, because dependency ratios can have different effects across different business lines.

The demand for insurance may differ according to human capital endowment. The level of education is generally hypothesized to be positively related to insurance consumption. Many empirical papers have verified a strong positive and significant relationship for life insurance demand.[32] However, some papers did not found any significant relation questioning the fact that the level of education may not interfere at the earlier stage of development but does later.[33] Truett and Truett[34] recognize that people that are more educated may have a stronger desire to protect dependents, that is, a higher intensity of the bequest motive. Millo and Carmeci[35] propose a different view. They find from survey data a negative relationship and relate education to the capacity to manage risks implying that better educated people are better able to diversify their

[27] Hwang and Gao (2003); Hwang and Greenford (2005).
[28] Showers and Shotick (1994).
[29] Hammond et al. (1967); Duker (1969); Anderson and Nevin (1975); Ferber and Lee (1980); Burnett and Palmer (1984); Fitzgerald (1987); Gandolfi and Miners (1996); Chen et al. (2001).
[30] Truett and Truett (1990); Browne and Kim (1993); Feyen et al. (2013).
[31] Beck and Webb (2003).
[32] Hammond et al. (1967); Ferber and Lee (1980); Burnett and Palmer (1984); Gandolfi and Miners (1996).
[33] Outreville, 1996; Beck and Webb, 2003; Esho et al., 2004; Park and Lemaire, 2011).
[34] Truett and Truett (1990).
[35] Millo and Carmeci (2014).

portfolio. Bayer et al.[36] argue that a more relevant effect to measure would be access to financial knowledge rather than education in general. This variable has never been tested to our knowledge.

Within an expected-utility framework, decision makers are usually assumed to be nonsatiated and risk averse. In the theoretical literature the level of risk aversion is hypothesized to be positively correlated with insurance consumption in a nation.[37] From the point of view of insurance demand, many empirical papers have used proxies for risk aversion following Lewis[38] who suggested that a number of variables may explain differences in risk aversion and insurance demand. Many empirical papers have verified a positive and significant relationship between insurance demand and the level of education. However, the link between risk aversion, the level of education, or human capital accumulation remains largely hypothetical as demonstrated by Outreville.[39]

3. Data and descriptive statistics

The Survey of Household Income and Wealth (SHIW) is conducted every two years by the Bank of Italy. The Bank conducts periodical sample surveys on households, businesses and selected intermediaries. The SHIW began in the 1960s with the aim of gathering data on the incomes and savings of Italian households. Over the years, the scope of the survey has grown and now includes wealth and other aspects of households' economic and financial behaviour.

The SHIW dataset includes several information pieces about Italian households, including household composition and characteristics, income and employment variables, wealth and its components. The 2012 survey comprises about 8,000 households (24,000 individuals), distributed over about 300 Italian municipalities. In our analysis, we select a sample consisting of individuals aged between 24 and 65 who are either a household head or the head's spouse. We exclude other relatives and children living in the household so as to focus on the couple (or single) decisions. Our final sample consists of 6,973 individual-observations. The survey provides statistical information by age of the household head, the education level, the employment status, the size of the household and income. To control for the diversity of economic situations in Italy, the survey also proposes a breakdown by regions and size of cities.

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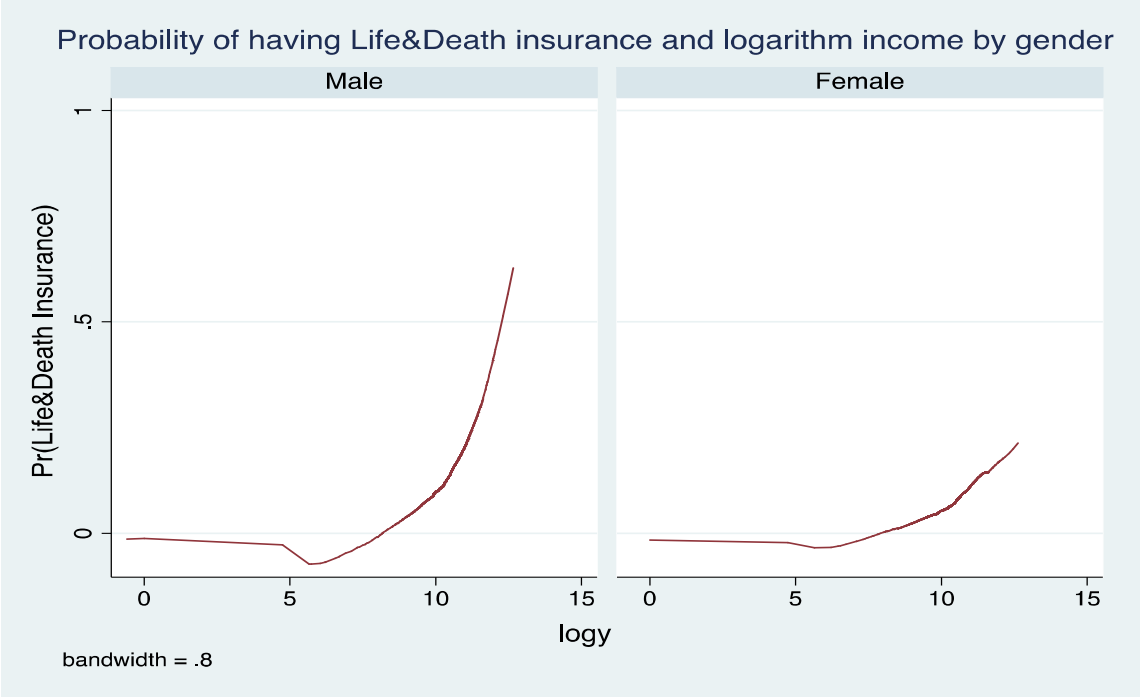
[36] Bayer et al. (2009).
[37] Schlesinger (1981); Szpiro (1985).
[38] Lewis (1989).
[39] Outreville (2015).

