

‘Growing out of the growing pain’: The role of financial literacy on the demand for life insurance in China

Dayong Zhang^a, Hongyang Wang^a, Alessandra Guariglia^b, and Gangzhi Fan^c

^aResearch Institute of Economics and Management
Southwestern University of Finance and Economics, China

^bDepartment of Economics, University of Birmingham, UK

^cDepartment of Real Estate Studies, Konkuk University, Korea

Abstract

Using the 2013 wave of the China Household Finance Survey (CHFS), we investigate the impact of financial literacy on the demand for life insurance in China. Our empirical results show that financial literacy significantly increases both the probability of purchasing life insurance and the premium paid. This finding is robust to measuring financial literacy in various ways. Additional regression results show that access to professional training in economics/finance plays a more important role on the demand for life insurance for relatively poorer people, and that the sensitivity of insurance demand to all our measures of financial literacy is higher for households located in relatively less developed regions.

Keywords: Financial literacy, Life insurance, Factor analysis, CHFS, China

JEL: D14, G22

1. Introduction

China has been considered as an insurer's 'dream' (Economist, 2011). With the largest population in the world and fast economic growth in the last couple of decades, the growth of the life insurance market in the country has in fact been phenomenal, to the extent that China has become the fifth biggest life insurance market in the world (McKinsey & Co. 2012). Specifically, China accounts for more than 5% of the world's premium volume and has been leading the world in terms of premium growth in recent decades¹. Recent statistics reported in *Munich Re Economic Research* (2014) show that in 2013, China has taken over France in terms of premium volume, becoming number four in the world and is likely to soon pass the UK, gaining third place. Yet, compared to the majority of other countries, the insurance penetration rate remains extremely low (see Fig. 1)². Taken together, these figures depict a very promising picture for insurance companies.

(Insert Fig. 1 here)

Yet, insurance companies in China are facing increasing problems due to capital shortfalls, increased constraints put by China's insurance regulator, and inadequate risk-management practices. These problems affect local and foreign companies alike. With reference to the latter, Moody's documents that only 11 out of 47 foreign outfits operating in China made a profit in 2010, and this profit was a 'meager sum' (The Economist, 2011). In addition, foreign insurance companies have a very low market share, which keeps dropping³. Coupled with the recent overall fall in the growth rate of life insurance premium income documented in Mc Kinsey & Co. (2012)⁴, this scenario has been described as a 'growing pain' (Economist, 2011).

A survey by McKinsey & Co. (2012) suggests that the 'growing pain' in the Chinese life insurance market could be due to the fact that the current products do not fully meet the needs of consumers. Among 2410 interviewees, the survey documents in fact that 33% cannot find the right product, and 22% of the answers indicate a mismatch between premium and

¹ Specifically, the total premium has doubled between 2007 and 2010, and the average per head premium payment has grown from 70 RMB in 1999 to 789 RMB in 2013 (China Statistics Year Book).

² The insurance penetration rate in a given year is defined as the premium underwritten in that year as a share of GDP. It denotes the level of development of the insurance sector.

³ Their market share was 8.9% in 2005 and dropped to 5.6% in 2013. (The Economist, 2011)

⁴ Yean (2013) documents a 9% overall drop in life insurance premium income in 2011.

insurance coverage. In addition, a considerable number of consumers indicate that insufficient knowledge about insurance products is the main reason preventing them from purchasing these products. McKinsey & Co.'s (2012) study also indicates that there are clear problems in the existing business models, distribution channels, as well as a general shortage of capital and labor. All together, these factors have been contributing to the slowing down of the life insurance industry.

Obviously, retreating from China would be unwise for foreign insurance companies (Yean, 2013). China's insurance market is in fact still growing and has further huge potential, especially considering the growing share of the aging population, the rapid urbanization, and the emerging middle class. Hence to take advantage of the growth in the market and grow out of the 'growing pain', action is needed. In order to design effective policies, it is critically important to understand the determinants of Chinese customers' demand for life insurance.

Several studies worldwide have studied life insurance demand in recent years (Zietz, 2003), but most of this literature has focused on developed countries. This literature has highlighted the importance of demographic, economic, and financial factors. Yet, studies on the demand for life insurance in China are scarce. One exception is Shi, Wang, and Xing (2015), who find that the demand for life insurance is positively related with the return to education and the education level of the household head. They also find that social connections play an important role, and that wealth and income are related to life insurance demand by in an inverted U- shaped relationship. Although their findings are interesting, the data used in Shi, Wang, and Xing (2015) only covers the year 2002.

Building on Shi, Wang, and Xing (2015), our work contributes to the literature in the following three ways. First, and most importantly, we focus for the first time on the role of financial literacy in determining the demand for life insurance. Several existing studies suggest that financial literacy is a very important factor affecting financial market participation in developed countries (see, for example, Feng and Seasholes, 2005; van Rooji et al., 2011; and Lusardi and Mitchell, 2014, for a survey), as well as China (Yin et al., 2014). Yet, to the best of our knowledge, the effects of financial literacy on life insurance demand

have not been widely investigated⁵. Our goal is to fill this gap in the literature, focusing on the Chinese market. We believe financial literacy is likely to play a significant role on the demand of life insurance in China because, according to our dataset, only 34.6% of respondents claim they trust insurance products. This could be due to lack of familiarity with insurance products, and could explain the low participation rate in the Chinese insurance market.

