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Precautionary Savings and the Self-Employed

Does Uncertainty Magnitude Matter?

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Precautionary Savings and the Self-Employed: Does Uncertainty Magnitude Matter?♦

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Abstract

Precautionary savings have often been analyzed with regard to its impact on current savings. This work focuses instead on the impact of uncertainty on savings under bequest form. We thus turn the focus on estimating whether and to what extent income variability does have an effect on post-mortem savings. We approximate the post-mortem savings with the closest dedicated savings, which is savings in term insurance, a lump sum inherited at the death of the subscriber. Furthermore, we test whether the intensity of the income variance or the riskiness of the job type - such as self-employment - matters more in the choice. Our results show that, even after controlling for income uncertainty, self-employment status is one of the most relevant variables affecting term insurance ownership.

Keywords: precautionary savings, bequest, term insurance, self-employment

JEL: D91 (Intertemporal Household Choice, Life Cycle Models and Saving),
E21 (Consumption, Saving, Wealth),
G11 (Portfolio Choice, Investment Decisions)

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I. Introduction

The presence and intensity of precautionary savings has been extensively debated in the economic literature. Precautionary motives for savings arise when the income variability increases the motivation for savings, even if future income is not expected to change. In other words, mean preserving income variability generates additional savings due to precautionary reasons. The seminal work by (Caballero, 1990) showed the direct effect that stochastic income has on the savings and consumption trajectories. The derived testable implication is that savings are enhanced by a factor proportional to income variance and the prudence parameter. The more prudent people are, the more they procrastinate their consumption facing an additional variability in their income, despite no changes in the expected income level. In other words, the empirically relevant conclusion is that the variance of income fluctuations, if utility is exponential, should enter the Euler equation directly, so as to test the strength of precautionary savings motives.

Following such a model, the empirical findings on the magnitude of precautionary savings offer mixed conclusions and have been debated intensively. Some scholars found a tiny effect of precaution on savings, therefore they concluded that uncertainty and income variability do not crucially matter[3]. Nevertheless, it should be stressed that income variability, although important, is not the only component of the employment risk. For instance, self-employed individuals, even if they showed the same expected income as well as income variance as an employee, would be subject to a business risk, thus expecting a different behavior, *ceteris paribus*, than employees.

Although such impact of uncertainty on current savings has been studied by several scholars in different contexts and countries, little has been written on whether current income uncertainty brings about additional savings for the next generation, rather than increasing savings for future consumption. This paper aims to fill this gap in the literature. In other words, our goal is to analyze how the bequest varies following a change in uncertainty, and to disentangle whether self-employment itself, rather than the intensity of income variability, is responsible for the propensity to be covered by a term (death) insurance[4].

More specifically, we would like to detect whether intention to bequeath is affected by the riskiness of the job type. The higher the level of riskiness, the more the intensity of precautionary savings we would observe. How much of this income riskiness is transferred to post-mortem savings? Moreover, is it the type of employment itself or the intensity of income variability that drives the impact? We claim that, once controlled for the variance of income, if an effect of self-employment status is still present, we can conclude that other elements related to job riskiness rather than the income variability affect savings.

We acknowledge that being involved in a risky job is an endogenous variable, depending on the risk attitude, which, in turn, affects savings decisions. Not taking this element into account would downward bias our results. We thus control for the endogeneity of the work status. Even after having used individual fixed-effects and instrumental variables to tackle such endogeneity issue,

[3] For an extensive review, see (Lusardi, 1998) and (Kennickell & Lusardi, 2006).

[4] We should also mention that this paper is not a stand-alone project, but it is rather a companion paper with the investigation done on the determinants of life and term insurance demand in (Luciano, Outreville, & Rossi, 2015) and (Luciano, Rossi, et al., 2015)

our results show that self-employment status is one of the most relevant variables affecting death insurance ownership, despite having controlled for the uncertainty of income.

This paper is organized as follows. Part I motivates the paper. Parts II, III and IV describe the conceptual framework and give an overview of the related literature. Parts V, VI and VII discuss the empirical analysis. Part VIII concludes.

II. Literature review

Our paper adds to the literature of precautionary savings by looking at one specific type of savings: bequests in the form of term insurance. Quantitative estimates of precautionary savings are important for policy makers: how savings – and therefore economic growth – will change due to increased income risk depends on the savings motives.

A widely used empirical approach – pioneered by (Fisher, 1956) – consists of regressing household wealth on income risk. Using this identification strategy, (Kazarosian, 1997), (Carroll & Samwick, 1997), (Carroll & Samwick, 1998) found evidence of precautionary savings in the US. Similarly, results in (Guariglia & Kim, 2003b) and (Guariglia & Kim, 2003a) supported the presence of precautionary savings among Russian households[5].

Some of the studies have raised some skeptical concerns on how uncertainty has been measured in empirical studies. This followed an influential work of (Skinner, 1988): the author pointed out that workers involved in riskier occupations exhibited lower levels of savings. However, he argued that this finding could, be confounded with endogeneity of the riskier occupation, which could in turn be determined by the lower degree of risk aversion. Indeed, (Lusardi, 1997) stressed the difficulty in finding exogenous sources of risk and warned against using occupation as proxy for income risk due to self-selection of individuals into occupations based on their level of risk-aversion. Therefore, (Lusardi, 1998) suggested using measurements of subjective probabilities of risk, such as probability of job loss, provided that the question is easy for respondents to understand. More recently, (Mastrogiacomo & Alessie, 2014) showed that, taking into account the uncertainty perceived by a second earner as well as the main one, subjective and objective measures of uncertainty provide similar results, and precautionary savings could account for up to 30% of the total savings in the Netherlands.

More importantly, (Hurst, Lusardi, Kennickell, & Torralba, 2010) underlined the importance of distinguishing between business owners and non-business owners in analyzing household wealth. In fact, neglecting this distinction may lead to an overestimation of precautionary savings, since entrepreneurs face higher risks, hold more wealth and have different savings motives. This is consistent with the low retirement savings found by (Mastrogiacomo & Alessie, 2015) in the Netherlands among the self-employed. Following this line, (Fossen & Rostam-Afschar, 2013) found that German entrepreneurs have higher savings rates than employees because, unlike the latter, entrepreneurs are not extensively covered by the social security system, thus they have to save for their old age. Furthermore, they found that more income volatility leads households to change their portfolios in favor of liquid assets but does not push households to hold more wealth. In addition to this, they adopt an IV approach in order to take into account the potential endogeneity of the entrepreneurial status due to the fact that credit constraints decrease the probability that poor people will become business owners, thus raising the issue of reverse causality with wealth. Similarly, (Kennickell & Lusardi, 2006) exploited a direct question on the desired amount of precautionary savings. For the US, they found that precautionary savings motives affect the

[5] In a specular way, (Guariglia & Rossi, 2002) showed in the UK that labor income risk is pivotal in shaping current changes in consumption. Similarly, (Jessen, Rostam-Afschar, & Schmitz, 2016) argued that wage risk is an important driver of labor supply.

decision of every household. However, it only reflects a small proportion of total wealth. Furthermore, precautionary savings are mainly driven by older households and business owners. Therefore, the authors suggested considering not only income risk but also risks related to health, longevity, and entrepreneurship. This conclusion is supported by (Fulford, 2015), who showed that income uncertainty does not substantially explain household savings decisions, and (Jappelli, Pistaferri, & Padula, 2008), who rejected the buffer stock model.

This paper also relates to the literature on term (life) insurance and bequest motive. Indeed, starting from (Bernheim, 1991), term insurance has often been used to test the importance of the bequest motive in saving decisions. A review of the literature is provided by (Zietz, 2003) and (Baek & DeVaney, 2005). We could also mention (Inkmann & Michaelides, 2012), who found evidence of the importance of the bequest motive in the UK. Moreover, (Sauter, 2014) and (Sauter, Walliser, & Winter, 2015) used two natural experiments in Germany to show the importance of bequest motive in term insurance demand while controlling for tax regimes[6]. (Liebenberg, Carson, & Dumm, 2012) also found a positive link between having a new child and subscribing to a term insurance in the US, while (Li, Moshirian, Nguyen, & Wee, 2007) argued that the demand for term insurance increases with the number of dependents in OECD countries. These findings are consistent with the overall importance of a bequest motive among US households highlighted by (Kopczuk & Lupton, 2005)[7].

[6] For later reference, we should also point out that (Jappelli & Pistaferri, 2003) showed that in Italy the demand of life insurance does not substantially depend on the tax treatment.

[7] Finally, from a theoretical perspective, it is worth mentioning the use of term insurance to study household consumption in a general equilibrium overlapping generation model by (Hong & Ríos-Rull, 2012). (Strawczynski, 1999) also proved that wealth segmentation of altruistic individuals between annuities and riskless bond may not be optimal once income uncertainty is introduced in an overlapping generation model.

III. Conceptual Framework

Precautionary savings has occupied a large part of the literature on life cycle savings and consumption: it is defined as the additional savings, due to an increase in uncertainty, in a mean-preserving context. Put differently, despite no changes in expectations, if the environment has become more volatile, savings would react accordingly and would increase so as to accommodate the additional uncertainty.

The magnitude of the importance of precautionary savings is far from clear-cut. Moreover, as discussed in the literature review, all studies share the common denominator of being related to active savings during a lifetime, without looking at the post-mortem dedicated savings, such as death insurance, which can be defined as savings for intergenerational purposes, the beneficiary not being the subscriber.

Our paper looks at such different dimensions of savings, i.e., savings specifically and voluntarily devoted to life insurance products for intergenerational transmission, such as term insurance. We want to focus on term insurance products and we want to explore a specific channel: whether income volatility, which is more acute among self-employed individuals, affects also voluntary bequests, which are best approximated by the demand for term insurance.

We should clarify that we use post-mortem savings and bequest as synonyms. However, we are not claiming that the only reason to leave a bequest is a precautionary one. Indeed, individuals facing the same level of uncertainty may decide to leave different bequests, simply because their altruistic parameter is different. Nevertheless, we do claim that precautionary savings is one of the components of a bequest, thus, additional uncertainty should increase bequest levels, since it should increase precautionary savings.

Although there are different portfolio choices that are determined by the bequest motive, we have decided to only concentrate on term insurance, because it is the only financial instrument entirely dedicated to leaving a bequest. In other words, we argue that it is the best approximation available to measure voluntary bequest, while we do not consider in this analysis the involuntary bequest. This implies that we have not included housing wealth in our dependent variables. Indeed, individuals buy houses, not only to leave them as bequest to their children or spouses, but also as investments and for consumption. In these cases, it is not possible to disentangle all these motivations. On the other hand, term insurance provides us with a pure channel: transferring wealth to the beneficiaries, usually the spouse or the offspring, is the only reason behind the purchase of these insurances. This is in line with (Dynan, Skinner, & Zeldes, 2002), who warned that, in models with uncertainty, it is usually difficult to disentangle life-cycle and bequest savings.

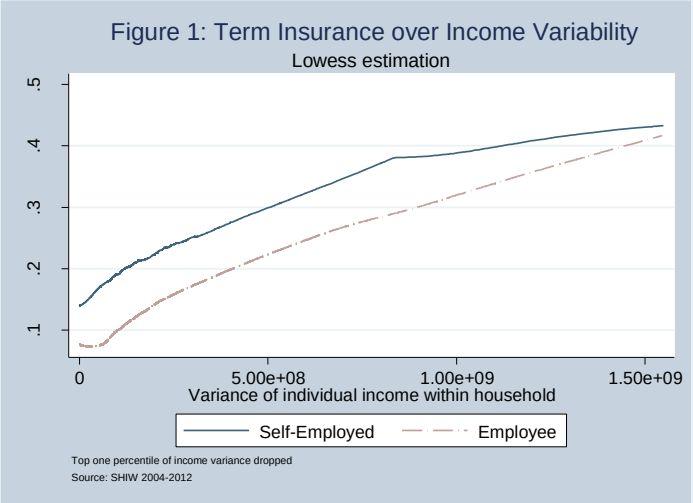
As far as employment status is concerned, precautionary savings are driven by two components: the magnitude of riskiness associated with income profile and the prudence index. *Ceteris paribus* we know that an employee with the same expected income profile should show lower savings than a self-employed, due to lower exposure to uncertainty. However, prudence depends on preferences, which, in turn, can shape labor decisions such as the choice between becoming a self-employed or an employee. Put differently, the type of job a person has is endogenous. Self-employed individuals are likely to have a higher tolerance for risk, which is responsible for a lower

saving propensity. Hence, we expect that the forces driving the self-employment status are negatively correlated to those determining precautionary savings. Precautionary savings magnitude thus embeds these two drivers, which go in different direction.

To summarize, self-employed are – by definition – more exposed to income risk, the reason being simply that their income is not fixed to any amount but varies according to the business. In other words, self-employed surely have a more volatile income profile. However, we want to extend the analysis further by looking at whether the intensity of the income variability, approximated by the sample variance of income, also matters in addition to being a self-employed *tout court*.