We have information on the type of insurance held and the amount of premium paid, both for life and death insurance. In the SHIW terminology, traditional life insurance guarantees a lump sum or an annuity upon survival of the subscriber and death assurance (thereafter referred as term insurance) guarantees to beneficiaries a payment if death occurs to the subscriber. At the national level, insurance contracts cover around 10% of households.[40] Looking into the gender dimension, men owned about twice as much insurance as women. Contracts with the highest financial content – including unit and index-linked - have very often a single premium and represent 21% of the total premiums in 2012. The remaining 79% are more likely to have periodic premiums. We reconstruct a similar percentage of premiums in the SHIW sample by isolating "Traditional Life and Term Insurance", defined as the policies with a premium smaller than € 1500.

The breakdown by gender offers the possibility to analyze discrepancies between the demand for insurance when the head of the household is a female compared to male. Figure 1 below shows how the probability of having Life and Term Insurance changes with the logarithm of the disposable income. The relationship is increasing for both male and female but at a much higher level for men for higher levels of income.

Figure 1: Relationship between Ownership of Life Insurance and Income



Source: Calculated from the SHIW data, 2012.

[40] Ania (2013).

4. Empirical analysis of the willingness to buy an insurance contract

4.1 Methodology

The dependent variable reflects the willingness to buy an insurance contract and takes value one if the respondent has at least a life or a term insurance product. We then use dummies to capture the type of life insurance contract. The first dummy takes value one if respondents own a traditional life insurance product, irrespective of a term insurance product. Symmetrically, we construct a dummy equal to one if respondents own a term insurance policy.

For each type of dependent variable, we first estimate the probability of owning insurance with a probit model, as follows:

$$Pr(Y_i = 1| Z_i) = \Phi (\beta_0 + \beta_1 Z_i)$$

where Y is the dummy variable on insurance, Z_i is a vector of individual, economic and socio-demographic characteristics described below, Φ represents the standard normal cumulative distribution function.

In order to examine the differences between life and term insurance, taking into account the potentially strong correlation among the two types of insurance, we next estimate the two insurance type subscription using a bivariate probit model. This allows for a joint estimation of the two outcomes without assuming absence of correlation. Indeed, it is likely that individuals who demand more insurance own more than one type of protection. We use the same vector of explanatory variables as for the probit analysis.

Descriptive statistics of the explanatory variables Z_i presented in appendix 1. The "degree" variable is a dummy that takes the value 1 if the respondent has at least a bachelor degree, zero otherwise. The variable "risk averse" is a dummy variable that takes the value 1 if the respondent has chosen the low return answer in the survey.[41] The spouse/cohabitant variable takes value 1 if the respondent is engaged with someone, zero otherwise.

[41] The question RISKFIN used is the following: "In managing your financial investments, would you say you have a preference for investments that offer": 1) a very high returns, but with a high risk of losing part of the capital, ; 2) a good return, but also a fair degree of losing part of the invested capital; 3) a fair return, with a good degree of protection for the invested capital; 4) low returns, with no risk of losing the invested capital.

The variable “bequest” is a dummy variable that takes value 1 if the respondent gives one of the following answers as reasons for saving: i) education/economic support to children and grandchildren; ii) legacy to children and grandchildren; iii) Owning a house and having children (still alive) who do not reside with the respondent. In order to control for the number of components and their different role in the family we include a set of a variables that count the household members. These variables count the number of components under 15 years, the number of components between 15 and 25, the number of components between 25 and 55, and the number of components above 55. The distinction reflects the possible levels of dependency of the household’s members. Additional dummy variables are reflecting gender (female), stocks holdings and homeownership.

We also include income ratio (income over net wealth) to count for the wealth effect. Age and age squared are both included to capture the effect of aging in the life insurance demand. We expect participation to be positively correlated with age and negatively correlated with its square, so as to get a demand curve concave in age. We also include three geographical dummies to control for the north, center, south and the islands respectively (the last being the baseline). Due to cultural and income differences among north, centre and south regions of Italy, we expect a significant impact of these variables. Similarly, we have dummy variables to control for the size of the city of residence: small city (0-20.000 inhabitants, the baseline), medium city (20.000-40.000 inhabitants) large city (40.000-500.000 inhabitants) and mega city (more than 500.000 inhabitants).

To capture the job effect we include 3 dummies: employee, self-employed and not-employed (the baseline). Not employed in the SHIW classification includes retirees and persons with transitory jobs.

4.2 Estimation results for total life and term insurance contracts

The estimated coefficients in the probit analysis presented in table 1 represent the marginal effects, evaluated at the sample mean values of the continuous explanatory variables and at the mode for dichotomous ones.