Our second contribution is that we use a much more recent dataset than Shi, Wang, and Xing (2015), namely the 2013 wave of the China Household Financial Survey (CHFS). This enables us to capture the recent trends and associated ‘growing pain’ in the Chinese insurance market.

Our final contribution is that we use a larger and more representative dataset than Shi, Wang, and Xing (2015): Our dataset covers in fact 28,156 households in the entire Chinese territory, whilst theirs only covers 6,835 urban households located in two municipalities and 10 provinces.

Our key finding is that knowledge linked directly or indirectly to insurance/finance significantly boosts demand for life insurance. This finding is robust to measuring financial literacy in various ways. Our results also show that professional training in economics/finance plays a more important role for relatively poorer people, and that the sensitivity of insurance demand to all our measures of financial literacy is higher for households located in relatively less developed regions. Our findings have a clear policy implication: In order to increase participation in insurance markets, the general public has to be educated. Hence, whilst it is important for insurance companies to tailor their products to satisfy the needs of Chinese customers, they also need to think about the best possible ways to enhance the financial knowledge of the public. Ensuring that customers are better informed will in fact result in higher levels of demand for insurance products.

The remainder of this paper starts with a brief literature review in Section 2. Section 3 provides a description of our dataset, and explains how we measure financial literacy. Section 4 presents some descriptive statistics. Empirical results are reported and discussed in Section

⁵ One exception is Mahdzar and Victorian (2013) who focusing on a very small sample of 259 Malaysian individuals, find that financial literacy does not affect life insurance demand.

5. Section 6 concludes.

2. Literature review

2.1 Theoretical and empirical research on countries other than China

Theoretical studies on life insurance can be dated back to Yaari (1965) who establishes a life-time model with uncertainty, in which the optimal level of life insurance demand depends on a utility maximization process. Hakansson (1969), Fischer (1973), and Lewis (1989) further expand this basic idea. Their model predicts that demand for life insurance depends positively on the expected probability of death, the household consumption level, and the level of risk aversion. On the other hand, the household's wealth level and the premium rate affect demand negatively. More recently, Chang (2004) expands Lewis' (1989) model to incorporate bequests, the number and age of the children, and other factors.

Since Hammond, Houston and Melander's (1967) study, which was the first to address the demand for life insurance empirically, researchers have shown strong interest in understanding why consumers demand life insurance. Zietz (2003) provides a survey of the relevant literature. Factors affecting insurance demand have been categorized into consumer-specific factors (personal and demographic factors, financial and economic factors) and more general factors (insurance product features, political factors, economic conditions). This research has often reached contradictory conclusions. For example, Berekson (1972) and Truett and Truett (1990) find a positive link between age and the demand for life insurance, whilst Ferber and Lee (1980) and Auerbach and Kotlikoff (1989) find a negative relationship. Showers and Shotick (1994), among others, move one step further, suggesting that age and demand for life insurance do not exhibit a linear relationship, but rather an inverted U-shaped relationship. Other studies focus on the role of education, family size, number of children, risk attitude and so on (e.g. Truett, 1990; Browne and Kim, 1993; Gandolfi and Miners, 1996; Giesbert, Steiner and Bendig, 2011).

The majority of empirical studies that make use of survey data to understand the determinants of life insurance demand focus essentially on the U.S. market. It is, however, important to realize that consumers in other countries may behave differently due to cultural,

economic, or other differences. This has triggered studies based on countries other than the US. Among these, Beenstock, Dickinson, and Khajuria (1986) investigate the determinants of life insurance in 10 OECD countries. Li et al. (2007) extend their analysis to 30 OECD countries using more recent data. Focusing on developing countries, Babbel (1981) finds that inflation is a significant determinant of the demand for life insurance in Brazil, whilst Truett and Truett (1990) find higher income elasticity for Mexican consumers relative to US consumers. Browne and Kim (1993) conduct a cross-country empirical study using information on 45 countries (including both developed and developing countries) and find that the dependency ratio, income, social security, inflation, and the price of the insurance have a significant impact on the demand for life insurance. Using a cross-sectional dataset for 48 developing economies in a survey by the United Nations Conference on Trade and Development (UNCTAD), Outreville (1996) shows not only the importance of income and inflation in affecting the demand for life insurance, but more distinctively, that financial development and market structure also matter. Beck and Webb (2003) use a panel of 68 countries in 1961-2000 to show that macroeconomic factors (such as inflation, income and financial development), as well as religious and institutional factors are robust determinants of life insurance purchase.

2.2 Empirical research on China

It is only recently that studies started focusing on the determinants of life insurance in China. Hwang and Gao (2003) and Hwang and Greenford (2005) are the first. Although only based on aggregate level data, their work provides valuable information on the fast-growing insurance market in China. Hwang and Gao's (2003) time series analysis suggests that economic security, education and social structure changes are the main factors affecting life insurance participation in China. Hwang and Greenford (2005) emphasize the importance of the Chinese culture and the one-child policy: The significant negative impact of the one-child policy indicates the importance of family structure in China. Consistent with international studies, the authors also find that income and education are significant determinants of life insurance demand, whilst the price of life insurance does not play a significant role.