Given the above discussion, we would expect income risk to increase all forms of precautionary savings, thus also the probability of holding death insurance. On the other hand, since self-employment status embeds different channels – risk aversion and higher uncertainty – which go in different directions, we cannot determine the expected sign of this variable ex-ante. However, we do expect that once we control for time-invariant individual characteristics, such as risk aversion, self-employment status will only capture institutional and individual time-varying features and uncertainty (not generated by income risk). Hence, we would expect the sign of self-employment to be positive in the fixed-effects econometric specifications.

A preliminary empirical motivation for this paper and a supportive evidence for the previous considerations are given in the following graph (Figure 1). We have plotted the likelihood of having a term insurance over a measure of income variability, i.e., the variance of the individual income within a household (see the empirical sections for a detailed description of this indicator). As is clear from the figure, we can highlight two facts. First, as expected, intergenerational precautionary savings – as approximated by death insurance – increases in income variance. Second, there is a substantial employment gap: holding income variability constant, self-employed individuals are more likely to have subscribed to a term insurance than employees. We will further analyze these two stylized facts in the subsequent sections.



IV. Theoretical Framework

This section introduces a very simple theoretical model in order to help the reader to become familiarized with the research question, as well as to show formally the ideas described in the above conceptual framework. We consider the intertemporal utility of a household wrapped in two periods as follows:

$$\max_{c_1,c_2,B} U = \max_{c_1,c_2,B} U(c_1) + \beta E_1[U(c_2, B)]$$

Where c_1 is consumption at time one and c_2 is consumption at time two; B is inheritance left to the dependents. Utility is increasing in its arguments and concave. Bequest is inserted as an additional *post-mortem* utility, whose importance is higher, the stronger the generosity motive. The intuition is that individual uncertainty affects future generations through the level of bequest, because such post-mortem savings enters these altruistic agents' utility function. Assuming for simplicity that there is no bequest received, we can rewrite the intertemporal utility as follows:

$$\max_{s,B} U = \max_{s,B} U(y_1 - s) + \beta E_1[U(\tilde{y}_2 + s - B, B)]$$

Where s is savings from period one to period two[8] and y_1 is income in period one, known with certainty. Moreover, $\tilde{y}_2$ is income in period two, stochastic, with average value $\bar{y}_2$ and a random shock ε with zero mean and variance σ^2. In other words

$$\tilde{y}_2 = \bar{y}_2 + \varepsilon$$

$$\varepsilon \sim N(0, \sigma^2)$$

Since income is stochastic in the second period, our goal is to sketch out the effect of income uncertainty on the bequest value B. If B is decided exogenously as a lump sum to give to the children, current income variance won't affect the amount of bequest. However, in this model, bequest enters the utility of the parents.

Imposing negative exponential utility so as to get closed-form solutions and testable empirical prediction, the intertemporal utility becomes[9]:

$$\max_{s,B} U = \max_{s,B} - e^{-\gamma(y_1 - s)} - E_1[e^{-\gamma(\tilde{y}_2 + s - B)} + ke^{-\gamma B}]$$

Where γ is the coefficient of absolute risk aversion (CARA), while k is the bequest factor, i.e., a measure of altruism[10]. Therefore, we can now easily compute the first order conditions (FOCs) with respect to B and s.

[8] Note that in the model, the bequest value B appears only in the second period. This does not imply that death insurance can be bought only in the second period. Indeed, such assumption would be unrealistic, since individuals buy such insurance over the lifetime. Here we are assuming that the final value of B is decided in the last period, while if individuals decide to buy death insurance in the first period, such amount would be included in the savings s.

[9] This framework has also been discussed in (Rust, Hall, Benitez-Silva, Hitsch, & Pauletto, 2005).

[10] Note that, for simplicity, we have assumed β to be equal to 1 and no interest rate. The main conclusions of the model would not change using different settings, although the closed-form solution would become more cumbersome.

$$\frac{\partial U}{\partial s} = -\gamma e^{-\gamma(y_1 - s)} + E_1\left[\gamma e^{-\gamma(\tilde{y}_2 + s - B)}\right] = 0 \quad (1)$$

$$\frac{\partial U}{\partial B} = -\gamma e^{-\gamma(\tilde{y}_2 + s - B)} + k\gamma e^{-\gamma B} = 0 \quad (2)$$

We can now exploit the property that:

$$E_1\left[e^{-\gamma\tilde{y}_2}\right] = e^{-\gamma\bar{y}_2 + \gamma^2\frac{\sigma^2}{2}}$$

Therefore, since *s* and *B* are not stochastic, we can rewrite Equation 1 as:

$$e^{-\gamma(y_1 - s)} = \gamma e^{-\gamma\bar{y}_2 + \gamma^2\frac{\sigma^2}{2} - \gamma s + \gamma B}$$

That is:

$$-\gamma(y_1 - s) = -\gamma\bar{y}_2 + \gamma^2\frac{\sigma^2}{2} - \gamma s + \gamma B$$

$$y_1 - s = \bar{y}_2 - \gamma\frac{\sigma^2}{2} + s - B$$

$$s = \frac{y_1 - \bar{y}_2 + \gamma\frac{\sigma^2}{2} + B}{2}$$

We can now define:

$$k = e^{\bar{k}}$$

So we can rewrite Equation 2 as:

$$e^{-\gamma(\tilde{y}_2 + s - B)} = e^{-\gamma\left(B + \frac{\bar{k}}{-\gamma}\right)}$$

$$-\gamma(\tilde{y}_2 + s - B) = -\gamma\left(B - \frac{\bar{k}}{\gamma}\right)$$

$$s = 2B - \tilde{y}_2 - \frac{\bar{k}}{\gamma}$$

So merging the two FOCs:

$$\frac{y_1 - \bar{y}_2 + \gamma\frac{\sigma^2}{2} + B}{2} = 2B - \tilde{y}_2 - \frac{\bar{k}}{\gamma}$$

$$B = \frac{y_1 - \bar{y}_2 + \gamma\frac{\sigma^2}{2} + 2\tilde{y}_2 + 2\frac{\bar{k}}{\gamma}}{3}$$

From this, it is immediate to see that:

$$\frac{\partial B}{\partial \sigma^2} = \frac{\gamma}{6} > 0$$

Therefore, income uncertainty is expected to increase bequest[11]. In other words, income variance is thus transferred partially to current savings and partially to future bequests. Furthermore, intention to leave an inheritance enhances savings but reduces the intensity for which people intend to cope during the lifetime with uncertainty, which is transferred also to additional bequest.

We can also use this model to look at the effect of self-employment on post-mortem savings. Indeed, as explained before, occupational choice is endogenous and depends on the individual risk-aversion. Therefore, we expect individuals with low γ to be more likely to become self-employed. It can be easily seen that:

$$\frac{\partial B}{\partial \gamma} = \frac{\sigma^2}{2} - 2\frac{\bar{k}}{\gamma^2}$$

As a result, for certain values of income risk and altruism, the level of bequest can be decreasing in γ. Put differently, it is possible that low risk-averse individuals become self-employed and leave larger bequests to their heirs.

[11] It is worth noting that the above closed-form solution for bequest includes also $\tilde{y}_2$. This is because B is the actual bequest in the second period, not the expected one. On the other hand, the expected bequest $E_1[B]$ would only contain $\bar{y}_2$ and σ^2.

V. Data

The Bank of Italy's first Survey of Household Income and Wealth (SHIW) was conducted in 1965. Since then, the survey was conducted yearly until 1987 (except 1985) and every two years thereafter. The SHIW surveys a representative sample of the Italian resident population and covered about 8,000 households (defined as groups of individuals related by blood, marriage or adoption and sharing the same dwelling).

In particular, in 2012 a sample of 8,151 households was drawn from 371 municipalities, resulting in 20,022 respondents, including 12,986 income recipients. The primary sampling units were the municipalities, stratified by region and population, while households were the secondary sampling units. Households were randomly selected from registry office records. Starting in 1989, some households from the previous surveys has been re-interviewed. Respondents included in the panel component of the dataset increased over time (approximately 4,000 households have been lately re-interviewed since the previous wave). The data were collected mainly through a Computer-Assisted Personal Interviewing program (CAPI). Interviews lasted on average 49 minutes. Households did not receive any compensation. A similar sample designed was implemented in the previous waves[12].Our empirical analysis draws from a longitudinal dataset: the Survey on Household Income and Wealth (SHIW) for the years ranging from 2004 to 2012[13]. For the purpose of our analysis SHIW is very well suited, as it collects detailed information on socio-demographic individual characteristics, household composition, income, wealth and the insurances subscribed by the respondents. The survey has also several interesting subjective variables such as the intention to bequeath as well as the perception of risk.

In 2012, panel households, i.e., households interviewed in more than one survey, accounted for 56.6% of the total interviewed households. The response rate among the panel households was 82.2%, although it was slightly lower among self-employed individuals[14]. Several measures were implemented in order to reduce the non-response rate. Each household selected for the interview was guaranteed complete anonymity. They also received a booklet describing the purpose of the survey and how the data were used. Respondents could also call a toll-free number to ask for clarifications. Moreover, the selection of interviewers had improved over time, and each interviewer had a limited number of households to contact in order to reach his or her target. In addition to this, if a household could not be contacted, it was replaced by another within the same municipality. Finally, the sample was post-stratified at the end of the survey in order to rebalance the various segments of the populations.

A key issue is the data quality: researchers may worry that respondents may misreport their income and wealth. First, it should be noted again that participation into this survey was voluntary; respondents were reassured about the anonymity of the data and that this information would not be used for tax purposes. Second, at the end of each interview, the interviewer was asked to assess the reliability of the information provided regarding income, wealth, and savings. The average

[12] A detailed description of the survey design is included in (Bank of Italy, 2014).

[13] Data from this survey are also included in the European dataset Household Finance and Consumption Survey (HFCS) and are harmonized following the directives of the Luxembourg Income Study and Luxembourg Wealth Study.

[14] As shown in Table A2 in the Appendix. Most of the attrition rate is due to the survey design, thus it should not bias the empirical results in the next sections.

reported reliability was quite high (8.2 out of 10), although it was slightly lower among self-employed workers (7.7). Third, survey estimates were compared to figures from the national accounts, even if some variables were defined differently. These figures suggest that income and financial wealth were under-estimated, while total wealth seems to be consistent between the two sources. Finally, in previous years, survey estimates were compared with tax returns: reported employee incomes were similar, while there was a significant under-estimation of self-employment incomes in the tax returns[15].

Another statistical concern with this kind of data is the potential heavy use of imputation of missing data. However, as reported in (Bank of Italy, 2014), the number of missing data that were imputed using regression models was modest. For instance, for the 2010 wave, answers for variables such as firm value or self-employed workers' revenue had to be imputed on average in fewer than 4% of cases[16].

For the purpose of our analysis, we restrict our sample to individuals who are either the head of household or the spouse, and who are aged between 25 and 65 years[17]. The reason behind this sample choice is that we want to avoid modeling insurance decisions for people who do not decide family issues, such as children or other relatives belonging to the same household.

[15] See (Cannari, Ceriani, & D'Alessio, 1995).

[16] See (Bank of Italy, 2012)

[17] The role of household head is self-stated. He or she is defined as the person who takes financial decisions, or the most informed one.

VI. Empirical evidence on participation

Pooled OLS and FE

The aim of this section is to estimate the determinants of death insurance, in particular, the effect of income variability and job type on bequests[18]. In other words, the econometric specification is the following:

$$y_{it} = \beta_1 IncomeRisk_{it} + \beta_2 SelfEmployed_{it} + x'_{it}\beta_2 + \varepsilon_{it}$$

Where the dependent variable y_{it} is an indicator variable equal to one, if the individual *i* held a term insurance at time *t*. This depended on the income risk faced by the individual in that period ($IncomeRisk_{it}$), whether the individual was a self-employed worker ($SelfEmployed_{it}$), and other time-varying regressors (x_{it}).

We have taken two different measures of income variance, upon which we have built Table 1 and Table 2. We have first considered the variance of income within the family and then the individual variance over time[19-20-21]. The first two columns contain the pooled OLS estimation results, with or without the interaction term between self-employment and income risk.

From an econometric perspective, some people may argue that a linear probability model is not the best way to model a limited dependent variable model (term insurance) with an endogenous dummy regressor (self-employment). However, we follow (Joshua D Angrist, 2001), (J. D. Angrist & Pischke, 2009) and argue that this is appropriate for estimating average causal effects[22].

One of the main issues of the OLS estimation is that self-employment is endogenous: the decision to become an entrepreneur is not random, but it rather depends on unobserved characteristics, which are not controlled for. Similarly, income risk may also depend on individual preferences. Therefore, the first attempt to control for these endogeneity problems is to add individual additional regressors, which may affect the outcome variable and be correlated with income risk or self-employment. Following this approach, we have added several socio-demographic controls:

[18] The empirical analysis has been done with Stata 14.