As predicted by the theoretical and empirical literature[42] income (in log form) has a positive effect on the demand for life insurance. The coefficients indicate that doubling log income would increase the chance of buying insurance by between 0.4% and 8 percentage points. Also, we find that demand for insurance is significantly lower for women but does not depend on the interaction with other variables such as the education level, the fact of being self-employed or employee, or the income ratio.

Holding higher education (a university degree or above) is a significant factor. Individuals with a university degree have a higher chance to own insurance between 0.1 and 1.5 percentage points. This may be related to the fact that decision makers with higher education have also higher income. It certainly points to the better capacity of savings diversification of decision-makers with higher education, since when financial market participation is included this variable becomes non-significant. In this sense, education seems to work as a proxy for financial education rather than risk aversion.[43]

The demand for insurance is increasing in age and decreasing in its square. This signals that, in the range included in the sample, between 24 and 65, demand is increasing at relatively young ages, and decreasing later, with a peak at age 43. Showers and Shotick[44] also find age and age^2 to be significant factors in the demand equation.[45] This is consistent with the traditional life-cycle behavior of savings. As for income, this is a consequence of the savings nature of insurance, be it in the form of pure endowment, annuity or death assurance. However, when financial proximity (holding stocks or real estate) is included, the concave behavior, which we label "age effect" totally disappears suggesting that the age effect could be a proxy for participation in the financial market.

Risk aversion - measured by the risk attitude of the financial decision maker in the household rather than at individual level - has a negative effect on the demand for insurance, but is only significant in few specifications. Different variables such as holding stocks or having a house would better proxy the implicit risk aversion, since they testify diversification needs.

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[42] Outreville (2013).
[43] See Outreville (2015).
[44] Showers and Shotick (1994).
[45] Fitzgerald (1989) suggests that the demand for life insurance depend on the relative age of husband and wife and introduce a quadratic function of age and the difference between the husband's and the wife's ages. This information is unfortunately not available in the survey.

The composition of households illustrates that the age of dependents influences the interest in insurance. Respondents with more children under the age of 15 are more likely to demand insurance. Family members in high school or university age (15 to 25), including people who may be searching for a job or who just entered the job market, are neutral with respect to the likelihood of demanding insurance. The family as a group (or a network) demand less insurance when there are people between 25 and 55 and senior people in the household. Insurance demand is higher when children are young and the presence of a spouse is only significant where the variables describing the composition of the family by age is not present. In those cases it has a negative sign, supporting the idea of a family network. This result contradicts partly Bernheim at al.[46] who find that significant uninsured financial vulnerabilities are more common among low-income households, couples with disparate earnings, relatively young households and couples with dependent children.

Labor market status significantly affects the insurance demand. Those who are self employed instead of being employees have more chances of being insured and the impact range from 0.5% to 6% depending on the equation estimated. All others equal, it is higher when the ratio of income to wealth is not included. When we control for the reliance on cumulated wealth, as represented by the income ratio, the need for insurance protection is lower. The income ratio enters with a negative coefficient suggesting that wealth is an important determinant and that looking at income variable only can be very misleading as wealth is playing an increasing role.

We indeed add variables that indicate financial proximity, i.e. the familiarity of respondents to financial market opportunities and the need for diversification. We include a dummy variable for being a homeowner and holding stocks. The evidence of a positive and significant coefficient for home ownership and stocks ownership in the regressions signals that people who are more familiar with financial investments, either in the form of real estate or stocks, and that do diversify, are also more willing to buy insurance.

Insert table 1 here

Controlling for the geographical context in Italy shows that the richest regions (north) and the size of cities have a significant but different impact on the demand for insurance as proved before by

[46] Bernheim at al. (2003).

Millo and Carmeci.[47] The intention to bequeath does not have a significant impact on insurance demand. We are, however, aware that demand for life insurance and bequest do not necessarily share the same driving factors, since here all forms of insurance are examined. More importantly and as already been pointed in the literature, the intention to bequeath is not necessarily captured by the self-declared intention.[48]

4.3 Estimation results when disaggregating life and term insurance contracts

Estimation results using the bivariate probit approach when we disaggregate between traditional life and term insurance are presented in table 2a and 2b.

The probability of having a life (term) insurance is higher if the respondent already has a term (life) insurance. Consumers willing to buy insurance protection are interested in all types of insurance products, revealing more an attitude than a decision to protect against specific risks. On the other hand, it may be the case that insurance companies sell to the customers a diversified set of products to cover their needs.

Insert tables 2a and 2b here

Income is a significant and positive determinant of the demand for both life and term insurance and as expected, both types of contract are subject to a wealth effect. The ratio of income to wealth has a negative impact (which means, all others equal, that wealth has a positive impact). Income ratio is not significant for life insurance, while it is for term insurance. The wealth effect on the global willingness to buy insurance observed previously seems to be explained by the demand for term insurance. The concave behavior of insurance demand with respect to age is confirmed for term contracts, while it is weaker in life contracts. We pointed out previously that term insurance contracts are more popular among relatively young households, for whom they appear to be less expensive.