More recently, Shi, Wang, and Xing (2015) use the 2002 China Household Income

Project (CHIP) micro-survey data to study the determinants of life insurance demand in China. They first focus on the relationship between education and the demand for life insurance. They then look at the impact of expected income, wealth, portfolio selection, and social connections. They find that the demand for life insurance is positively related with the return to education and the education level of the household head. They also find that social connections play an important role, and that wealth and income are related to life insurance demand by in an inverted U shaped relationship.

2.3 Our contribution

We build on the work by Shi, Wang and Xing (2015) by focusing on financial literacy, in addition to education, as a possible determinant of life insurance demand. Financial literacy has been found to be a very important factor affecting financial market participation in developed countries (see, for example, Feng and Seasholes, 2005; van Rooji et al., 2011; and Lusardi and Mitchell, 2014, for a survey), as well as China (Yin et al., 2014). Yet, the effect of financial literacy on life insurance demand has not been widely explored. We believe that although the level of and return to education have been found to significantly increase the chance of purchasing life insurance in several countries (e.g. Burnett and Palmer, 1984; Truett and Truett, 1990; Browne and Kim, 1993; Beck and Webb, 2003; Li et al., 2007; Shi, Wang and Xing, 2015), financial knowledge/education may be more relevant, as it contributes to reducing information asymmetries and enables therefore households to evaluate their needs to purchase life insurance more accurately. Financial literacy relates in fact more directly than general education to knowledge about financial markets, risk and insurance. In other words, a higher financial literacy can enhance the demand for life insurance given the same level of education.

Furthermore, whereas Shi et al.'s (2015) dataset only covers the year 2002, we undertake our analysis based on survey data for 2013. We believe that the situation in China in 2013 was substantially different from that in 2002 for the following reasons. First, the social security system was still poorly developed in the early 2000s, and the insurance industry was at its early stage of expansion. Eleven years later, i.e. in the year in which the CHFS survey was conducted, the social security system has been thoroughly established in both urban and

rural areas, and the life insurance industry is experiencing the ‘growing pain’ described in the introduction. Second, between 2002 and 2013, both the Chinese financial system and the Chinese economy have experienced significant changes. China now possesses the second largest stock market in the world, and is considered as the second largest economic power in the world. Third, over the period 2002-2013, the housing market has developed considerably. The commercialization of the housing market in China started in fact in 1998 and slowly changed the life style of most urban population. In 2013, housing assets are a very important part of total household wealth (over 60% on average according to the CHFS). Fourth, infrastructures have developed substantially between 2002 and 2013 and modern technologies such as the internet and mobile phones are now widespread. Finally, the fast urbanization process in China over the last decades has changed the social structure significantly⁶. Given these significant changes, the role of life insurance in China is likely to be very different in 2013 compared to 2002. Hence, a study focused on the year 2013 is likely to deliver different results compared to a study undertaken eleven years earlier, especially considering the troubled situation in which the insurance industry finds itself in at present.

Finally, our empirical analysis will be based on a larger and more representative dataset than the one used by Shin et al. (2015), namely the China Household Finance Survey (CHFS) dataset, which we describe in the next section. Specifically, our dataset covers 28,156 households in the entire Chinese territory, whilst theirs only covers 6,835 urban households distributed in two municipalities and 10 provinces.

3. The CHFS data and the measurements of financial literacy

The CHFS data is a nationwide household-level survey that collects detailed information about household finance and assets, and most importantly, insurance in China. A stratified three-stage probability proportion to size (PPS) random sample design is used. Currently, two waves of the survey are available. The first was conducted in 2011 with a sample size of 8,438 households and 29,500 individuals. The second wave was conducted in 2013 and covers 28,143 households and 97,916 individuals. The 2013 wave covers 29 provinces, 262

⁶ According to the China National Bureau of Statistics, the urbanization rate was 39.09% in 2002 and has risen to 52.57% in 2012.

counties, and 1,048 communities.

According to the CHFS data, only 8.9% of Chinese people own insurance products and this number falls to 5.1% for rural residents. At the household level, only 17.7% of all 28,143 households own life insurance products. One of the interesting questions in the survey asks whether respondents trust insurance products. The five possible answers are: ‘fully trust’, ‘trust’, ‘in between’, ‘do not trust’, and ‘extremely do not trust’. Only 34.6% of all answers fall into the ‘trust’ and ‘fully trust’ categories (see Fig. 2 and Table 2). The percentage of insured individuals in these two groups are 24.8% and 25.8%, respectively. These percentages are clearly higher than the percentages of 8.6% and 13.8% observed respectively for those who ‘do not trust’ or ‘extremely do not trust’ insurance products⁷.

The high percentage of disbelief of Chinese households for insurance products sends an important signal to insurance companies and researchers. It is clear that an increased trust of insurance products would significantly improve the participation in life insurance markets. Letting the general public know more about insurance products could be a way to improve the general trust towards insurance products.