[19] In particular, the first measure has been constructed by computing, in each wave, the variance of the net individual labor income within each household (including incomes from all members of the households, not only the household head and the spouse). On the other hand, the second measure has been derived as follows: in 2012, the variance for each individual across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on. These two procedures have allowed us to obtain two time-varying indicators, which thus can be used also in a FE model. For both measures, the standard deviation has been divided by 100000. Our measure of labor income includes all sources of income from employment and self-employment activities, but it does not include pensions and other social transfers, as well as rents and capital gains. The reason behind this choice is that we want to approximate labor income risk associated with the employment status; thus, the last two categories would not fit in this definition. Finally, given the results in (Jappelli & Pistaferri, 2003), we feel confident in using net rather than gross income.

[20] Table 1 does not include the individual income over household income ratio since it is strongly correlated with our definition of variance within family. Results do not change substantially by adding such regressors. Table available upon request.

[21] An additional measure of income risk that we could have used is the subjective one used, among the others, by (Guiso, Jappelli, & Terlizzese, 1992) and (Mastrogiacomo & Alessie, 2014). However, in the waves used in our analysis, this kind of question was available only in 2012, thus making it impossible to use a FE estimation, as done in the next section.

[22] For the sake of comparison, we have also estimated a Pooled Probit. Results do not change substantially: the marginal effect of the household income risk is 0.012 and insignificant, while for the self-employment indicator, the impact is 0.061 and highly significant (compared with Table 1, where the coefficients are 0.021 and 0.084, respectively). Table available upon request.

gender, age (also squared to account for nonlinearities), marital status, education level, geographical indicators, household size, proportion of household members below age 25, and whether the household head and/or spouse have offspring living outside the household. In addition to this, it is also important to include economic indicators: individual income, income-wealth ratio, individual income over household income, and whether the household own a house. A preliminary way to deal with the different attitude towards risk of self-employed and employees is to add a subjective measure of risk aversion[23].

The most striking result from this simple model is that, *ceteris paribus*, income risk does not statistically affect the likelihood of holding a term insurance in almost all specifications and in both tables. The gist of the results suggests that, if we interpret term insurance as the best proxy for "wanted" bequests, income variability does not actually pass through post-mortem savings. On the other hand, we detect that self-employment status – despite having controlled for income variability – has a positive and statistically significant impact on the probability of holding a term insurance.

Even after the inclusion of the aforementioned controls, we may still worry about some unobservable omitted variables. Moreover, we have not exploited so far the panel dimension of the dataset. Therefore, a second way to deal with endogeneity is to add individual fixed effects in the estimation model, so we are able to control for time-invariant individual features. Furthermore, we have also added time fixed effects to take into account shocks specifics to certain periods (like the 2007 financial crisis). Formally, the econometric specification can be written as:

$$y_{it} = \beta_1 IncomeRisk_{it} + \beta_2 SelfEmployed_{it} + x'_{it}\beta_2 + \mu_i + \alpha_t + \varepsilon_{it}$$

Where μ_i is the individual fixed-effect and α_t is the time fixed-effect. The estimation results are shown in the third and fourth columns of Table 1 (variance within family) and Table 2 (variance over time)[24].

It is then possible to note that the coefficient of self-employment remains statistically significant, although the magnitude is lower than the OLS estimate: being self-employed increase the probability of holding a term insurance by four percentage points. It is even more striking that such an indicator is one of the few regressors that remain significant when the fixed effects are added. Income risk remains uninfluential[25].

[23] A detailed description of these controls is available in the Appendix.

[24] One advantage of a linear model is that it is straightforward to add fixed-effects, and the coefficients can be interpreted as average partial effects. A simple logit or probit model would not allow the inclusion of μ_i with only five observations for individuals because of the incidental parameter problem. An alternative approach would have been to estimate a conditional logit model. However, since the distribution of the fixed effects is unknown, it would have not been possible to estimate the average partial effects in this case, but only the effect of the regressors on the log-odds ratio (Wooldridge, 2010). Such estimates are available upon request.

[25] One may claim that our dependent variable is equal to one if an individual owns a term insurance at a certain point in time, not if he or she has bought such a financial product in the time period considered. Therefore, it would be possible to claim that income risk may actually affect the probability of buying a term insurance but not the probability of holding such insurance. This may be true for the OLS estimates. However, the FE estimator is a within estimator: it exploits only the variation over time within individuals. As a result, if income risks were indeed pivotal in the term insurance demand function, the FE estimate should be significant, since it would capture exactly the variables that induce an individual to move from not owning a term insurance

We should also point out that the coefficient of the interaction term between the self-employment indicator and our measures of income risk are almost always insignificant. Indeed, as it is clear from Table 2, the interaction with the variance over time is significant in the OLS specification, but it becomes indistinguishable from zero once we add the fixed effects.

Among the other regressors in Table 1, it is interesting to note that the logarithm of individual net income is also positive and significant in the FE estimation, which is something that we would expect: richer individuals tend to leave bigger bequests, thus, they are more likely to buy death insurance[26]. Furthermore, looking at Table 2, we can notice again that individual income is positive and significant in the FE estimation. The only other statistically significant regressor is household size: individuals in larger households tend to hold less death insurance.[27]

Another surprising result is that having a son or a daughter living outside the household does not affect the probability of holding death insurance. The same can be said about the proportion of individuals aged less than 25 inside the household[28]. We would instead expect that having a son or a daughter increases the bequest motive. This result may be due to the low variability in the explanatory variable, given the fact that our sample only includes individuals aged between 25 and 65[29].

in a specific wave to owning the insurance in the next wave (or vice versa). Since we do not find such an effect, our results are robust to this argument.

[26] This is also consistent with the finding of (Rampini & Viswanathan, 2016) that lower risk managements among constrained households makes them more vulnerable to shocks.

[27] We have also tried to include in the FE specification the age of the household head and its squared term. If the household head did not have a spouse, we have tried either to impute zero age to those observations or to consider only households with a spouse. In both cases and for both income risk measurements, the main results do not change, and the coefficients of these new regressors are not statistically significant, probably because of the high correlation with the age of the household head.

[28] A similar result is obtained if we drop these two regressors and include "Have a son or a daughter" in the specification. However, in the FE regression, with income variance within family the coefficient of such offspring variable, it is positive with a p-value of 0.11.

[29] In fact, the probability of transitioning from not having a child to having one is only 16%.

Table 1: Variance within family - Death Insurance (D) - OLS and FE

	(1) OLS	(2) OLS	(3) FE	(4) FE
Income risk (variance)	0.0212	0.0172	0.0510	0.0489
	(0.0202)	(0.0173)	(0.0565)	(0.0676)
Self-Employed	0.0843***	0.0809***	0.0409**	0.0408**
	(0.0087)	(0.0092)	(0.0160)	(0.0160)
IncomeRisk*Self-Employed		0.1443		0.0067
		(0.1452)		(0.1151)
Not Employed	-0.0099*	-0.0101**	0.0127	0.0126
	(0.0051)	(0.0051)	(0.0095)	(0.0095)
Age	0.0122***	0.0122***	0.0015	0.0016
	(0.0017)	(0.0017)	(0.0061)	(0.0061)
Age^2	-0.1343***	-0.1341***	-0.1271**	-0.1272**
	(0.0186)	(0.0186)	(0.0584)	(0.0584)
Married	0.0033	0.0033	-0.0117	-0.0117
	(0.0075)	(0.0075)	(0.0262)	(0.0262)
High School	0.0395***	0.0394***	0.0044	0.0044
	(0.0050)	(0.0050)	(0.0214)	(0.0214)
Tertiary education	0.0701***	0.0698***	0.0033	0.0033
	(0.0083)	(0.0083)	(0.0469)	(0.0470)
Medium city	-0.0096	-0.0098	-0.0031	-0.0031
	(0.0072)	(0.0072)	(0.0566)	(0.0566)
Large city	-0.0156***	-0.0157***	-0.0168	-0.0169
	(0.0056)	(0.0056)	(0.0608)	(0.0608)
Mega city	-0.0233***	-0.0234***	-0.0074	-0.0074
	(0.0088)	(0.0088)	(0.0518)	(0.0518)
North Italy	0.0396***	0.0394***		
	(0.0052)	(0.0052)		
Centre Italy	0.0284***	0.0283***		
	(0.0061)	(0.0061)		
HH size	-0.0049*	-0.0049*	-0.0027	-0.0027
	(0.0028)	(0.0028)	(0.0060)	(0.0060)
# hh members<25/HHsize	0.0432***	0.0432***	0.0233	0.0233
	(0.0137)	(0.0137)	(0.0270)	(0.0270)
Offsprings outside hh	-0.0001	-0.0001	0.0075	0.0075
	(0.0053)	(0.0053)	(0.0087)	(0.0087)
Home-owner	0.0443***	0.0442***	0.0132	0.0132
	(0.0046)	(0.0046)	(0.0130)	(0.0130)
Log(Ind Income)	0.0027***	0.0027***	0.0031***	0.0031***
	(0.0005)	(0.0005)	(0.0009)	(0.0009)
IndIncome/Wealth	-0.0000***	-0.0000***	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Risk Adverse	-0.0184***	-0.0183***	0.0077	0.0077
	(0.0038)	(0.0038)	(0.0049)	(0.0049)
Constant	-0.2208***	-0.2198***	0.3175*	0.3175*
	(0.0395)	(0.0395)	(0.1683)	(0.1683)
Time dummies	No	No	Yes	Yes
Observations	35215	35215	35215	35215
AdjustedR^2	0.05665	0.05676	0.01449	0.01447
WithinR^2			0.01508	0.01508
OverallR^2			0.00559	0.00560
Average obs per ind			1.70	1.70

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household. Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Upper and lower 0.5 percentile of individual income dropped

Table 2: Variance over time (MA) - Death Insurance (D) - OLS and FE

	(1) OLS	(2) OLS	(3) FE	(4) FE
Income risk (variance)	0.0013	-0.0054***	-0.0014	-0.0019
	(0.0082)	(0.0007)	(0.0036)	(0.0033)
Self-Employed	0.0845***	0.0830***	0.0465**	0.0420**
	(0.0124)	(0.0124)	(0.0198)	(0.0198)
IncomeRisk*Self-Employed		0.0766***		0.3840
		(0.0116)		(0.3781)
Not Employed	-0.0109	-0.0111	0.0145	0.0144
	(0.0073)	(0.0073)	(0.0110)	(0.0110)
Age	0.0117***	0.0117***	-0.0006	-0.0005
	(0.0025)	(0.0025)	(0.0072)	(0.0072)
Age^2	-0.1208***	-0.1203***	-0.1136	-0.1139
	(0.0269)	(0.0269)	(0.0699)	(0.0699)
Married	0.0234**	0.0238**	-0.0003	-0.0003
	(0.0099)	(0.0099)	(0.0239)	(0.0239)
High School	0.0388***	0.0389***	-0.0006	-0.0005
	(0.0069)	(0.0069)	(0.0277)	(0.0277)
Tertiary education	0.0703***	0.0703***	-0.0062	-0.0063
	(0.0115)	(0.0115)	(0.0797)	(0.0797)
Medium city	-0.0132	-0.0136	-0.0625	-0.0636
	(0.0097)	(0.0097)	(0.0747)	(0.0746)
Large city	-0.0184**	-0.0186**	-0.0628	-0.0621
	(0.0076)	(0.0076)	(0.0793)	(0.0793)
Mega city	-0.0221*	-0.0223*	-0.0488	-0.0482
	(0.0126)	(0.0126)	(0.0584)	(0.0584)
HH size	-0.0046	-0.0047	-0.0133*	-0.0133*
	(0.0040)	(0.0040)	(0.0074)	(0.0074)
# hh members<25/HHsize	0.0606***	0.0610***	0.0123	0.0124
	(0.0205)	(0.0205)	(0.0300)	(0.0301)
Offsprings outside hh	-0.0073	-0.0077	-0.0051	-0.0053
	(0.0070)	(0.0070)	(0.0096)	(0.0096)
Home-owner	0.0458***	0.0457***	0.0143	0.0144
	(0.0064)	(0.0064)	(0.0147)	(0.0147)
Log(Ind Income)	0.0007	0.0007	0.0038***	0.0037***
	(0.0010)	(0.0010)	(0.0014)	(0.0014)
IndIncome/Wealth	-0.0000***	-0.0000***	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
IndIncome/HHIncome	0.0315**	0.0313**	-0.0128	-0.0125
	(0.0136)	(0.0136)	(0.0192)	(0.0192)
Risk Adverse	-0.0119**	-0.0117**	0.0082	0.0084
	(0.0052)	(0.0052)	(0.0056)	(0.0056)
Constant	-0.2554***	-0.2546***	0.4703**	0.4680**
	(0.0595)	(0.0595)	(0.1965)	(0.1963)
Time dummies	No	No	Yes	Yes
Observations	18808	18808	18808	18808
AdjustedR^2	0.05484	0.05528	0.01404	0.01420
WithinR^2			0.01514	0.01535
OverallR^2			0.00478	0.00541
Average obs per ind			2.25	2.25

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner. Female, North Italy and Centre Italy have been dropped because of collinearity or not reported.

The measurement of income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped.