The number of dependents below age 15 is a significant driver of term insurance contracts explaining why households with young dependents are also willing to buy more term insurance as a form of bequest. The number of dependents between ages 15 and 25 is negative and significant in

[47] Millo and Carmeci (2014).
[48] Hurd (1987).

explaining the demand for life insurance, while it is not for term insurance. For other age categories the estimated coefficient is also negative confirming that the presence of older household members plays a role in the global "family network" as mentioned previously. For both life and term insurance, the presence of a spouse is a significant factor but not in all specifications and this result also confirm the idea of a family network.

Job market participation has the same effect on both life and term insurance contracts, i.e. self-employment increases the demand of insurance. Risk aversion is never significant for life insurance, and significant only in some specifications for term insurance. As mentioned previously the measure of risk aversion (self declaration in the survey) may not be correctly reflecting the behavior of respondents. Other factors related to the behavior of respondents are significant for both types of products and confirm previous results.

The gender issue is relevant for both life and term insurance contracts. Women are less likely to buy insurance contracts whatever type of product is examined even controlling for all other variables. The effect does not depend on the education level, the fact of being self-employed or employee, or the income ratio. This result confirm that women do not monetize their importance in the "family network" or do not perceive their death as a risk as important as the risk of losing the head member of the household (generally the man).[49] Until December 2012, term insurance premiums for women were lower than for men because women death probabilities, at any given age, are smaller than for men. It will be interesting to see whether the effect will be different in the next SHIW survey in 2014, after the introduction of unisex tariffs.

[49] We do not distinguish between households in which a man or the woman has the highest income of the household. Non-monetized aspects of household participation are not captured in the survey, and are very often provided by women.

Table 1: Probit analysis of the willingness to buy insurance

Dependent variable: Having an insurance policy (either life or term)

	1	2	3	4	5	6	7
Female	-0.0490***	-0.0445***	-0.0360***	-0.00267***	-0.00253***	-0.00195*	-0.0023
	0.0057	0.0057	0.0060	0.0039	0.0038	0.0031	0.0036
Log income	0.0706***	0.0760***	0.0694***	0.00387***	0.00364***	0.00461***	0.00476***
	0.0061	0.0061	0.0063	0.0058	0.0055	0.0068	0.0070
Degree	0.0153*	0.0080	0.0060	0.00118**	0.00109**	0.0010	0.0013
	0.0091	0.0087	0.0084	0.0018	0.0017	0.0017	0.0022
Age	0.0171***	0.00905*	0.00817*	0.000944***	0.000879***	0.0005	0.0006
	0.0045	0.0051	0.0051	0.0014	0.0013	0.0008	0.0009
Age2/1000	-0.0195***	-0.00906*	-0.0081	-0.00107***	-0.00099***	-0.0005	-0.0005
	0.0491	0.0058	0.0578	0.0162	0.0152	0.0082	0.0094
North	0.0160**	0.0091	0.0093	0.000909*	0.000849*	0.0006	0.0006
	0.0082	0.0080	0.0080	0.0014	0.0013	0.0010	0.0011
Centre	0.0214**	0.0172*	0.0148	0.00114*	0.00104*	0.0010	0.0011
	0.0104	0. 0101	0.0100	0.0018	0.0016	0.0016	0.0018
Risk averse	-0.0110*	-0.0088	-0.0075	-0.000696*	-0.000642*	-0.0006	-0.0003
	0.0063	0.0067	0.0067	0.0011	0.0010	0.0010	0.0007
Spouse or cohab	-0.0226*	-0.0138	-0.0096	-0.0011	-0.00114*	-0.0007	-0.0009
	0.0069	0.0119	0.0114	0.0018	0.0018	0.0013	0.0016
#components	-0.0037			-0.0002	-0.0003		
	0.0032			0.0004	0.0005		
# under 15		0.00903**	0.00876**			0.000516*	0.000627*
		0.0042	0.0041			0.0008	0.0010
# 15-25		-0.0067	-0.0064			-0.0005	-0.0005
		0.0050	0.0050			0.0008	0.0009
# 25-55		-0.0265***	-0.0248***			-0.00174***	-0.00198***
		0.0071	0.0071			0.0026	0.0029
# > 55		-0.0356***	-0.0328***			-0.00233***	-0.00277***
		0.0086	0.0087			0.0035	0.0041
Employee			0.0109	0.0008	0.0008	0.0012	0.0019
			0.0084	0.0014	0.0013	0.0020	0.0030
Self employed			0.0627***	0.00515***	0.00487***	0.00595***	0.00870***
			0.0157	0.0074	0.0070	0.0086	0.0122
Income/wealth				-0.000031**	-0.0000301***	-0.0000281*	-0.0000330**
				0.0000	0.0000	0.0000	0.0000
Medium city				-0.0006	-0.0006	-0.0006	-0.0008
				0.0010	0.0010	0.0011	0.0014
Large city				-0.00117**	-0.00112***	-0.00131***	-0.00163***
				0.0018	0.0018	0.0020	0.0025
Mega city				-0.00225***	-0.00211***	-0.00243***	-0.00312***
				0.0035	0.0033	0.0038	0.0048
Bequest intention					0.0004	0.0001	-0.0001
					0.0007	0.0005	0.0006
Degree*female						-0.0003	-0.0005
						0.0010	0.0014
Female*employee						-0.0006	-0.0009
						0.0015	0.0020
Female*self-employed						-0.0006	-0.0009
						0.0015	0.0020
Incomeratio*female						0.0000	0.0000
						0.0000	0.0000
Holding stocks (d)							0.00709***
							0.0098
Homeowner (d)							0.00144**
							0.0023
Observations: 6973.							
(d) for discrete change of dummy variable from 0 to 1							
Standard Errors are presented below each coefficient and are clustered at family level.							
* p < 0.10, ** p < 0.05, *** p < 0.01							