(Insert Fig. 2 here)

Unlike education, which is normally measured by years of schooling (Beck and Webb, 2003), the level of financial literacy is often hard to quantify. Guiso and Jappelli (2008) suggest that simple subjective measures of financial knowledge might be misleading since respondents tend to overestimate their ability. It is therefore better to obtain a multi-measure of financial literacy. Angela et al. (2009), Calvet et al. (2009), and van Rooji et al. (2011) provide examples of how such measures of financial literacy can be constructed⁸.

Within the CHFS data, there are several questions that can be used to proxy for financial literacy. For example, respondents are asked whether they have taken any finance related classes and how much they have been paying attention to finance and economic news. We initially construct two indicators (*Class* and *Atten*) based on the answers given to these questions to measure the level of financial literacy. Respondents are also asked to answer

⁷ In a completely different setting, Cai et al. (2015) argue that lack of trust represents a significant barrier for farmers’ willingness to participate in a micro-insurance programme for sows in rural China. Cole et al. (2013) reach a similar conclusion focusing on rainfall insurance in rural India.

⁸ Also see Lusardi and Mitchell (2014) for a survey of recent literature on financial literacy.

three quizzes about inflation, the interest rate, and the risk of investment. Our third measure of financial literacy (*Grade*) is based on the number of correct answers they give to these quizzes⁹. Table 1 describes these financial literacy variables and reports some basic descriptive statistics. These statistics suggest that the degree of financial literacy among Chinese households is low. *Atten*, for example, measures how much attention the respondent paid to economics/finance information. It can take values ranging from 1 to 5, whereby 1 indicates people who pay extreme attention to this information, and 5 those who pay no attention at all. We observe that both the average and median of this variable are around 2, which suggests that most respondents pay little attention to finance/economic information. Furthermore, the average grade of answering the three quizzes is just 0.571, and only 7.13% out of 25,156 respondents claim to have taken economic/finance classes before.

(Insert Table 1 here)

Table 2 presents further descriptive statistics which combine the level of trust and financial literacy (as measured by the answers to the questions relative to *Atten*, *Class*, and *Grade*) with the percentage of people with insurance. Once again, we confirm that, in general, the level of financial literacy is clearly low in China no matter what measure is used. For instance, we observe that over 60% of households barely pay attention to finance/economics information¹⁰, and can therefore be considered as having limited financial knowledge. Furthermore, those groups who pay lower attention to finance/economics information also have lower participation rates in life insurance markets. For instance, 10.4% of respondents in the lowest *Atten* category have insurance, compared to 25.3% in the highest category. A similar pattern is observed for *Grade* and *Class*.

(Insert Table 2 here)

Following van Rooji et al. (2011), however, factors such as *Atten*, *Class*, and *Grade* may reflect only one side of the story. We therefore combine these indicators into a more

⁹ Detailed information on the questions and quizzes related to financial literacy are given in the Appendix. It is important to note that the three quizzes we refer to are related to the following concepts: (i) *numeracy and capacity to do calculations related to interest rates*, such as compound interest; (ii) *understanding of inflation*; and (iii) *understanding of risk diversification*. The quizzes posed to CHFS respondents are consistent with those devised by Lusardi and Mitchell (2008, 2011a, 2011b) and included in several surveys conducted in the US and other countries. See Lusardi and Mitchell (2014) for an overview of recent theoretical and empirical papers aimed at identifying the least financially literate population subgroups and at understanding the effects of financial literacy on people's behavior.

¹⁰ In particular, 36.2% of respondents answered 1 and 27.1% answered 2.

general measure. To do so, we use factor analysis to construct a more general financial literacy index. It is noteworthy that there are two recorded answers to the three finance quizzes: whether the respondents understand the question and whether they answer the question correctly. Both are used in each of the three quizzes when constructing the index.

Table 3 reports the key information for constructing this index. Eight variables are taken into consideration including *Atten*, *Class*, and the six components to the answers to the quizzes. “Eigenvalues” in panel I show that the number of factors to be used is 1 (based on the rule according to which the number of factors equals the number of eigenvalues larger than 1). “Proportion” measures the contribution of each factor (i.e. its eigenvalue over the sum of all eigenvalues), whilst “Cumulative” is simply the cumulative sum of proportions.

Panel II of Table 3 reports the KMO index (Kaiser-Meyer-Olkin measure of sampling adequacy), which ranges from 0 to 1 and indicates the extent to which the original variables can be factorized efficiently. The higher the KMO index, the more efficient the factorization. Interpretive adjectives for the KMO measure of sampling adequacy are: in the 0.90 as marvelous, in the 0.80's as meritorious, in the 0.70's as middling. We observe that the majority of KMO values in our Table are above 0.7. Furthermore, *Atten* and *Class* display values just under 0.9. In general, the KMO values of 6 of our 8 variables are at least 0.7, and satisfy therefore the minimum requirement for sample adequacy.

(Insert Table 3 here)

The loading factors measure the correlation between each variable and the factor. Let X_i represents the i th variable, and $factor_j$, the j th factor. Their relationship can be written as:

$$X_i = \sum \text{loading}_{ij} * factor_j$$

The last column in Panel II reports the β scores for each variable, which is used to construct our financial literacy index as follows:

$$Index = \sum_{i=1}^8 X_i * \beta_i$$

The index is standardized to ensure it has a mean of 0.