Robustness check: FE and IV for self-employment

We can argue that the FE specification is already robust to several endogeneity issues. For instance, the individual fixed-effect allows us to control for cultural factors and time-invariance individual attitudes, preferences, and abilities. Despite this, the estimation may still be biased, due to unobserved time-variant characteristics that affect the decision to hold a term insurance and are correlated with income risk or the self-employment indicator. For instance, risk-aversion may change over time and be correlated with the decision of holding a term insurance as well as the transition in or out of entrepreneurship.

Therefore, our next strategy has been to use an IV approach together with FE. In particular, we have exploited as instruments for self-employment status the average self-employment rate in the region in each wave. In addition to this, in the specification with the interaction term, we have instrumented such interaction between income risk and self-employed with the interaction of our income risk measure with the aforementioned instrument.

The results are qualitatively similar to the previous section[30]. Indeed, as shown in the second and third columns of Tables 3 and 4, even after controlling for fixed effect and instrumenting it, the coefficient of the self-employment dummy is statistically significant, and the economic magnitude is substantial[31-32]. On the other hand, income risk does not seem to affect the decision of holding a term insurance.

As usual, with the IV strategy, we may be concerned about the weakness of our instruments. First, as shown in the first column of Tables 3 and 4, from the first stage it is clear that the regional self-employment rate is an important predictor of individual self-employment status. This may reflect time-varying regional differences in legislation, tax treatments, or entrepreneurial culture. Second, the F-test of such an excluded instrument reported at the end of the second column is close to 10[33]. Third, we have one instrument only, so the IV estimate is median-unbiased[34]. Fourth, in order to dissipate any doubt, we have estimated the same model using a LIML estimation, which is less biased than the 2SLS in case of weak instruments. The results are the same as the 2SLS, thus supporting our strategy.

The other typical concern with the IV approach is related to the exogeneity of the instrument. From an intuitive point of view, it is difficult to see how the average self-employment rate in the region may be correlated with the decision of holding a term insurance. In addition to this, we know that, in Italy (as in other countries), if individuals are self-employed, it is likely that their children will be self-employed as well. In other words, intergenerational attitudes, role models, and knowledge

[30] IV/GMM estimations of the fixed-effects panel data model have been obtained using the Stata command xtivreg2. See (Baum, Schaffer, & Stillman, 2003), (Baum, Schaffer, & Stillman, 2007), (Schaffer, 2010).

[31] One of the drawbacks of the linear probability model is that the estimates can be larger than one, which may seem counter-intuitive, since probabilities are bounded between zero and one. However, the interpretation can be simple once we take that into account: if an individual shift from being an employee to a self-employed individual, *ceteris paribus*, the probability of buying a term insurance during the transition is equal to one.

[32] Even if the coefficient of self-employment status is positive, both in the FE and FE-IV cases, the latter is much larger in magnitude. This is unfortunately a typical result when instrumenting a dummy variable with another dummy variable.

[33] See (Stock, Wright, & Yogo, 2002).

[34] See (J. D. Angrist & Pischke, 2009).

play an important role in shaping entrepreneurship decisions.[35] Therefore, we could use whether the father was a self-employed as well as an instrument for self-employment[36]. However, this variable is time-invariant, so it is not possible to use it by itself in a fixed-effect specification. We can nevertheless interact it with the average self-employment rate in the region at each time period, thus obtaining a time-varying additional instrument. Having two instruments for one endogenous variable allows us to test for the exogeneity of such instruments through a Sargan-Hansen J test. The Hansen p-values are very high: 0.93 when income risk is approximated by income variance in the households, 0.89 when such risk is approximated by individual income variance over time. Thus, we are far from rejecting the null, which means that we can be confident in the exogeneity of our instruments[37].

Assuming that our instrument is valid, we can test the null hypothesis that our endogenous regressor (self-employment status) is actually exogenous[38]. The p-values of such a test are 0.012, when income risk is approximated by income variance in the households, and 0.057, when such risk is approximated by individual income variance over time. Therefore, it may seem appropriate to reject the null hypothesis. This supports the idea that instrumenting self-employment status may be a more conservative approach.

Finally, from a strictly technical point of view, the reported results are estimated using a 2SLS strategy. Although the standard errors and the statistics are robust to heteroscedasticity and clustering at the household level, the estimates are efficient only under the assumption of homoscedasticity. We have also computed the same specification using a two-step GMM estimation strategy, which is efficient under arbitrary heteroscedasticity and clustering at the household level. The standard errors do not vary substantially between the two estimators.

[35] See for instance (Dunn & Holtz-Eakin, 2000), (Colombier & Masclet, 2008), (Lindquist, Sol, & Van Praag, 2015), (Viinikainen et al., 2016).

[36] This idea is similar to the IV strategy implemented by (Calcagno & Urzi Brancati, 2014) and (Romiti & Rossi, 2012).

[37] We have also tried to use whether the mother used to be a self-employed individual as an instrument. The Hansen p-values are still large (although smaller than with the father self-employed), but the instrument is much weaker. The same conclusion can be derived for father self-employed interacted with age or age squared of the respondent. Tables available upon request.

[38] Option endog() of the command xtivreg2.

Table 3: Variance within family - Death Insurance (D) - FE and IV for self-employed

	(1) First Stage	(2) FE and 2SLS	(3) FE and 2SLS	(4) FE and LIML
Income risk (variance)	0.0110	0.0358	0.1324	0.0358
	(0.0294)	(0.0705)	(0.1553)	(0.0705)
Self-Employed		1.5265**	1.5327**	1.5265**
		(0.7578)	(0.7580)	(0.7578)
Regional Self-Employment	0.2993***			
	(0.0975)			
IncomeRisk*Self-Employed			-0.3029	
			(0.4074)	
Not Employed	-0.1825***	0.2839**	0.2850**	0.2839**
	(0.0129)	(0.1405)	(0.1405)	(0.1405)
Age	0.0007	0.0010	0.0009	0.0010
	(0.0042)	(0.0087)	(0.0087)	(0.0087)
Age^2	0.0051	-0.1373*	-0.1365*	-0.1373*
	(0.0399)	(0.0825)	(0.0825)	(0.0825)
Married	0.0384**	-0.0693	-0.0696	-0.0693
	(0.0196)	(0.0462)	(0.0463)	(0.0462)
High School	-0.0138	0.0234	0.0233	0.0234
	(0.0098)	(0.0288)	(0.0288)	(0.0288)
Tertiary education	-0.0083	0.0133	0.0130	0.0133
	(0.0226)	(0.0603)	(0.0603)	(0.0603)
Medium city	-0.0259	0.0338	0.0345	0.0338
	(0.0412)	(0.0925)	(0.0922)	(0.0925)
Large city	-0.0439	0.0422	0.0426	0.0422
	(0.0411)	(0.0896)	(0.0895)	(0.0896)
Mega city	-0.0056	-0.0024	-0.0022	-0.0024
	(0.0515)	(0.0904)	(0.0904)	(0.0904)
HH size	0.0086*	-0.0156	-0.0156	-0.0156
	(0.0046)	(0.0105)	(0.0105)	(0.0105)
# hh members<25/HHsize	0.0110	0.0062	0.0059	0.0062
	(0.0155)	(0.0365)	(0.0365)	(0.0365)
Offsprings outside HH	0.0114*	-0.0098	-0.0099	-0.0098
	(0.0058)	(0.0149)	(0.0149)	(0.0149)
Home-owner	-0.0043	0.0199	0.0197	0.0199
	(0.0079)	(0.0185)	(0.0185)	(0.0185)
Log(Ind Income)	0.0024**	-0.0004	-0.0003	-0.0004
	(0.0011)	(0.0026)	(0.0026)	(0.0026)
IndIncome/Wealth	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Risk Adverse	0.0014	0.0053	0.0054	0.0053
	(0.0029)	(0.0066)	(0.0066)	(0.0066)
Constant	0.0514			
	(0.1146)			
Time dummies	Yes	Yes	Yes	Yes
Observations	35215	21467	21467	21467
Weak F test		9.41218	4.70683	9.41218

Standard errors in parentheses. Clustered SE at household level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

Excluded instruments for Self-employed: average self-employment rate in the region (wave specific)

Excluded instruments for IncomeRisk*Self-Employed: interaction of income risk measurement with the above instrument

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity

Table 4: Variance over time (MA) - Death Insurance (D) - FE and IV for self-employed

	(1) First Stage	(2) FE and 2SLS	(3) FE and 2SLS	(4) FE and LIML
Income risk (variance)	0.0002	0.0000	-0.0007	0.0000
	(0.0031)	(0.0060)	(0.0057)	(0.0060)
Self-Employed		1.3768*	1.3386	1.3768*
		(0.8364)	(0.8309)	(0.8364)
Regional Self-Employment	0.2862***			
	(0.0995)			
IncomeRisk*Self-Employed			0.5216	
			(1.2798)	
Not Employed	-0.1772***	0.2507*	0.2449	0.2507*
	(0.0150)	(0.1508)	(0.1498)	(0.1508)
Age	0.0017	0.0048	0.0050	0.0048
	(0.0045)	(0.0098)	(0.0097)	(0.0098)
Age^2	-0.0019	-0.1123	-0.1128	-0.1123
	(0.0434)	(0.0886)	(0.0876)	(0.0886)
Married	0.0028	-0.0042	-0.0041	-0.0042
	(0.0143)	(0.0298)	(0.0294)	(0.0298)
High School	-0.0131	0.0155	0.0153	0.0155
	(0.0099)	(0.0346)	(0.0343)	(0.0346)
Tertiary education	-0.0318	0.0350	0.0340	0.0350
	(0.0200)	(0.0861)	(0.0855)	(0.0861)
Medium city	-0.0779	0.0385	0.0346	0.0385
	(0.0561)	(0.1396)	(0.1380)	(0.1396)
Large city	-0.1049*	0.0716	0.0693	0.0716
	(0.0536)	(0.1442)	(0.1427)	(0.1442)
Mega city	-0.0961**	0.0760	0.0738	0.0760
	(0.0437)	(0.1175)	(0.1164)	(0.1175)
HH size	0.0107**	-0.0276**	-0.0272**	-0.0276**
	(0.0052)	(0.0129)	(0.0128)	(0.0129)
# hh members<25/HHsize	-0.0206	0.0384	0.0379	0.0384
	(0.0159)	(0.0387)	(0.0382)	(0.0387)
Offsprings outside HH	0.0065	-0.0140	-0.0140	-0.0140
	(0.0059)	(0.0132)	(0.0131)	(0.0132)
Home-owner	-0.0030	0.0185	0.0186	0.0185
	(0.0085)	(0.0189)	(0.0187)	(0.0189)
Log(Ind Income)	0.0008	0.0027	0.0026	0.0027
	(0.0014)	(0.0024)	(0.0024)	(0.0024)
IndIncome/Wealth	-0.0000	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
IndIncome/HHIncome	0.0165	-0.0346	-0.0336	-0.0346
	(0.0187)	(0.0342)	(0.0336)	(0.0342)
Risk Adverse	-0.0021	0.0108	0.0109	0.0108
	(0.0032)	(0.0073)	(0.0072)	(0.0073)
Constant	0.1008			
	(0.1222)			
Time dummies	Yes	Yes	Yes	Yes
Observations	18808	15700	15700	15700
Weak F test		8.26388	2.42677	8.26388

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: SHIW 2004-2012, individuals aged 25-65, household head and partner
The measurement of income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income;
in 2010, the variance across all waves except 2012 of the net individual labor income;
in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.
Excluded instruments for Self-employed: average self-employment rate in the region (wave specific)
Excluded instruments for IncomeRisk*Self-Employed: interaction of income risk measurement with the above instrument
Upper and lower 0.5 percentile of individual income dropped
Female, North Italy and Centre Italy have been dropped because of collinearity

Robustness check: FE and IV for self-employment and income risk

In this paper, we are interested in estimating the causal impact of two variables: self-employment status and income risk. We have already addressed potential endogeneity issues by adding additional controls, individual and time fixed-effects, and by instrumenting self-employment status. The last concern is about income risk: as in the previous section, we may be worried that time-varying individual unobservables may bias our estimation. The source of endogeneity may be the same one highlighted for occupational status: risk-aversion could be time varying and affect the level of income risk experienced by an individual. This issue is now tackled by instrumenting our income risk measures as well as our self-employment indicator.

In order to find an appropriate exclusion restriction, we employ a similar strategy to the one used before: at each point in time we take the average income risk of the individuals who live in the same region and have the same occupation. In this context, we divided individuals into three categories: employees, self-employed individuals, and individuals outside the labor force, i.e., retirees, students, and unemployed individuals. In addition to this, since now we have two instruments – average self-employment rate and average income risk – we have also included the interaction between these two variables as an additional instrument.

As shown in the first two columns of Table 5, the estimates are qualitatively similar to the ones shown in the previous tables: income risk does not statistically affect the decision of holding a term insurance, while self-employment status positively, significantly, and substantially increases the probability of holding such insurance.