Table 2: Bivariate Probit Results

Table 2a: Traditional Life Insurance							
	1	2	3	4	5	6	7
Female	-0.240***	-0.216***	-0.163***	-0.172***	-0.173***	-0.146	-0.132
	-5.62	-4.92	-3.47	-3.64	-3.68	-1.07	-0.98
Log income	0.517***	0.554***	0.514***	0.499***	0.497***	0.495***	0.417***
	9.80	10.30	9.47	8.86	8.85	8.83	6.88
Age	0.116***	0.067	0.0619	0.0565	0.0569	0.0571	0.0514
	3.11	1.57	1.45	1.31	1.32	1.32	1.19
Age2/1000	-1.331***	-0.682	-0.625	-0.566	-0.574	-0.574	-0.526
	-3.27	-1.42	-1.3	-1.17	-1.18	-1.18	-1.08
Degree	0.0312	-0.00809	-0.0202	0.0133	0.0133	0.0364	0.0347
	0.48	0.12	0.31	0.20	0.20	0.41	0.39
North	-0.013	-0.0479	-0.0464	-0.0537	-0.0536	-0.053	-0.0625
	-0.2	-0.73	-0.71	-0.79	-0.79	-0.78	-0.92
Centre	0.0733	0.0535	0.0393	0.0303	0.0288	0.0292	0.0205
	0.95	0.69	0.50	0.39	0.37	0.37	0.26
Riskaverse	-0.0663	-0.0565	-0.048	-0.0598	-0.0594	-0.0592	-0.0266
	-1.20	-1.02	-0.86	-1.06	-1.05	-1.05	-0.46
Spouse or cohab	-0.153*	-0.121	-0.0959	-0.0948	-0.0982	-0.1	-0.0975
	-1.79	-1.33	-1.06	-1.03	-1.07	-1.09	-1.05
#components	-0.0558*						
	-1.88						
# under 15		0.0278	0.0259	0.017	0.0127	0.0135	0.0104
		0.72	0.68	0.44	0.32	0.34	0.26
# 15-25		-0.0928**	-0.0915**	-0.0949**	-0.0977**	-0.0979**	-0.0936**
		-2.1	-2.06	-2.11	-2.15	-2.15	-2.04
# 25-55		-0.175***	-0.165***	-0.167***	-0.168***	-0.166***	-0.150**
		-2.96	-2.78	-2.75	-2.75	-2.75	-2.45
# > 55		-0.239***	-0.223***	-0.230***	-0.229***	-0.227***	-0.213***
		-3.48	-3.16	-3.27	-3.25	-3.24	-3.04
Employee			0.0658	0.0634	0.0635	0.0788	0.104
			0.91	0.87	0.87	0.58	0.77
Self employed			0.351***	0.329***	0.330***	0.351**	0.387***
			3.93	3.66	3.67	2.44	2.71
Income over wealth*100				-0.338**	-0.341**	-0.226	-0.205
				-1.96	-1.98	-1.09	-0.97
Medium city				-0.0488	-0.0503	-0.0494	-0.0497
				-0.6	-0.62	-0.61	-0.61
Large city				-0.108	-0.109	-0.11	-0.105
				-1.61	-1.62	-1.63	-1.57
Mega city				-0.437***	-0.435***	-0.433***	-0.424***
				-3.29	-3.28	-3.27	-3.17
Bequest intention					0.0221	0.0224	0.0132
					0.38	0.39	0.23
Degree*female						-0.0459	-0.0501
						-0.37	-0.40
Female*employee						-0.0142	-0.0239
						-0.09	-0.16
Female*self employed						-0.0321	-0.0401
						-0.18	-0.22
Income ratio*female						-0.00222	-0.00222
						-1.1	-1.08
Holding Stocks							0.304***
							3.46
Home owner							0.108
							1.54
Observations: 6973.							
t-statistics are presented below each coefficient.							
* p < 0.10, ** p < 0.05, *** p < 0.01							