4. Other variables and descriptive statistics

Table 4 reports definitions of the remaining variables used in our analysis, together with their expected signs.

(Insert Table 4 here)

Following the empirical study of Shi, Wang and Xing (2015), we use two variables as proxy for the demand for life insurance. The first one (*Ins_hh*) is a dummy variable equal to 1 if the household has life insurance, and 0 otherwise. The second one (*Ln_pre**) is the logarithm of the annual average premium payment¹¹.

Our control variables include demographic and economic factors, as well as other control variables that have been found to be significant determinants of the demand for life insurance in the existing literature. The motivation for including *trust* comes from Figure 2, which suggests the presence of a positive association between trust and life insurance demand. Age and risk attitude are included after observing the non-linear patterns illustrated in Fig. 3. Focusing on US data, Showers and Shotick (1994) also identify an inverted U-shaped relationship between age and the rate of insured households, whereby the middle aged population groups (aged between 30 and 40 years) are the most likely to be insured¹².

(Insert Fig. 3 here)

Interestingly, Figure 3 shows that more risk-averse people buy less life insurance, which is rather counterintuitive at first glance. However, a recent study by Giesbert, Steiner and Bendig (2011) finds a similar pattern focusing on Ghanaian household survey data, and explain it in the light of the fact that these households consider life insurance as risky. Households that are more risk averse are therefore less prone to participate in life insurance. Like us, Giesbert, Steiner and Bendig (2011) also conclude that improving financial literacy could increase the take-up for insurance.

Our remaining control variables are taken from Shi, Wang and Xing (2015). These include education, income, wealth, financial assets, health status, housing, family size, business ownership, gender and job status. Other variables such as marriage and social

¹¹ We add 1 to this variable as several households do not pay any premium.

¹² In order to allow for a non-linear relationship between age and the demand for life insurance, we include both the age of the household head and its square among our control variables.

security (measured by pension and medical insurance possession) are also added following Zietz, 2003).

Table 5 reports descriptive statistics of all variables used in our empirical model. Our sample includes 25,156 households and all variables are winsorized at the 1% level to take outliers into account.

(Insert Table 5 here)

We observe that only 17.7% of households have life insurance¹³. The average annual premium paid is 983 RMB Yuan (equivalent to 158 USD) per household. Furthermore, the percentage of households that trust insurance products only amounts to 20.6%¹⁴.

The Table also shows that 18.6% of the households in our sample have their own business. Housing makes up on average around 61% of households' wealth (in monetary value). Furthermore, according to the CHFS data, house ownership in China is around 89%. The heavy concentration of household wealth on housing may explain households' low participation in financial markets: The average share of financial assets to total assets is in fact only 14%¹⁵. If we compare these numbers with corresponding ones in the US, the differences are striking. First, according to the Census Bureau's Housing Vacancy Survey, home ownership in the US was only 65% in 2012. Second, according to the Federal Reserve Board Survey of Consumer Finance, primary residences and other residential real estate accounted for only 37% of household total wealth in the US in the same year, while financial assets made up around 49% of total wealth.

Moving to demographic variables, the average age of the respondents in our sample is 50.52, and the average household size is about 3-4 people. This is consistent with the fact that China is becoming an aging society and its family structure has shifted towards smaller core families, rather than traditional bigger extended families. The gender ratio is slightly skewed towards males, and around 15% of respondents are not married.

¹³ Note that in order to be recorded as having life insurance, it is sufficient that only one member of the household has life insurance. If we consider the percentage of individuals having life insurance, the figure is much lower, namely 8.6%.

¹⁴ This figure includes households who responded 'fully trust' and 'trust' to the question on the extent to which they trust insurance products.

¹⁵ Financial assets include cash, bank deposits, stocks, bonds, mutual funds, derivatives and other assets. Net wealth is calculated by adding financial and non-financial assets (including businesses, real estate, vehicles, and durables) and excluding debt.

The average number of years of education is 8.845, which is roughly consistent with the Chinese education policy, characterized by 9 year compulsory education. The majority of households are risk averse (67.8%), and pension and medical insurance possession are high (78.9% and 92.4% respectively). This can be explained by the extensive social security reforms that took place in China in recent years. Finally, about 34% of respondent do not have a job or are retired.

5. Testable hypotheses and baseline specification

5.1 Testable hypotheses

Although education has been found to be an important determinant of life insurance purchase (e.g. Shi, Wang and Xing, 2015), we believe that knowledge directly linked to finance/economics may be more relevant. Specifically, because financial knowledge helps reducing information asymmetries, and enables households to treat insurance products rationally, it is likely to raise demand for life insurance, even after one controls for the level of general education. We thus propose our first testable hypothesis:

H1: Ceteris paribus, financial literacy increases households' demand for life insurance.

High-income families are likely to be more exposed to life insurance products than low-income families. For example, agents of insurance companies tend to approach the former families more often. We therefore expect the role of financial literacy on the demand for life insurance to be stronger for low-income families. This leads us to our second hypothesis:

H2. The effect of financial literacy on the demand for life insurance will be stronger for low-income households relative to their high-income counterparts.