As far as the exogeneity of the instruments is concerned, the Hansen p-values reported at the bottom of Table 5 are particularly high, thus, we are far from rejecting the null hypothesis of instrument validity. On the other hand, while the F-tests of excluded instruments in the first stages are higher than 10 for self-employment status, those for income risk are lower than such a threshold. Therefore, in order to verify whether there is a significant bias due to weak instruments, we have also reported the LIML estimates (last two columns of Table 5). The 2SLS and LIML outputs are very close, thus, we do not think that we should be concerned about weak instruments in this context.

We have also tested whether income risk is actually exogenous. The p-values are low, 0.011 for the variance within the household and 0.080 for the variance over time. Therefore, instrumenting such variables produces more conservative estimates. Moreover, we have also compared the 2SLS and GMM estimates: the t-statistics are slightly larger in absolute value in the latter, but our main conclusions do not change.[39]

[39] We also tried to add the interaction between father self-employed and average self-employment rate as an instrument, but the estimates were less precise. Moreover, IV estimates should typically be interpreted as local average treatment effects (LATE), or as weighted LATE in case of multiple instruments. Therefore, adding more instruments makes it more difficult to understand which is the relevant subpopulation for which we estimate the average treatment effect.

Table 5: Death Insurance (D) - FE and IV for self-employed and income risk

	(1) FE and 2SLS - HH	(2) FE and 2SLS - Time	(3) FE and LIML - HH	(4) FE and LIML - Time
Income risk (variance HH)	-10.2780		-11.0973	
	(7.5394)		(8.5018)	
Income risk (variance Time)		-0.5610		-0.5633
		(0.6348)		(0.6382)
Self-Employed	0.6475**	0.7078*	0.6877**	0.7108*
	(0.3185)	(0.4080)	(0.3432)	(0.4099)
Not Employed	0.1019*	0.1361*	0.1075*	0.1367*
	(0.0557)	(0.0764)	(0.0585)	(0.0767)
Age	-0.0005	0.0027	-0.0006	0.0027
	(0.0118)	(0.0086)	(0.0125)	(0.0086)
Age^2	-0.1697	-0.0780	-0.1731	-0.0779
	(0.1227)	(0.0783)	(0.1307)	(0.0784)
Married	0.0129	0.0332	0.0151	0.0334
	(0.0468)	(0.0332)	(0.0503)	(0.0332)
High School	0.0079	-0.0357	0.0080	-0.0359
	(0.0296)	(0.0353)	(0.0306)	(0.0354)
Tertiary education	0.0316	-0.0245	0.0338	-0.0245
	(0.0674)	(0.0824)	(0.0701)	(0.0824)
Medium city	0.0048	-0.0111	0.0053	-0.0108
	(0.0653)	(0.1009)	(0.0667)	(0.1010)
Large city	0.0233	0.0056	0.0262	0.0059
	(0.0692)	(0.1016)	(0.0711)	(0.1017)
Mega city	0.0314	0.0130	0.0344	0.0133
	(0.0698)	(0.0783)	(0.0731)	(0.0784)
HH size	-0.0155	-0.0234**	-0.0164	-0.0235**
	(0.0115)	(0.0094)	(0.0124)	(0.0094)
# hh members<25/HHsize	0.0815	0.0609	0.0862	0.0611
	(0.0620)	(0.0392)	(0.0676)	(0.0393)
Offsprings outside HH	0.0146	-0.0082	0.0153	-0.0082
	(0.0159)	(0.0104)	(0.0169)	(0.0104)
Home-owner	0.0088	0.0295	0.0085	0.0296
	(0.0200)	(0.0182)	(0.0209)	(0.0182)
Log(Ind Income)	0.0046	0.0037**	0.0047	0.0037**
	(0.0034)	(0.0017)	(0.0037)	(0.0017)
IndIncome/Wealth	-0.0000	0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Risk Adverse	0.0028	0.0071	0.0025	0.0071
	(0.0076)	(0.0061)	(0.0080)	(0.0061)
IndIncome/HHIncome		-0.0295		-0.0296
		(0.0245)		(0.0246)
Time dummies	Yes	Yes	Yes	Yes
Observations	21467	15700	21467	15700
Hansen p-value	0.68347	0.79867	0.69823	0.79884

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of HH income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

The measurement of Time income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Excluded instruments for Self-employed: average self-employment rate in the region (wave specific)

Excluded instruments for Income Risk: average self-employment rate in the region (wave and occupation specific)

The additional excluded instrument is the interaction between the above two instruments.

Female, North Italy and Centre Italy have been dropped because of collinearity.

Upper and lower 0.5 percentile of individual income dropped

Additional Robustness checks

One concern may be that death insurance does not approximate intergenerational transfers, but it is, rather, a way to protect the spouse in case of the death of the respondent. First, it should be noted that if this were true, our results would still be interesting in the context of bequest and precautionary savings. Furthermore, we have already included a marriage indicator in our controls to take this into account, and we have found that its coefficient is not statistically different from zero. In addition to this, it is important to point out that most of the individuals in our selected sample have a son or a daughter (around 88% in the subsample used in the FE specification). Nevertheless, as an additional robustness check, we may restrict our sample to only households with offspring and run the same FE regression as in the previous section. As shown in Table A3, the main result does not change substantially: income risk remains insignificant, while self-employment status is still a key driver of the demand for death insurance, although it is now significant only at a 10% level[40]. In this table, income risk is again measured as the variance of individual incomes within family, which is the case that is more relevant in this context[41]. Indeed, we may think that when there is high inequality between the individual incomes of household members, e.g., between husband and wife, the higher-income agent will try to protect the other household members by buying a term insurance. By restricting our sample to households with offspring, we show evidence that such a mechanism is probably used to protect not only the spouses but also their sons and daughters. Therefore, our assumption that term insurance is a valid – although imprecise - proxy for intergenerational transfers seems to hold.

It may also be interesting to see the estimation results if we use only occupational status or income risk as measures of uncertainty. As shown in the second columns of Tables A3 and A4, if we do not include income risk, the coefficient of self-employed does not change substantially in the FE specification[42]. This is not surprising, since we dropped a regressor that was statistically insignificant. On the other hand, if we exclude the occupational status indicators from the regressions (Columns 3), income risk remains insignificant. Again, this was expected, since income risk by construction should not capture the other components of uncertainty and institutional factors incorporated into the self-employed indicator.

As discussed in the data descriptions, the Bank of Italy implemented several strategies in order to obtain high-quality information. Nevertheless, researchers are typically worried about measurement errors and misreporting when dealing with surveys with income and wealth variables. We have addressed this issue in three ways. First, by estimating a FE model, we allow for constant measurement errors. In other words, as long as individuals systematically underreport or overestimate their income and wealth, this feature of the data will be captured by the time invariant individual fixed-effect. Second, at the end of each interview the interviewer is asked to evaluate the quality of the responses, with particular emphasis on the answers related to income

[40] We have also re-estimated the FE specification with the IV for self-employment status for this subsample. The coefficient of self-employment is again positive and significant at a 5% level, while income risk is insignificant. Nevertheless, both regressors became insignificant when we re-estimated the FE specification with the IV both for self-employment status and income risk.

[41] Table A4 shows the estimation results when income risk is measured by the variance of individual income over time.

[42] The same conclusions can be obtained from the FE and IV specifications.

and wealth. Hence, we could estimate the same FE model by using only the most reliable data (rate 8/10 or higher). As shown in the last columns of Tables A3 and A4, the estimates are qualitatively similar. In particular, it is reassuring to note that the results concerning the income remain the same: income risk is still insignificant, while richer individuals are more likely to hold a term insurance.[43] Third, we have computed the ratio between the premium amount paid for the life and term insurance of an individual and his or her household income. If this ratio is very high, it may be a sign that the income was underreported. Very few people in our sample had such a ratio higher than 0.1 (in 2012 there were only 49 of them), so misreporting does not seem to be endemic in this survey. Moreover, if we estimate the same FE model using only observations with low premium over income ratios, we reach the same conclusions of the previous empirical section.

Another concern may be that our sample includes individuals too young who are not yet considering the possibility of buying a term insurance. Therefore, we have tried to restrict our sample to individuals aged between 35 and 65 rather than between 25 and 65, in order to investigate potential age-related heterogeneities[44]. As shown in the first columns of Table A5 and Table A6, the results from the FE estimation with the restricted sample are similar to those of the larger sample.

So far, we have measured income risk only using the income of employees and self-employed individuals. The rationale behind this choice is that, when an individual retires, there is a drop in his or her income. Therefore, income risk would increase because of such drop. However, retirement is an expected shock; it does not actually indicate an increase in uncertainty. Therefore, it should not influence the probability of holding a term insurance. Despite this, especially when we use the variance of income within family, it may be worth looking at what happens if we do include all forms of income in the algorithm that computes the income risk indicators. The FE estimation results are shown in the second columns of Table A5 and Table A6[45]. Using this different definition of income risk does not change the coefficients of the main regressors of interest.

Similarly, we can extend our sample and also look at the probability of holding a term insurance for individuals aged between 25 and 75. Indeed, some individuals may decide to remain in the workforce, even after age 65. Therefore, our previous threshold would be too restrictive. In this context, the definition of income risk that seems more appropriate is the one just discussed with pensions and social transfers included in the measurement. As is clear from the FE estimates in the third columns of Table A5 and Table A6, the results are very similar to the previous tables[46].

The dataset also includes the weights for the primary sampling units (constant for individuals in the same households). Following (Solon, Haider, & Wooldridge, 2015), in this paper the sampling is independent of the dependent variables (conditioning on the explanatory variables), so using

[43] This result is also important since one may argue that measurement errors could be higher among self-employed individuals since they are typically more reluctant to disclose their income and wealth. Using the interviewer's evaluation, we are able to drop all unreliable observations. If it were indeed true that data on self-employed individuals were noisier, this strategy would simply take this into account by excluding more self-employed individuals rather than employed, retired, or inactive individuals.

[44] This is also consistent with the findings of (Kung & Fang, 2012).

[45] The same conclusions can be obtained from the FE and IV specification.

[46] The same conclusions can be obtained from the FE and IV specification.

weights in order to correct for endogenous sampling does not seem appropriate here. Moreover, using weights in order to estimate average partial effects in case of heterogeneous effects is usually insufficient. Therefore, rather than weighting, when we suspected heterogeneity in this paper, we tried to analyze it by adding interaction terms or by focusing the estimation on a sub-sample. Finally, reporting heteroscedasticity-robust standard errors rather than using weights to obtain more precise estimates under heteroscedasticity seems more conservative. To conclude, we do not find sufficient reasons to justify weighting in this paper when we estimate causal effects. Nevertheless, for the sake of completeness, we have reported in the last columns of Tables A5 and A6 the pooled OLS estimates when such weights are used[47]. The estimates with or without weights are not significantly different from each other.

We may worry that wealth is endogenous. Therefore, we have also tried to conduct our analysis without including such a variable. Omitting the income-wealth ratio from the FE specification does not significantly change the coefficients of income risk and self-employment status (Column 1, Table A7 and Table A8).[48-49]

It may also be interesting to investigate whether there is heterogeneity among the category of self-employed. In particular, in the second columns of Tables A7 and A8, we have distinguished between self-employed with or without employees in the FE specification[50]. The two coefficients are similar, although self-employed with employees are slightly more likely to hold a term insurance. This may capture the fact that owners of firms with employees could be more responsible, since their employees rely on them. Therefore, this attitude could apply in the family setting as well, thus pushing people to buy a term insurance for their spouses and children.

[47] These weights are computed separately in each wave; thus, it is not possible to use them with the FE estimators.

[48] If household wealth was zero, while individual income was positive, such ratio was set equal to individual income. We also tried to set to missing or to one of the ratio for those (few) observations. Results do not change substantially. Tables available upon request.

[49] A similar concern about the "Not Employed" indicator, since occupational status is endogenous and we have instrumented only for self-employment status. A possible solution could be to pool together employees, inactive, and retirees as a comparison group, i.e., to drop the dummy variable "Not Employed". In such specifications the coefficient of self-employed is still positive and significant, while income risk remains insignificant. Tables available upon request.

[50] We have considered as self-employed without employees individuals who worked as freelancers (*libero professionista*), artisan (*artigiano*) or business owners without employees (*lavoratore autonomo*). On the other hand, we have considered self-employed with employees business owners with employees (*imprenditore individuale*), owners or members of family businesses (*titolare o coadiuvante di impresa familiare*), and partners in large firms (*socio/gestore di societá*).

VII. Empirical evidence on term insurance premiums

So far we have focused on participation of the term insurance market. However, it may be interesting to look at the effect of uncertainty on the intensity of post-mortem savings. Indeed, some changes over time may not incentivize individuals to subscribe or rescind a term insurance, but they may be big enough to push people to vary the amount paid annually on premiums.[51] In other words, one advantage of using premiums as a dependent variable is that we expect them to be less persistent over time, thus, there should be more variability.

We start this section by using a Tobit model to allow for the zero values of the dependent variable for those who do not have any insurance contracts (or only a pure life insurance). The results are presented in Table 6. Column 1-2 measures income risk with the variability of incomes within the household, while Column 3-4 uses the variability of individual net income over time as proxy for income risk. For each income risk measure, we report both the cross-section estimated for the latest wave considered (2012) and the estimates with all the waves pooled. We start by reporting the estimated coefficients, which is the marginal effect on the latent variable.