Table 2b: Term Insurance							
	1	2	3	4	5	6	7
Female	-0.394***	-0.368***	-0.310***	-0.322***	-0.322***	-0.265**	-0.248*
	-9.45	-8.63	-6.73	-6.97	-6.98	-1.99	-1.87
Log hh income	0.511***	0.569***	0.525***	0.512***	0.511***	0.511***	0.407***
	10.39	11.06	9.92	9.36	9.37	9.35	6.95
Age	0.131***	0.0695*	0.0641	0.0599	0.0597	0.058	0.0478
	3.83	1.74	1.59	1.48	1.48	1.44	1.19
Age2/1000	-1.488***	-0.691	-0.631	-0.585	-0.584	-0.563	-0.471
	-3.96	-1.53	-1.38	-1.27	-1.27	-1.23	-1.03
Degree	0.120*	0.065	0.0514	0.0881	0.0881	0.0864	0.087
	1.94	1.03	0.82	1.40	1.40	1.05	1.05
North	0.135**	0.078	0.0797	0.068	0.0681	0.0692	0.055
	2.19	1.26	1.28	1.06	1.06	1.07	0.84
Centre	0.141**	0.111	0.0955	0.0872	0.0869	0.0878	0.0757
	2.03	1.57	1.34	1.22	1.21	1.22	1.05
Riskaverse	-0.0853*	-0.0675	-0.0577	-0.0679	-0.0676	-0.0669	-0.0227
	-1.66	-1.31	-1.11	-1.3	-1.3	-1.29	-0.42
Spouse or cohab	-0.152**	-0.0775	-0.0478	-0.0468	-0.0478	-0.0494	-0.0462
	-1.98	-0.93	-0.57	-0.56	-0.56	-0.58	-0.54
#components	-0.0135						
	-0.57						
# under 15		0.0881***	0.0865***	0.0782**	0.0771**	0.0766**	0.0750**
		2.82	2.76	2.48	2.33	2.32	2.26
# 15-25		-0.0306	-0.0286	-0.0299	-0.0307	-0.031	-0.0241
		-0.79	-0.73	-0.76	-0.77	-0.78	-0.6
# 25-55		-0.224***	-0.214***	-0.220***	-0.220***	-0.220***	-0.196***
		-3.93	-3.73	-3.71	-3.71	-3.73	-3.3
# > 55		-0.290***	-0.273***	-0.283***	-0.283***	-0.285***	-0.264***
		-4.06	-3.75	-3.81	-3.83	-3.86	-3.59
Employee			0.0829	0.0765	0.0765	0.127	0.156
			1.20	1.11	1.10	1.01	1.24
Self employed			0.388***	0.361***	0.361***	0.402***	0.445***
			4.62	4.30	4.30	2.97	3.29
Income over wealth*100				-0.383**	-0.384**	-0.361**	-0.335**
				-2.47	-2.47	-2.42	-2.27
Medium city				-0.104	-0.105	-0.105	-0.104
				-1.40	-1.40	-1.41	-1.39
Large city				-0.165***	-0.165***	-0.165***	-0.160**
				-2.66	-2.66	-2.66	-2.57
Mega city				-0.408***	-0.407***	-0.409***	-0.406***
				-3.50	-3.50	-3.52	-3.48
Bequest intention					0.0061	0.00646	-0.00625
					0.11	0.12	0.11
Degree*female						0.00645	0.000919
						0.06	0.01
Female*employee						-0.0739	-0.0857
						-0.50	-0.58
Female*self employed						-0.0461	-0.0538
						-0.26	-0.31
Income ratio*female						-0.000477	-0.000416
						-0.35	-0.28
Holding Stocks							0.398***
							5.11
Home owner							0.144**
							2.18
Observations: 6973.							
t-statistics are presented below each coefficient.							
* p < 0.10, ** p < 0.05, *** p < 0.01							

5. Empirical analysis of the willingness to pay for an insurance contract

This Section studies the correlation of premiums paid with the same set of explanatory variables introduced above. Instead of focusing on participation, we consider the amount of income or wealth devoted to insurance protection. This is a continuous variable censored to zero, the value of the premium for those who do not participate. We use is a tobit model to take into account the (left) censoring of the dependent variable at zero. We also exclude from the sample the single premiums that were paid as lump sum.

The results are provided in Table 3 below (all life insurance together, life only, term only). Term insurance premiums and, as a consequence, pooled life and term, are negatively affected by gender. This result confirms the relatively low importance given to the death of the female spouse, either because she does not contribute to the household income, or because her role is not monetized. Women undervalue the opportunity cost associated to their role in the household. Income has a positive and significant effect for all types of insurance.

Insert table 3 here

There is no significant evidence that age determines the willingness to pay measured by the amount of premiums, while it was a significant explanatory variable for the willingness to buy. However, the age of the dependents in the household affects the level of premiums: the number of children under 15 is a positive and significant for term insurance while there is no evidence that it affects life contracts. The presence of family members between 15 and 25 decrease the amount spent in life insurance, but do not affect the amount spent in term contracts. As a general rule, the presence of household members beyond 25 affects negatively the amount spent in both life and term insurance confirming the hypothesis of a family network.