China is a vast country with clear regional differences among the Eastern, Central, and Western areas, in terms of economic development, economic structure, culture and natural endowments. Eastern regions are traditionally richer areas with a higher population density. These regions are also characterized by a higher level of economic, as well as financial development. Central and Western regions, on the other hand, are relatively less developed both economically and financially. Households in those regions generally have a lower

participation rate in life insurance¹⁶. We therefore expect the effects of financial literacy to be higher. This leads us to our third testable hypothesis:

H3. The effect of financial literacy on the demand for life insurance will be stronger in Central and Western regions compared to Eastern regions.

5.2 Baseline specifications and estimation methodology

Given the characteristics of our two dependent variables, the following Probit and Tobit models will be estimated:

Model 1 (Probit):

$$Pr(Ins_hh = 1) = \Phi(\alpha + \beta \cdot Finance\ literacy + \gamma \cdot control + \varepsilon) \quad (1)$$

Model 2 (Tobit):

$$Ln_pre^* = \alpha + \beta \cdot Financial\ literacy + \gamma \cdot Control + \varepsilon \quad (2)$$

Our strategy is to generate baseline regressions using our three individual literacy measures, as well as the index. We will initially estimate these models using Probit and Tobit estimators. Next, we will verify the extent to which our results are robust to controlling for the possible endogeneity of the regressors using an Instrumental Variables (IV) approach.

6. Empirical results

6.1 Baseline regressions

Table 6 reports baseline regression results using Probit (columns 1 to 4) and Tobit models (columns 5 to 8), respectively. In each set of results, we use our four proxies for financial literacy, namely, *Atten.* (columns 1 and 5), *Grade* (columns 2 and 6), *Class* (columns 3 and 7), and the *Index* we constructed using the factor model (columns 4 and 8). The results show that, whichever the measure used, financial literacy consistently plays a significant role in increasing both the probability of purchasing life insurance and the average premium payment. Specifically, the marginal effects associated with the Probit models suggest that the role of financial literacy in affecting participation in life insurance ranges from 1.7% to 4.5%.

¹⁶ See Fig. 4 for details.

For the Tobit models, marginal effects range from 13.8% to 34.5%. Among all factors, the impact of taking finance/economics classes is the most influential. Taking finance/economics classes increases in fact the participation rate by 4.5%. Similarly, for existing life insurance holders, taking finance/economics classes increases the level of premium payment by 34.5%: Given the average of 983 RMB Yuan premium level, taking classes can raise this number to 1322 RMB Yuan. This is a sizable effect. These findings therefore strongly support our first hypothesis, according to which improving financial literacy is associated with a higher demand for life insurance.

Although, consistent with Shi, Wang and Xing (2015), education has positive and significant coefficients in all specification, financial literacy clearly dominates. Given the low rate of participation in China's life insurance market, the fact that knowledge, and especially finance-related training, increases both the probability of purchasing life insurance and the premium paid suggests that policies aimed at educating the general public and disseminating knowledge on financial products could contribute to increase participation in life insurance markets.

(Insert Table 6 here)

Focusing on the other control variables, we observe that trust in life insurance products (*Trust*) has a positive and significant impact on both the probability of purchasing insurance and the premium paid. This is another important result for insurance firms to consider: Whilst trying to re-design their products, they may pay more attention to ways to gain the public's trust.

Consistent with Showers and Shotick (1994), we observe that *Age* does have an inverted U-shape relationship with life insurance participation. Furthermore, in line with Giesbert, Steiner and Bendig (2011), the marginal effects of being risk-averse are significant and negative. An explanation for this finding could be that life insurance products are considered as a risky investment in China.

Income, wealth, financial assets and housing value all have a significant impact on the demand for life insurance. With the exception of housing, these variables are positively associated with households' participation in life insurance markets. This is consistent with the majority of the existing literature, as well as with Shi, Wang and Xing (2015). Yet, contrary to Shi, Wang, and Xing (2015), we find that housing wealth is negatively associated with

participation in insurance markets. In order to explain this contrasting finding, we note that the market reform aimed at commercializing the housing market in China started in 1998 and lasted several years. The housing market situation was therefore very different in 2001 (the year considered in Shi, Wang, and Xing's, 2015, study)¹⁷, and 2013 (the year considered in our study). It is possible that in 2013, house owners consider housing wealth as an effective alternative of insurance, which acts as a substitute for life insurance. Similar arguments may apply to the possession of a pension or medical insurance, which may be considered as alternatives to life insurance, and may therefore reduce the participation in life insurance markets. However, although these variables all exhibit a negative coefficient, these coefficients are not statistically significant.

Having a job appears to be negatively linked to the probability of having life insurance. This can be explained considering that in most cases, it is compulsory for the employer to offer a pension, as well as medical insurance, unemployment insurance, accidental insurance and maternity insurance (5 insurances) to their employees. It is therefore possible that employed respondent have less incentive to purchase other insurance products.

Demographic factors appear to be also, at least partly, relevant to the demand for life insurance. Specifically, consistent with Wang and Xing (2015), males are less likely than females to buy life insurance. Marriage has no significant impact on the probability of purchasing insurance, whilst family size does. Unlike economic conditions, the impact of cultural and traditions tends to be stable over time. It is therefore not surprising that our results relative to demographic factors are similar to Shi, Wang and Xing (2015), whose data refer to a much earlier period.