It is reassuring to note that the role of occupational status is pivotal, not only when looking at participation but also when looking at the amount of premiums paid. Indeed, the coefficient of self-employment is always positive, large, and statistically significant. On the other hand, income risk remains indistinguishable from zero in almost all specifications.

Given these estimates, we can also compute the marginal effects of income risk and self-employment on the censored dependent variable. We can compute it by taking the coefficients of the Pooled Tobit (Column 2-4, Table 6), computing the derivative of such models with respect to income risk or self-employment, calculating the value of such a derivative for each observation, and then averaging across individuals. After these calculations, we get that the marginal effects of self-employment are around 120 euros and highly significant.[52] On the other hand, the marginal effects of income risk within family and over time are both insignificant.

One may now argue that the restrictions imposed by the Tobit model are unrealistic: we are assuming that the same variables explain participation in the life insurance market and the premium amount. Furthermore, the coefficients have to have the same sign, both when explaining the probability of a nonzero observation and the amount of a positive one. In addition to this, the Tobit model is built to take into account the censoring of the latent variable. As a result, it predicts not only a cluster of zeros but also some relevant mass around zero. We do not believe that these assumptions are too strong in this setting. In fact, there are no variables that, *a priori*, should affect participation but not demand intensity. Furthermore, we do not expect the sign of the regressors to differ between the two underlining equations. Last but not least, there is a substantial mass at zero,

[51] As discussed in the previous section, one may argue that income risk may affect the probability of buying a term insurance, but not the probability of holding such insurance. This section provides additional prof against this argument since, if income risk does indeed influence the decision to subscribe to a term insurance, there is no reason to believe that it should not affect the premium paid for such insurance.

[52] SE computed with the Delta-method.

as well as some around it. Even if the latter were not true, the coefficient would be attenuated, so our results for occupational status would still be valid.[53]

Despite the above considerations, in order to check the robustness of our estimates, we have estimated a Heckman (Tobit II) model, where the first step is a Probit model for computing the probability of owning a term insurance (dummy variable), and the second step has the premium amount as dependent variable, so people without insurance have missing values for the premium amount. The coefficient of the Mill's ratio in the second stage is not statistically different from zero, thus, we can make the case that sample selection is not an issue in this context[54-55].

As an additional robustness check, Table A9 in the Appendix shows the estimation results for the linear models: the first two columns contain the OLS and FE estimated coefficients when income risk is measured as variability within the household, while in the last two, we have looked at the individual variability over time. The advantage of this approach is that we can easily include individual fixed effects without incurring in the incidental parameters problem. As in the nonlinear models, income risk remains insignificant, both in the OLS and the FE specification, while the coefficient of self-employment status is again positive and significant, although the magnitude is much lower than in the Tobit model[56-57].

[53] See (Greene, 2012) page 856.

[54] Tables available upon request.

[55] As an alternative to the Tobit model, we have followed (Burke, 2009) and we have also estimated Cragg's double hurdle model. This model also allows for different coefficients in the two estimation stages. Indeed, it first estimates a Probit model to determine the probability that the dependent variable is positive, and then it fits a truncated normal model on the positive values. The marginal effect of self-employment status is still positive and significant, although the magnitude is smaller than in the Tobit model. Tables available upon request.

[56] The premium amount paid has been set equal to zero for individuals without a pure or mixed term insurance, as we did for the Tobit estimation. We have also tried to estimate the same models by treating as missing such values, like we did for the Heckman model. Although the number of observations drops substantially, the OLS and FE estimates remain qualitatively similar in most of the specifications. Tables available upon request.

[57] We have also tried to estimate a FE and 2SLS model using the same exclusion restriction exploited in the previous sections. However, the estimates are extremely noisy, and it is not possible to reject the null hypothesis of zero impact for self-employment or income risk (with both definitions). Nevertheless, if we use the logarithm of the premium amount as dependent variable, the coefficient of self-employment is also significant, even when we instrument this variable.

Table 6: Term Insurance Premium - Tobit

	(1) 2012 HH	(2) Pooled HH	(3) 2012 Time	(4) Pooled Time
Income risk (variance HH)	3319.1**	273.5		
	(1626.1)	(214.0)		
Income risk (variance Time)			-2973.8	12.7
			(4431.0)	(113.3)
Self-Employed	1557.1***	1287.4***	1118.5***	1255.5***
	(516.6)	(156.3)	(283.7)	(182.3)
Not Employed	-585.4*	-277.9**	-533.2*	-395.0**
	(314.5)	(136.8)	(308.9)	(196.4)
Female	-957.6***	-898.6***	-880.1***	-876.7***
	(216.9)	(98.9)	(207.3)	(147.5)
Age	322.6**	325.1***	252.1**	298.3***
	(157.3)	(56.5)	(116.5)	(74.6)
Age^2	-3169.6*	-3436.1***	-2237.7*	-2992.8***
	(1652.0)	(608.7)	(1206.6)	(784.5)
Married	624.1	129.3	520.6	470.4**
	(429.3)	(183.4)	(386.5)	(239.2)
High School	971.2***	909.5***	931.8***	936.9***
	(284.6)	(121.8)	(246.5)	(163.4)
Tertiary education	1721.8***	1587.1***	1357.0***	1554.8***
	(532.3)	(196.0)	(378.6)	(232.1)
Medium city	-618.8*	-202.7	-663.8**	-317.7
	(318.9)	(148.2)	(295.1)	(205.7)
Large city	-664.7**	-353.1***	-816.0***	-453.4***
	(260.2)	(121.4)	(255.7)	(166.5)
Mega city	-1641.5**	-374.6	-1146.0**	-494.6
	(714.3)	(230.3)	(546.7)	(319.7)
North Italy	663.6***	759.8***	659.5**	820.7***
	(250.0)	(134.7)	(266.3)	(187.4)
Centre Italy	452.9	611.5***	498.4*	771.8***
	(280.2)	(152.2)	(276.3)	(222.8)
HH size	-462.6**	-132.5*	-421.8**	-122.7
	(200.3)	(73.0)	(173.8)	(104.8)
# hh members<25/HHsize	2329.1***	824.4**	2281.3***	1035.8**
	(775.9)	(328.4)	(787.2)	(496.4)
Offsprings outside HH	-466.6	-58.4	-199.4	-194.8
	(331.9)	(143.9)	(272.6)	(185.5)
Home-owner	842.3***	1015.2***	480.6*	1082.9***
	(326.3)	(148.9)	(269.7)	(201.2)
Log(Ind Income)	119.3**	135.7***	13.8	89.9**
	(59.1)	(24.2)	(55.3)	(36.5)
IndIncome/Wealth	-26.6*	-0.2**	-24.2**	-0.2*
	(15.0)	(0.1)	(10.9)	(0.1)
Risk Adverse	-352.3	-265.5***	-219.6	-124.2
	(248.7)	(90.1)	(205.5)	(118.8)
IndIncome/HHIncome			565.8	466.9
			(470.6)	(295.6)
Constant	-15676.8***	-13604.3***	-12037.2***	-15145.7***
	(5156.5)	(1639.8)	(3214.2)	(2180.6)
Sigma	4345.9***	3777.7***	3379.7***	3714.3***
	(998.4)	(290.8)	(398.8)	(330.1)
Time dummies	No	Yes	No	Yes
Observations	7832	35215	4816	18808
Pseudo R^2	0.02778	0.02651	0.02559	0.02585

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of HH income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

The measurement of Time income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped

VIII. Discussion

The above empirical sections contain a rather surprising result: the employment status is a key determinant of the term insurance demand, while income risk does not seem to play a role in this context. We may speculate about this result. One possible explanation can be found in the Italian pension system: although there are several cases and clauses (INPS, 2015a), on average, self-employed individuals have a lower compulsory contribution rate than employees[58]. As a result, it seems rational for an individual who switched from being an employee to a self-employed (which is the one that causes the relevant variation in the FE estimation) to buy a term insurance in order to protect his or her dependents against such a decrease in future survivor pension benefits[59].

Another interpretation may assign a different concept of risk to the self-employment dummy. In other words, the self-employment indicator may capture the business risk held by such individuals. This extra risk may bring about additional post-mortem precautionary savings. [60]

[58] Indeed, the average compulsory contribution rate for employees is around 33%, while for self-employed the average rate is 23% (Italian Government, 2001). Furthermore, if the individual dies, the spouse is usually entitled to 60% of his or her pension. For the offspring, if he or she is a minor or a student, he or she is entitled to 70% of the pension when an only child. If there are more than one offspring, each child receives 20% (or 40% if the spouse is not entitled). See (INPS, 2015b), (INAS, 2013).

[59] See (SSA, 2012).

[60] Another reason behind the role of self-employment status could be related to health and life expectancy: if self-employed people believe that their life expectancy is lower than the average, they may apply for death insurance in order to protect their families against their premature death. However, we cannot test if this interpretation is valid, because our dataset does not contain any information about life expectancy.

IX. Conclusions

Our results indicate that the intensity of the income variability is not the key driver of the term insurance demand. Therefore, if income variability affects savings, this will go to the saving component within life rather than to the death insurance. Put differently, no prudence is reflected into the savings component that is devoted to the descendants. If uncertainty affects savings decisions, savings must be devoted to absorb fluctuations during the lifetime.

What is also clear is that the status of self-employment keeps being relevant in almost all specifications, also when it is instrumented, highlighting that self-employed have different preferences for savings types than employees, while they react to fluctuations in income not different from them.

From a policy perspective, we think that this study is important, because it analyzes one channel through which current and past uncertainty may affect future generations. This is relevant, especially in this moment, since some researchers and policy-makers are emphasizing the role of self-employment in reducing unemployment rates and boosting innovation and GDP levels[61]. If these policies are successful and we experience higher self-employment rates, our study predicts that (*ceteris paribus*) savings in the form of voluntary bequest and insurance wealth will increase a considerable extent. This may in turn have important implications in terms of long-term inequality and economic growth.

[61] See, for instance, (Baumol, 1990), (Baumgartner & Caliendo, 2008), (Sobel, 2008), (Thurik, Carree, van Stel, & Audretsch, 2008), (Fairlie, 2013).

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Appendix

Table A1: Summary statistics – All waves (2004 to 2012) [62]

Variable	Obs	Mean	SD	Min	Max
Self-Employed	44,702	0.114	0.317	0	1
Income risk within hh	40,572	0.015	0.136	0	24.760
Income risk over time	18,830	0.009	0.307	0	30.879
Income risk within HH* self-employed	40,572	0.003	0.024	0	3.505
Income risk over time*self-employed	18,830	0.002	0.091	0	12.161
Mother self-employed	39,391	0.081	0.273	0	1
Father self-employed	39,097	0.225	0.418	0	1
Regional self-employment	44,702	0.114	0.024	0.047	0.229
Income risk within HH*regional self-empl	40,572	0.002	0.014	0	2.321
Income risk over time*regional self-empl	18,830	0.001	0.042	0	3.815
Reg inc risk within HH by wave and occup	44,702	0.015	0.012	0.004	0.155
Reg inc risk over time by wave and occup	35,371	0.009	0.037	0.001	0.423
Reg inc risk within hh*regional self-empl	44,702	0.002	0.001	0.000	0.015
Reg inc risk over time*regional self-empl	35,371	0.001	0.005	0.000	0.048
Not Employed	44,702	0.403	0.490	0	1
Female	44,702	0.539	0.498	0	1
Age	44,702	48.850	10.049	25	65
Age^2	44,702	2.487	0.962	0.625	4.225
Married	44,702	0.846	0.361	0	1
High School	44,702	0.299	0.458	0	1
Tertiary education	44,702	0.117	0.321	0	1
Small city	44,702	0.280	0.449	0	1
Medium city	44,702	0.189	0.391	0	1
Large city	44,702	0.444	0.497	0	1
Mega city	44,702	0.087	0.282	0	1
North Italy	44,702	0.448	0.497	0	1
Centre Italy	44,702	0.201	0.401	0	1
South Italy	44,702	0.350	0.477	0	1
HHsize	44,702	3.089	1.207	1	12
# hh members <=25 / hhsize	44,702	0.249	0.234	0	1
Offspring outside hh	44,702	0.295	0.456	0	1
Has offspring	44,702	0.829	0.377	0	1
Home-owner	44,702	0.696	0.460	0	1
Log(Ind Income)	44,702	8.256	3.602	-0.709	11.629
IndIncome/Wealth	44,702	140.451	1412.763	-733.2	37426
IndIncome/HHIncome	44,619	0.515	0.349	0	4.379
Risk Averse	38,799	0.473	0.499	0	1

[62] Note: this table includes all observations in the relevant sample. The actual number of observation used in each regression may vary since not all variables are observed for each individual and in some cases the panel dimension may not be present.