Table 3: Tobit analysis of the willingness to pay for insurance

	All	Life	Term
Female	-59.59*	-55.72	-65.73**
	-31.06	-36.82	-31.51
Log income	82.77***	96.52***	73.21***
	28.2	35.21	25.27
Age	11.01	13.47	9.676
	8.031	10.52	7.74
Age2	-110.2	-137.6	-95.02
	-89.56	-117.6	-86.41
Degree	26.8	10.4	24.85
	18.51	21.89	17.56
Risk averse (d)	2.327	-0.614	2.09
	9.281	12.06	8.984
Spouse or Cohab (d)	-17.31	-25.72	-10.83
	-17.29	-22.89	-16.48
# under 15	11.13	5.483	14.87*
	7.223	8.575	7.679
# 15-25	-7.341	-16.75	-2.185
	7.378	10.7	6.825
# 25-55	-31.08**	-34.91*	-34.11**
	-14.5	-18.1	-15.17
#>55	-42.75**	-48.23**	-44.36**
	-17.83	-22.08	-18.15
Employee	9.603	-1.717	4.937
	23.46	-30.27	22.24
Self Employed	75.03**	67.12	66.32*
	37.22	42.39	34.19
Degree*female	-21.08	-23.07	-16.62
	-22.4	-29.53	-21.5
Employee*1female	13.75	26.56	13.98
	28.18	37.33	27.2
Self-employed*female	6.967	17.95	12.66
	33.33	43.89	32.62
Income over wealth	-0.604	-0.628	-0.663*
	-0.391	-0.514	-0.361
Income over wealth* female	-0.172	-0.304	-0.0567
	-0.753	-0.945	-0.723
north (d)	4.68	-25.21	3.155
	11.41	-17.07	10.98
centre (d)	7.893	-8.842	-0.278
	13.18	-16.52	-12.49
Med city (d)	-12.05	-13.23	-21.52
	-13.41	-17.46	-14.09
Large city (d)	-22.84*	-22.82	-23.66*
	-12.78	-15.77	-12.58
Mega city (d)	-64.93**	-70.59**	-58.02**
	-26.64	-32.86	-24.65
Bequest intention (d)	-3.291	1.111	-4.151
	-9.949	12.91	-9.674
Stock holding (d)	72.18***	60.32**	71.28***
	27.97	28.48	27.42
Home ownership (d)	19.58	19.88	19.87*
	13.08	16.38	12.77
Observations: 6970.			
Standard deviations are presented below each coefficient.			
* p < 0.10, ** p < 0.05, *** p < 0.01			
(d): Marginal Effect of the conditional mean are reported			
dE(Insurance Premium|Insurance>0)/dx .			

Being self-employed affects positively the amount spent in term insurance premiums, while there is no evidence that being employee, as compared to being unemployed, leads to spending more in insurance. Higher education has a positive but not significant impact. Risk aversion is not significant in explaining the amount spent, whether this is for life or term insurance. Variables that do explain the amount of term insurance premiums are stock ownership and, to a lesser extent, home ownership. This confirms the role of financial market proximity, and understanding of risky market values and payoffs, in explaining the amount of hedging through insurance. It says again that risk aversion is better proxied by observed diversification through the stock market than by self-declarations.

Macro geographical area are again non significant, while living in a large city or in a mega city decrease the willingness to pay for insurance.

6. Policy implications

To study policy implications, we first produce a prediction of the probabilities to have one form of insurance (life or term) given that the respondent already has the other. We do this separately for men and women, given that their demands are significantly different. We then study the (unconditional) probabilities of having either life or term insurance, under several scenarios applied to significant variables such as income, education and stock ownership.

Knowing whether women or men are more likely to increase their demand, and whether the increase comes more easily from life or term insurance contracts, together with the analysis provided above on the determinants of participation into the insurance market, for each sex, should provide a detailed policy guidance. Knowing which policy instruments are more effective, among tax relief (so as to increase disposable income), education or financial market proximity, is also a useful analysis.

Let us denote the predicted probability of buying term insurance (D) given that the individual has life insurance (L), after controlling for all the regressors in Tables 2 (last specification illustrated in column 7 of these Tables), as P(D=1|L=1), and use a similar notation for the symmetric probabilities. We obtain the following table 4 below:

Table 4: Conditional probabilities of the willingness to buy insurance

Males	Females
P(D=1|L=1) = 0.83	P(D=1|L=1) = 0.72
P(L=1|D=1)= 0.57	P(L=1|D=1)= 0.64

For both men and women, the probability of adding a second, different contract to their portfolio, once they enter the insurance market, is greater than 50%.. The conditional probability of owning a term insurance, conditional on having a life insurance (0.83 for men, 0.72 for women), is greater that the probability of adding a life contract, if the individual has already a term insurance contract (0.57 and 0.64 respectively).This may be interpreted as a "care" effect towards their relatives. Term insurance is a pure risk and bequest coverage while life insurance could be an investment strategy shared with the rest of the household.

The fact that buying insurance coverage is greater for men than for women reaffirms the lack of sensitivity towards the contribution of women to the household. Investors are more willing to protect against death of a male since informal care provided by family members is not monetized. However, we do not distinguish in the sample whether the higher probability for men comes from households in which the head is a man. From a policy point of view, this may imply that policy interventions such as tax deductibility of the premium, shield from inheritance tax or other reductions on tariffs are more likely to have an effect on women than men.

Let us consider now unconditional probabilities of participation presented in table 5 below. Again, the willingness to buy insurance is higher for men than for women. In the base line scenario, the difference between the predicted probabilities of participation between sexes is higher for term insurance. In the previous section 3 on the willingness to buy insurance, we observed that income, education and financial proximity (Stock holder and home owner) as a proxy for financial proximity and risk aversion, were significant drivers of insurance demand, controlling for gender. In order to design policy intervention, we therefore imagine shocks to financial market participation, in the form of owning stocks, income, education, and the last two together, and measure their marginal effect on insurance market participation. We consider separately life (L=1) and term insurance contracts (D=1) and use specification (7) in above Tables 2, to generate the predicted probabilities. For the sake of completeness, we report in the Table 5 below the baseline probabilities and the marginal effects of the shocks.