The results of the Tobit models (columns 5 to 8 of Table 6) confirm that financial literacy is important for the life insurance industry not only to expand their business towards new customers, but also to increase the level of participation of existing customers. As foreign companies have a relatively low market share, they may want to pay more attention to attract new customers. By contrast, the main Chinese insurers, who have a relatively bigger customer base, may benefit more from educating their existing customers, hence gaining

¹⁷ Shi, Wang, and Xing (2015) make use of the CHIP 2002 survey, which reflects what happened in 2001.

premium increases. The signs and significance of the other control variables are generally similar in the Tobit and Probit models.

6.2 Results based on an instrumental variable (IV) approach

Financial literacy may be endogenous as people who purchase life insurance products have more incentives to search for relevant information. Among our proxies for financial literacy, the only one which is unlikely to be affected by endogeneity problems is *Class*, which is based on whether respondent attended economics and/or finance classes in the past. In this subsection, we check the extent to which our results are robust to instrumenting *Atten*, *Grade*, and *Index* making use of community average levels of these financial literacy proxies¹⁸. The community is the smallest sampling unit in the CHFS survey and, in China, people belonging to the same community/neighborhood are closely linked together. We therefore believe that the average level of financial literacy in the community is closely linked with that of each member of the community. Yet, community-level financial literacy is unlikely to be affected by individuals' decisions on life insurance purchase.

Our IV results, which are reported in Table 7, suggest that our general conclusion that financial literacy has a positive effect on the probability of purchasing life insurance and on the premium paid still holds. The coefficients and marginal effects associated with *Atten*. and *Grade* are generally higher than the baseline results, and still statistically significant. In particular, a higher financial literacy is associated with an increase in the probability of purchasing life insurance ranging from 6.2% to 9.1% (columns 1-3). A positive association between financial literacy and premium payment is also observed in our IV Tobit models (columns 4-6). These findings provide further support to our Hypothesis 1. The coefficients on the control variables are generally consistent with those observed in our baseline regressions.

(Insert Table 7 here)

Arguably, other financial variables such as income, wealth or financial assets may also be

¹⁸ The CHFS survey is based on a stratified three stage probability proportion to size (PPS) random sample design. The primary sampling unit is the county (including county level cities and districts). Then, residential communities are chosen from each county. In the last stage, 25 households are chosen on average from each residential community.

subject to endogeneity problems. Table 8 produces further robustness check instrumenting those variables using their community average level as instruments. In both the IV Probit and Tobit specifications, we observe that the impact of financial literacy on life insurance purchase remains stable, whilst the marginal effects of income and financial assets increase quite significantly.

(Insert Table 8 here)

In both Tables, we report a range of tests for instrument validity. The Wald statistic is distributed as chi-square under the null of exogeneity. In both Tables, it suggests that the null hypothesis that all regressors are exogenous should be rejected, and that it is therefore appropriate to use an IV estimator. In order to verify that the excluded instruments are sufficiently correlated with the included endogenous regressors, we present the following three tests: The Cragg-Donald F statistic, which is used to test for weak identification, and the Anderson canonical correlation statistic and the KP- LM statistic, which are distributed as chi-square under the null that the equation is unidentified. The statistics reported in both Tables 7 and 8 suggest that our model is identified, meaning that the relationship between the included endogenous regressors and the instruments is sufficiently strong to justify inference from the results¹⁹.

6.3 Differentiating the effects of financial literacy by income

From what we have seen in the results above, both financial literacy and household income play an important role in determining the purchase of life insurance. We next investigate the extent to which the effect of financial knowledge on the probability of purchasing life insurance and the premium paid differs for households with different income levels. *Ceteris Paribus*, we would expect that for high income families, life insurance decisions are less sensitive to the level of financial knowledge. This sub-section is aimed at testing this hypothesis (Hypothesis 2). To this end, we add to our baseline specification interactions of our four financial literacy proxies with a dummy equal to 1 for high-income households, and

¹⁹ We do not report the Sargan test of overidentifying restrictions, as this test is only valid if the relevant equation is overidentified, with more excluded instruments than included endogenous variables, which is not the case here.

0 otherwise²⁰. The coefficients on these interaction terms will tell whether the impact of financial literacy on life insurance participation is sensitive to the level of income.

The results of this exercise are reported in Table 9. Columns 1-4 and 5-8 report IV Probit and IV Tobit estimates, respectively. Focusing on *Index* (columns 1 and 5), we observe that the coefficient on the interaction term is not statistically significant, which does not provide support for Hypothesis 2. Looking at individual components of financial literacy, we can see that the hypothesis is only supported for *Class* (columns 4 and 8). Furthermore, the interactions between *Grade* and income (columns 2 and 6) and between *Atten* and income (columns 3 and 7) attract a positive coefficient, which suggests that the higher their income, households who pay a lot of attention to economics/finance information and households who achieved higher grades in the quizzes are more likely to purchase life insurance and to pay higher premiums. The latter findings do not support Hypothesis 2.