SHIW panel component and attrition rate

Table A2: Households interviewed in the 1987-2012 surveys[63]

Year of first interview	Year of the survey												
	1987	**1989**	**1991**	**1993**	**1995**	**1998**	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**	**2012**
1987	8,027	1,206	350	173	126	85	61	44	33	30	28	23	21
1989		7,068	1,837	877	701	459	343	263	197	159	146	123	102
1991			6,001	2,420	1,752	1,169	832	613	464	393	347	293	244
1993				4,619	1,066	583	399	270	199	157	141	124	106
1995					4,490	373	245	177	117	101	84	75	62
1998						4,478	1,993	1,224	845	636	538	450	380
2000							4,128	1,014	667	475	398	330	256
2002								4,406	1,082	672	525	416	340
2004									4,408	1,334	995	786	631
2006										3,811	1,143	856	648
2008											3,632	1,145	806
2010												3,330	1,015
2012													3,540
Sample size	8,027	8,274	8,188	8,089	8,135	7,147	8,001	8,011	8,012	7,768	7,977	7,951	8,151
Panel hh as % total hh		14.6	26.7	42.9	44.8	37.3	48.4	45.0	45.0	50.9	54.4	58.1	56.6

Bank of Italy started to include household interviewed in the previous waves (panel households) in the SHIW since 1989. From the above table, we can see that for instance in 2012 the sample consisted of 8,151 households, with panel households accounting for 56.6% of the total sample. Of these, 21 households were interviewed since 1987, 102 since 1989, 244 since 1991 and so on, while 3,540 were interviewed for the first time in 2012. Interviewers contacted all households that had participated in at least two earlier surveys in order to form the panel sample. In addition to these, also some households interviewed only in the previous wave were contacted. It is also worth noting that all households that were formed out of the original panel households (typically because children of the original household had set up a new household) were contacted.

[63] Source: (Bank of Italy, 2014)

Variable description

This appendix contains the detailed description of all the variables used in the regression models. All monetary variables, such as income and wealth indicators, have been adjusted for inflation[64].

Term insurance is a dummy dependent variable which takes value one if the respondent owned a life insurance which pays an annuity or a lump sum to the beneficiaries when the subscriber dies. Note that this includes also mixed policies, but not pure life insurances, i.e. policies which pay an annuity or a lump sum only when the subscriber reaches a certain age[65-66]. As showed in the Table below, around 9.5% of the individual in our sample owned a term or mixed insurance. If we look at the trend over time, we can see that there had been an increase between 2004 and 2006, followed by a decrease in the subsequent waves (probably due to the 2007 financial crisis).

	Wave					
	2004	2006	2008	2010	2012	Total
Uninsured	8,278	7,819	8,082	8,136	8,102	40,417
	88.72	87.93	90.73	92.21	92.62	90.41
Insured	1,053	1,073	826	687	646	4,285
	11.28	12.07	9.27	7.79	7.38	9.59
Total	9,331	8,892	8,908	8,823	8,748	44,702
	100	100	100	100	100	100

Self-employed is an indicator variable which takes value one if the respondent was working as entrepreneur, freelancers, self-employed, artisan, owner or member of a family business, and similar. We did not include among them the uncharacteristic workers since their precarious working conditions are very different from the other categories[67].

Not Employed is an indicator variable which takes value one if the respondent was looking for his/her first job, or he/she was unemployed, retired, a housewife, a student or a wealthy individual.

Log (Individual Income) is the logarithm of the individual net (disposable) income. This individual income includes payroll income, pensions and net transfers, net self-employment income, property income. This variable takes value zero if the individual income was reported to be negative or

[64] Source: All-items HICP annual data from Eurostat

[65] Note that in 2010 and 2012 individuals were asked if they owned a life insurance, and subsequently they were asked separately if the contract included a life and/or death clause. In 2008 the follow-up question asked about the death clause but not the life one, so we can still disentangle pure death and mixed policies from pure life insurances. In 2004 and 2006 there was one question dedicated to death insurance, while life insurance had been measured together with private pension funds, so it has been possible to include these waves. Finally, in 2002 individuals were asked if they owned a life insurance, but there is no follow-up question, thus this wave has been excluded because it was impossible to distinguish between life and death insurance.

[66] We have also tried to do the empirical analysis using only pure death insurances. However, it was possible to disentangle pure and mixed policies only in 2010 and 2012 (see previous note), so there was not enough variability within individuals. In particular, between these two periods there were not enough people shifting between being employees and self-employed or between not owning and owning a pure term insurance.

[67] By doing so, these (few) kind of atypical workers ended up in the comparison group together with the employees. It may be argued that this is appropriate since often these workers were de facto equivalent to employees. Despite this, we have also tried to exclude them from the sample. Results do not change substantially. Tables available upon request.

missing. From the panel dataset, the observations in the upper and lower 0.5 percentile of the individual income distribution have been dropped.

Individual income/Household income is the ratio of individual income over the total income of the household, which provides a measure of how important the contribution of the individual is to the total disposable resources of the family.

Individual income/Wealth is the ratio of the net individual income and net wealth. Net wealth includes real assets (real estate, business equity, valuables), financial assets and financial liabilities. This ratio has been set equal to individual income if wealth was reported to be zero.

Female is a dummy variable which is equal to one if the respondent is a woman.

Age is the age of the respondent. In order to capture any concavity, we have also included among the regressors the squared of this variable (divided by 1000).

Married is an indicator variable which takes value one if the respondent declares that he/she is married or if the respondent declares that he/she is single/divorce/widow but somebody in the household declared to be the spouse or the cohabitee.

High school is an indicator variable which takes value one if the respondent has a high school diploma. Vocational schools are not included. *Tertiary education* is an indicator variable which takes value one if the respondent has at least a bachelor degree. The comparison group includes all individuals which completed a vocational training or a lower educational level.

Offspring outside hh is an indicator variable which takes value one if the respondent or his/her partner has a son or a daughter alive and living not in the same household.

Offspring is an indicator variable which takes value one if the respondent or his/her partner has a son or a daughter alive. Offspring can live in the same household or outside.

North/Centre/South is an indicator variable which takes value one if the respondent lives in North Italy/Centre Italy/South Italy and Islands (the latter being the baseline).

Small city is an indicator variable which takes value one if the respondent lives in a city with population 0-20,000. This is the baseline. *Medium city* is an indicator variable which takes value one if the respondent lives in a city with population 20,000-40,000. *Large city* is an indicator variable which takes value one if the respondent lives in a city with population 40,000-500,000. *Mega city* is an indicator variable which takes value one if the respondent lives in a city with population over 500,000.

Risk averse is a dummy variable that takes the value of one if the financial decision maker in the household has given the lowest degree of appeal to risky portfolio[68].

Number of Components below 25 years/*HHsize* is the ratio of the total number of individuals aged 25 or less in the household, divided by the total number of members in the household.

HHsize is the total number of members in the households, including the respondent and the spouse (if married/cohabiting).

Home-owner is an indicator variable which takes value one if the respondent owned the house where the household used to live.

Regional self-employment is the average value of the self-employment individual indicator across all relevant observations in a given wave and region (in Italy there are 20 regions).

Father self-employed dummy variable taking the value of one if the respondent's father was working as self-employed at the age of the respondent[69].

[68] 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 protection for 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."

[69] The main respondent is asked "what was the occupation of your mother and father at your age?". We consider self-employed people, freelancers and entrepreneurs in defining this variable.

Table A3: Variance within family - Term Insurance (D) - Sensitivity analysis

	(1) Offspring	(2) NoIncRisk	(3) NoOccStatus	(4) HQuality
Income risk (variance)	0.0502		0.0510	0.0663
	(0.0712)		(0.0565)	(0.0806)
Self-Employed	0.0282*	0.0453***		0.0774***
	(0.0169)	(0.0150)		(0.0258)
Not Employed	0.0026	0.0087		0.0092
	(0.0099)	(0.0090)		(0.0136)
Age	0.0000	-0.0023	0.0012	0.0105
	(0.0068)	(0.0057)	(0.0061)	(0.0080)
Age^2	-0.1163*	-0.0871	-0.1223**	-0.2381***
	(0.0642)	(0.0543)	(0.0583)	(0.0784)
Married	-0.0199	0.0057	-0.0102	0.0119
	(0.0305)	(0.0187)	(0.0264)	(0.0442)
High School	0.0140	-0.0005	0.0039	0.0215
	(0.0227)	(0.0201)	(0.0214)	(0.0267)
Tertiary education	0.0183	0.0028	0.0032	0.0025
	(0.0512)	(0.0424)	(0.0469)	(0.0642)
Medium city	-0.0267	-0.0199	-0.0039	0.0467
	(0.0650)	(0.0553)	(0.0563)	(0.0748)
Large city	-0.0150	-0.0265	-0.0180	0.0369
	(0.0693)	(0.0590)	(0.0609)	(0.0881)
Mega city	-0.0048	-0.0159	-0.0073	0.0324
	(0.0589)	(0.0484)	(0.0519)	(0.0733)
HH size	-0.0051	-0.0023	-0.0023	-0.0192**
	(0.0065)	(0.0058)	(0.0060)	(0.0090)
# hh members<25/HHsize	0.0111	0.0291	0.0237	0.0249
	(0.0295)	(0.0246)	(0.0270)	(0.0346)
Offsprings outside HH	0.0056	0.0051	0.0080	-0.0051
	(0.0100)	(0.0083)	(0.0087)	(0.0122)
Home-owner	0.0172	0.0141	0.0130	0.0589***
	(0.0143)	(0.0118)	(0.0130)	(0.0183)
Log(Ind Income)	0.0029***	0.0031***	0.0029***	0.0027**
	(0.0010)	(0.0009)	(0.0008)	(0.0013)
IndIncome/Wealth	-0.0000	-0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Risk Adverse	0.0068	0.0077	0.0078	0.0130*
	(0.0052)	(0.0047)	(0.0049)	(0.0072)
Constant	0.3961**	0.3987***	0.3321**	0.1238
	(0.1909)	(0.1543)	(0.1683)	(0.2151)
Time dummies	Yes	Yes	Yes	Yes
Observations	31011	38799	35215	22509

Standard errors in parentheses. Clustered SE at household level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household. Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A4: Variance over time (MA) - Term Insurance (D) - Sensitivity analysis

	(1) Offspring	(2) NoIncRisk	(3) NoOccStatus	(4) HQuality
Income risk (variance)	0.0619		-0.0013	-0.0124**
	(0.3636)		(0.0036)	(0.0062)
Self-Employed	0.0384*	0.0455***		0.0699**
	(0.0221)	(0.0151)		(0.0295)
Not Employed	0.0075	0.0084		0.0162
	(0.0119)	(0.0091)		(0.0159)
Age	0.0037	-0.0022	-0.0010	0.0032
	(0.0081)	(0.0057)	(0.0072)	(0.0100)
Age^2	-0.1626**	-0.0879	-0.1081	-0.1839*
	(0.0781)	(0.0544)	(0.0691)	(0.0978)
Married	-0.0195	0.0041	-0.0006	0.0144
	(0.0303)	(0.0192)	(0.0239)	(0.0411)
High School	0.0141	-0.0006	-0.0010	0.0402
	(0.0265)	(0.0201)	(0.0277)	(0.0355)
Tertiary education	0.0176	0.0029	-0.0075	0.0651
	(0.1123)	(0.0424)	(0.0797)	(0.0892)
Medium city	-0.1068	-0.0198	-0.0660	0.0005
	(0.0944)	(0.0553)	(0.0734)	(0.0823)
Large city	-0.1241	-0.0264	-0.0674	-0.0217
	(0.1017)	(0.0591)	(0.0787)	(0.0958)
Mega city	-0.1015	-0.0164	-0.0537	-0.0347
	(0.0821)	(0.0477)	(0.0580)	(0.0636)
HH size	-0.0133	-0.0029	-0.0129*	-0.0317**
	(0.0082)	(0.0059)	(0.0075)	(0.0126)
# hh members<25/HHsize	0.0034	0.0301	0.0116	0.0141
	(0.0327)	(0.0246)	(0.0300)	(0.0409)
Offsprings outside HH	0.0004	0.0051	-0.0048	-0.0223
	(0.0119)	(0.0083)	(0.0096)	(0.0146)
Home-owner	0.0227	0.0140	0.0142	0.0589**
	(0.0169)	(0.0118)	(0.0147)	(0.0229)
Log(Ind Income)	0.0043***	0.0034***	0.0035***	0.0040*
	(0.0014)	(0.0012)	(0.0013)	(0.0022)
IndIncome/Wealth	-0.0000	-0.0000	-0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
IndIncome/HHIncome	-0.0293	-0.0074	-0.0129	-0.0035
	(0.0194)	(0.0164)	(0.0192)	(0.0278)
Risk Adverse	0.0094	0.0077*	0.0082	0.0120
	(0.0061)	(0.0047)	(0.0056)	(0.0083)
Constant	0.4409*	0.4016***	0.4907**	0.4261
	(0.2265)	(0.1545)	(0.1960)	(0.2680)
Time dummies	Yes	Yes	Yes	Yes
Observations	16243	38720	18808	12445

Standard errors in parentheses. Clustered SE at household level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A5: Variance within family - Term Insurance (D) - Sensitivity analysis