Table 5: Unconditional probabilities of the willingness to buy insurance

Pr(L=1)	Base Line	With stocks	Income +10%	Education 40% with degree	Income +10% and 40% with degree
Female	0.05	0.08	0.05	0.05	0.05
Male	0.07	0.12	0.08	0.07	0.08
Total	0.06	0.09	0.06	0.06	0.06

Pr(D=1)	Base Line	With stocks	Income +10%	Education 40% with degree	Income +10% and 40% with degree
Female	0.05	0.10	0.06	0.06	0.06
Male	0.11	0.18	0.12	0.15	0.12
Total	0.08	0.14	0.09	0.08	0.09

We start in the second column by forecasting what would happen to life and term insurance if every household would participate in the stock market. For life insurance we get a marginal increase equal to 7% for women and 11% for men. For term insurance we get 10% for women, 18% for men. As expected, the impact is higher for men, for both contracts, and the difference between the two genders is greater for term insurance, since, all others equal, women are more reluctant than men to buy term insurance.

In the third column we present the effect of a positive income shock equal to 10%. The effect on life insurance demand for women and men is respectively 5% and 8%, the effect on term insurance is close to 6% and 12%. All others equal, the marginal effect on women is consistently smaller than on men, with the difference between genders more pronounced for term insurance. The effect of an income shock, even though as big as 10%, is smaller than financial proximity, as measured by stock ownership.

In the fourth column we consider the effect of raising the level of education so that 40% of the Italian population has a College degree (randomly choosing among all investors in the sample, independently of their initial level of education). The original percentage of individuals with a

College degree in the sample is around 15% (see the statistical appendix). The effect on life insurance demand for women and men is respectively 5% and close to 7%, while the effect of term insurance is close to 6% and 11%. The results parallel the ones of an income shock. We get the same result if we consider that all the pre-university people get a university degree.

The last column (fifth column) shows that a simultaneous increase in income and education do not provide a cumulative effect but rather a maximum effect similar to the income shock. As a general result, the effect is always greater on men than women, and always greater for term insurance rather than traditional life insurance contracts.

7. Conclusion

The purpose of this study is to estimate the influence of microeconomic determinants on the life insurance purchase decisions. The data is based on the Survey on Income and Households (SHIW) collected by the bank of Italy in 2012.

We first examine the propensity to buy insurance. We show that women are less likely to be insured than men, even controlling for all other variables. The gender issue is relevant for both traditional life and term insurance contracts. The demand for insurance is highly correlated with income, family structure and employment status. The age of dependents influences the willingness to buy insurance. The demand for insurance is increasing in age and decreasing in its square, so that, in the age range included in the sample, 24 to 65, demand is increasing at relatively young ages, and decreasing later, with a peak at age 43. This is consistent with the effect predicted by the bequest motive hypothesis. We also introduce new variables related to the financial status of households, namely home and stock portfolio ownership. We conclude that, all others equal, financial proximity is a strong factor explaining the willingness to buy insurance.

We then examine the willingness to pay for an insurance contract and find that the same set of variables produce the same result, i.e. women are less likely to pay for an insurance contract than men and financial proximity is a highly significant factor explaining demand.

To study policy implications, we calculate the probabilities of having either life or term insurance, under several scenarios applied to significant determinants of the demand for life insurance. All others equal, the marginal effect on women is consistently smaller than on men, with the difference

between genders more pronounced for term insurance. The analysis also suggests that increasing net income for a given gross income, improving education or relying on both is less effective than fostering stock market participation. We conclude that, all others equal, a way in which financial intermediaries or policy makers can increase further insurance demand is by increasing financial market proximity as a whole.

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Appendix A: Descriptive statistics of the variables used in the econometric analysis

Variable	Obs	Mean	Std. Dev.	Min	Max
Life & Death	6973	0.0903	0.2867	0	1
Female	6973	0.5469	0.4978	0	1
Degree	6973	0.1481	0.3552	0	1
Degree *female	6973	0.0860	0.2804	0	1
Age	6973	46.56	8.26	25	59
Age^2/100	6973	2.23	0.7435	0.62	3.48
North	6973	0.4171	0.4931	0	1
Centre	6973	0.2032	0.4024	0	1
Riskaverse	6973	0.5990	0.4901	0	1
Spouse or cohab	6973	0.8355	0.3707	0	1
# under 15	6973	0.6647	0.8989	0	5
# 15-25	6973	0.4941	0.7354	0	4
# 25-55	6973	1.65	0.7196	0	5
# > 55	6973	0.3963	0.7040	0	4
Employee	6973	0.5613	0.4962	0	1
Self employed	6973	0.1306	0.3370	0	1
Employee *female	6973	0.2581	0.4376	0	1
Self employed *female	6973	0.0438	0.2048	0	1
Income over wealth	6973	347.885	2443.247	-265.464	41000
Income ratio*female	6973	170.71	1701.90	-265.464	41000
Medium city	6973	0.1877	0.3905	0	1
Large city	6973	0.4850	0.4998	0	1
Mega city	6973	0.0869	0.2817	0	1
Bequest intention	6973	0.5478	0.4977	0	1
Holding stocks	6973	0.0764	0.2657	0	1