	(1) Older	(2) Pension	(3) Age25-75	(4) Weights
Income risk (variance)	0.0463	-0.0107	0.0026	0.0177
	(0.0616)	(0.0176)	(0.0149)	(0.0183)
Self-Employed	0.0391**	0.0409**	0.0419***	0.0847***
	(0.0171)	(0.0160)	(0.0157)	(0.0107)
Not Employed	0.0099	0.0125	0.0072	-0.0094
	(0.0100)	(0.0095)	(0.0092)	(0.0064)
Age	-0.0041	0.0015	-0.0001	0.0147***
	(0.0080)	(0.0061)	(0.0051)	(0.0022)
Age^2	-0.0759	-0.1274**	0.0123	-0.1595***
	(0.0744)	(0.0584)	(0.0374)	(0.0239)
Married	-0.0045	-0.0114	-0.0040	0.0044
	(0.0288)	(0.0262)	(0.0232)	(0.0098)
High School	-0.0009	0.0044	0.0097	0.0371***
	(0.0232)	(0.0214)	(0.0191)	(0.0064)
Tertiary education	0.0304	0.0036	0.0012	0.0748***
	(0.0516)	(0.0470)	(0.0414)	(0.0111)
Medium city	-0.0127	-0.0035	-0.0018	-0.0060
	(0.0677)	(0.0566)	(0.0484)	(0.0077)
Large city	-0.0077	-0.0171	-0.0007	-0.0079
	(0.0707)	(0.0608)	(0.0526)	(0.0065)
Mega city	-0.0011	-0.0075	0.0056	-0.0106
	(0.0584)	(0.0518)	(0.0416)	(0.0100)
HH size	-0.0054	-0.0028	-0.0012	-0.0097***
	(0.0065)	(0.0060)	(0.0054)	(0.0033)
# hh members<25/HHsize	0.0223	0.0239	0.0350	0.0584***
	(0.0293)	(0.0271)	(0.0255)	(0.0179)
Offsprings outside HH	0.0053	0.0075	0.0009	0.0002
	(0.0089)	(0.0087)	(0.0072)	(0.0073)
Home-owner	0.0134	0.0132	0.0144	0.0378***
	(0.0140)	(0.0130)	(0.0117)	(0.0063)
Log(Ind Income)	0.0036***	0.0031***	0.0028***	0.0029***
	(0.0010)	(0.0009)	(0.0008)	(0.0007)
IndIncome/Wealth	-0.0000	-0.0000	-0.0000	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Risk Adverse	0.0061	0.0077	0.0083**	-0.0169***
	(0.0051)	(0.0049)	(0.0041)	(0.0053)
Constant	0.4827**	0.3200*	0.0638	-0.1986***
	(0.2239)	(0.1683)	(0.1576)	(0.0509)
Time dummies	Yes	Yes	Yes	Yes
Observations	32239	35215	43428	35215

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A6: Variance over time (MA) - Term Insurance (D) - Sensitivity analysis

	(1) Older	(2) Older	(3) Age25-75	(4) Weights
Income risk (variance)	-0.0019	-0.0012	-0.0009	-0.0012
	(0.0037)	(0.0025)	(0.0027)	(0.0043)
Self-Employed	0.0419**	0.0465**	0.0446**	0.0811***
	(0.0209)	(0.0198)	(0.0187)	(0.0150)
Not Employed	0.0115	0.0145	0.0123	-0.0015
	(0.0115)	(0.0110)	(0.0104)	(0.0102)
Age	-0.0050	-0.0006	-0.0030	0.0148***
	(0.0093)	(0.0072)	(0.0059)	(0.0035)
Age^2	-0.0732	-0.1136	0.0298	-0.1519***
	(0.0873)	(0.0699)	(0.0432)	(0.0378)
Married	-0.0004	-0.0003	0.0024	0.0230
	(0.0248)	(0.0239)	(0.0174)	(0.0145)
High School	-0.0064	-0.0006	-0.0001	0.0399***
	(0.0295)	(0.0277)	(0.0245)	(0.0094)
Tertiary education	0.0126	-0.0062	-0.0374	0.0821***
	(0.0867)	(0.0797)	(0.0755)	(0.0164)
Medium city	-0.0704	-0.0625	-0.0536	-0.0076
	(0.0851)	(0.0747)	(0.0669)	(0.0114)
Large city	-0.0700	-0.0628	-0.0312	-0.0145
	(0.0876)	(0.0793)	(0.0690)	(0.0094)
Mega city	-0.0577	-0.0488	-0.0259	-0.0074
	(0.0680)	(0.0584)	(0.0435)	(0.0153)
HH size	-0.0144*	-0.0133*	-0.0094	-0.0102*
	(0.0079)	(0.0074)	(0.0064)	(0.0054)
# hh members<25/HHsize	0.0111	0.0123	0.0215	0.0776***
	(0.0326)	(0.0300)	(0.0282)	(0.0284)
Offsprings outside HH	-0.0068	-0.0051	-0.0067	-0.0173*
	(0.0098)	(0.0096)	(0.0077)	(0.0094)
Home-owner	0.0153	0.0143	0.0123	0.0348***
	(0.0154)	(0.0147)	(0.0122)	(0.0096)
Log(Ind Income)	0.0040***	0.0038***	0.0031***	0.0030**
	(0.0015)	(0.0014)	(0.0012)	(0.0014)
IndIncome/Wealth	-0.0000	-0.0000	-0.0000	-0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
IndIncome/HHIncome	-0.0118	-0.0128	-0.0022	0.0228
	(0.0201)	(0.0192)	(0.0163)	(0.0191)
Risk Adverse	0.0075	0.0082	0.0094**	-0.0122
	(0.0059)	(0.0056)	(0.0046)	(0.0075)
Constant	0.6079**	0.4703**	0.2017	-0.3462***
	(0.2569)	(0.1965)	(0.1941)	(0.0819)
Time dummies	Yes	Yes	Yes	Yes
Observations	17742	18808	24307	18808

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income;

in 2010, the variance across all waves except 2012 of the net individual labor income;

in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A7: Variance within family - Term Insurance (D) - Sensitivity analysis

	(1) NoWealth	(2) 2Selfempl
Income risk (variance)	0.0510	0.0509
	(0.0565)	(0.0565)
Self-Employed	0.0409**	
	(0.0160)	
Self-Employed w/o employees		0.0403**
		(0.0170)
Self-Employed w/ employees		0.0418*
		(0.0215)
Not Employed	0.0126	0.0126
	(0.0095)	(0.0095)
Age	0.0015	0.0015
	(0.0061)	(0.0061)
Age^2	-0.1269**	-0.1271**
	(0.0584)	(0.0585)
Married	-0.0120	-0.0117
	(0.0262)	(0.0262)
High School	0.0045	0.0044
	(0.0214)	(0.0214)
Tertiary education	0.0036	0.0033
	(0.0469)	(0.0469)
Medium city	-0.0028	-0.0031
	(0.0566)	(0.0566)
Large city	-0.0166	-0.0168
	(0.0608)	(0.0608)
Mega city	-0.0069	-0.0074
	(0.0518)	(0.0518)
HH size	-0.0026	-0.0027
	(0.0060)	(0.0060)
# hh members<25/HHsize	0.0233	0.0233
	(0.0270)	(0.0270)
Offsprings outside HH	0.0075	0.0075
	(0.0087)	(0.0087)
Home-owner	0.0133	0.0132
	(0.0130)	(0.0130)
Log(Ind Income)	0.0031***	0.0031***
	(0.0009)	(0.0009)
Risk Adverse	0.0077	0.0077
	(0.0049)	(0.0049)
IndIncome/Wealth		-0.0000
		(0.0000)
Constant	0.3177*	0.3177*
	(0.1683)	(0.1685)
Time dummies	Yes	Yes
Observations	35215	35215

Standard errors in parentheses. Clustered SE at household level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A8: Variance over time (MA) - Term Insurance (D) - Sensitivity analysis

	(1) NoWealth	(2) 2Selfempl
Income risk (variance)	-0.0014	-0.0014
	(0.0036)	(0.0036)
Self-Employed	0.0465**	
	(0.0198)	
Self-Employed w/o employees		0.0407*
		(0.0213)
Self-Employed w/ employees		0.0556**
		(0.0262)
Not Employed	0.0144	0.0144
	(0.0110)	(0.0110)
Age	-0.0006	-0.0006
	(0.0072)	(0.0072)
Age^2	-0.1136	-0.1132
	(0.0699)	(0.0699)
Married	-0.0003	-0.0004
	(0.0239)	(0.0239)
High School	-0.0006	-0.0004
	(0.0277)	(0.0277)
Tertiary education	-0.0061	-0.0059
	(0.0796)	(0.0798)
Medium city	-0.0624	-0.0622
	(0.0746)	(0.0744)
Large city	-0.0627	-0.0628
	(0.0793)	(0.0791)
Mega city	-0.0487	-0.0487
	(0.0584)	(0.0582)
HH size	-0.0133*	-0.0134*
	(0.0074)	(0.0074)
# hh members<25/HHsize	0.0124	0.0124
	(0.0300)	(0.0300)
Offsprings outside HH	-0.0051	-0.0050
	(0.0096)	(0.0096)
Home-owner	0.0144	0.0142
	(0.0147)	(0.0147)
Log(Ind Income)	0.0038***	0.0037***
	(0.0014)	(0.0014)
IndIncome/HHIncome	-0.0129	-0.0128
	(0.0192)	(0.0192)
Risk Adverse	0.0082	0.0083
	(0.0056)	(0.0056)
IndIncome/Wealth		-0.0000
		(0.0000)
Constant	0.4700**	0.4710**
	(0.1964)	(0.1964)
Time dummies	Yes	Yes
Observations	18808	18808

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity or not reported

Table A9: Term Insurance Premium - Linear OLS and FE

	(1) Pooled OLS HH	(2) FE HH	(3) Pooled OLS Time	(4) FE Time
Income risk (variance HH)	51.7	-1040.4		
	(51.9)	(1220.9)		
Income risk (variance Time)			1.3	-6.3
			(8.7)	(15.0)
Self-Employed	181.7***	84.7**	161.4***	91.1**
	(27.0)	(35.0)	(31.4)	(43.8)
Not Employed	-2.8	27.9	-26.5	27.6
	(14.0)	(22.7)	(19.6)	(27.3)
Age	24.8***	25.0*	23.8***	13.4
	(4.5)	(15.2)	(4.9)	(17.9)
Age^2	-246.3***	-424.0**	-224.0***	-374.6*
	(48.3)	(167.5)	(51.2)	(208.0)
Married	1.8	-43.7	27.4	77.1
	(20.4)	(44.9)	(26.1)	(100.3)
High School	72.9***	93.6	76.4***	142.5
	(12.0)	(101.2)	(17.7)	(162.8)
Tertiary education	205.8***	335.6	179.8***	485.5
	(29.7)	(290.6)	(33.3)	(554.5)
Medium city	-3.2	-11.8	-16.0	-47.4
	(15.5)	(79.7)	(22.9)	(107.9)
Large city	-8.6	-35.4	-23.8	-92.2
	(12.2)	(85.6)	(17.2)	(116.0)
Mega city	37.2	-24.9	17.5	-82.0
	(33.2)	(73.2)	(41.1)	(86.4)
HH size	-7.7	8.1	-2.7	-13.5
	(8.3)	(15.1)	(13.4)	(20.3)
# hh members<25/HHsize	11.2	21.3	12.3	-64.4
	(34.9)	(74.1)	(54.2)	(63.5)
Offsprings outside HH	-15.1	47.5	-20.5	34.1
	(18.3)	(32.1)	(22.9)	(53.9)
Home-owner	47.5***	-4.6	53.9***	11.7
	(11.5)	(23.5)	(17.4)	(19.1)
Log(Ind Income)	4.5***	6.1***	2.3	7.7**
	(1.6)	(1.9)	(2.1)	(3.2)
IndIncome/Wealth	-0.0***	-0.0	-0.0***	-0.0
	(0.0)	(0.0)	(0.0)	(0.0)
Risk Adverse	-18.6*	14.1	-6.4	8.2
	(9.9)	(10.7)	(12.5)	(15.3)
IndIncome/HHIncome			24.8	-31.5
			(33.4)	(56.1)
Constant	-424.8***	-140.8	-619.8***	324.9
	(107.0)	(379.8)	(112.3)	(373.8)
Time dummies	Yes	Yes	Yes	Yes
Observations	35215	35215	18808	18808

Standard errors in parentheses. Clustered SE at household level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SHIW 2004-2012, individuals aged 25-65, household head and partner

The measurement of HH income risk has been constructed by computing, in each wave, the variance of the net individual labor income by household

The measurement of Time income risk has been constructed as follows: in 2012, the variance across all waves of the net individual labor income; in 2010, the variance across all waves except 2012 of the net individual labor income; in 2008, the variance across all waves except 2012 and 2010 of the net individual labor income, and so on.

Upper and lower 0.5 percentile of individual income dropped

Female, North Italy and Centre Italy have been dropped because of collinearity