(Insert Table 9 here)

In summary, our findings suggest that by paying more attention to economics/finance news or being able to answer finance questions more accurately, high-income households are more likely to participate in the life insurance market and to pay higher premiums relative to low-income families. The evidence relative to whether respondents have ever taken economics/finance classes paints, however, a completely different picture, whereby it is low-income families who have taken classes who are more likely to purchase life insurance and to pay higher premiums relative to high-income families. These findings have clear policy implications. In particular, they suggest that in order to improve participation in life insurance markets, it is necessary to enhance financial literacy in general, but it is particularly important to pay more attention to teaching low-income households knowledge about economics/finance. This is consistent with the notion of building an ‘inclusive financial system’ as the quotation below suggests:

"The stark reality is that most poor people in the world still lack access to sustainable financial services, whether it is savings, credit, or insurance. The great challenge before us is to address the constraints that exclude people from full participation in the financial sector..."

²⁰ High income households are defined as households with income above the median.

Together, we can and must build inclusive financial sectors that help people improve their lives."

—Kofi Annan, UN Secretary General, 2003

It is not only the financial services that poor people lack access to, but also the specialized education necessary to understand these services. Without such knowledge/training, even when financial services, or more particularly life insurance, are available, low-income families are unlikely to participate. Thus, providing free or cheap training in economics/finance could help increase participation in the financial sector, especially for the poor. Focusing on life insurance, providing such services can be a very important direction to help the country 'grow out of the growing pain'.

6.4 Differentiating the effects of financial literacy by region

China is a vast nation with clear regional differences. Ranging from the more developed coastal regions like Shanghai and Guangdong to the poorer western regions such as Ningxia and Qinghai, there are not only differences in economic development, and economic structure between regions, but more importantly, also cultural differences. In this sub-section, we take a closer look at the possible regional differences in the relationship between financial literacy and life insurance market participation. Fig. 4 shows average participation rates in life insurance and associated average premium payments for the Eastern, Central, and Western regions. Both the participation rate and premium payment in the Eastern regions clearly dominate the other two areas. Focusing on the participation rate, the average for Eastern China is around 21%, whereas the rates for Central and Western regions are 17.04% and 17.54%, respectively. In terms of average premium payment, the gap between the highest average premium (observed in the Eastern region) and the lowest (observed in the Central area) is around 500 RMB Yuan. In summary, the Central region of China has both the lowest participation rate and average premium payment, but the difference between the Western and the Central regions are marginal²¹.

(Insert Fig. 4 here)

²¹ It should be noted that Tibet and Xinjiang have been excluded from our study.

To investigate the extent to which the effects of our four financial literacy proxies on the probability of participating in life insurance markets and average premium paid differ across regions, we add two interaction terms of our four financial literacy variables with dummies equal to one for the Central and Western region respectively, and 0 otherwise. We expect the effects of financial literacy to be stronger for firms located in Western and Central areas (Hypothesis 3). IV Probit and Tobit estimates are presented in columns 1-4 and 5-8 of Table 10, respectively. Focusing on *Index, Grade and Atten.*, we observe that Western Chinese households are more sensitive to the level of financial literacy relative to the other groups. Yet, focusing on *Class*, it is households located in the Central part of China, who are more likely to participate in life insurance after having taken finance/economics classes. These results provide therefore support for our Hypothesis 3 and suggest that policies aimed at enhancing participation in life insurance markets would be most beneficial if aimed at Central and Western areas.

(Insert Table 10 here)

7. Conclusion

The conflict between a huge, fast growing insurance market and the struggling insurance industry in China requires both policy makers and practitioners to develop the right strategy to achieve success. How to ‘grow out of the growing pain’ and maintain a healthy development of the insurance market is an important and urgent question to resolve. Understanding what affects the demand for life insurance in China is obviously one of the most important tasks to get the industry back on track.

In this paper, we have empirically studied the determinants of demand for life insurance in China based on a unique dataset, the 2013 wave of the China Household Finance Survey. In particular, we have focused on a very special factor, financial literacy, which has been largely neglected in existing studies. Controlling for standard demographic, economic and other general factors that affect demand for life insurance, we found strong evidence that financial literacy plays a very important role on life insurance demand in China. More specifically, using three different measures of financial literature taken from our survey, and combining them into an index constructed using a factor model, we have consistently shown

that financial literacy increases the probability of purchasing life insurance as well as the premium paid. These conclusions are robust to using the three different measures of financial literacy, as well as the index, and to controlling for endogeneity.

Our results have clear policy implications. They suggest that the insurance industry and/or the government should consider ways to educate the general public, providing people with the economic and financial knowledge necessary to understand insurance products. Reducing information asymmetries and improving public understanding about insurance products is likely to push the general demand for insurance up.

We have also looked at the extent to which the sensitivity of insurance demand to financial literacy varies for people belonging to different income groups and regional groups. We have shown that that access to professional training in economics/finance plays a more important role on the demand for life insurance for relatively poorer people. It is therefore particularly important to give these households better access to financial knowledge through accessible training programs. Finally, we have found that the sensitivity of insurance demand to all our measures of financial literacy is higher for households located in relatively less developed regions. Overall, our findings are consistent with the general objectives proposed by the UN that policy makers and practitioners should make financial services more accessible to those who are poor and/or located in less developed regions.

References

- Angela, A. Hung, Andrew M. Parker and Joanne K. Yoong, 2009, Defining and Measuring Financial Literacy, RAND Labor and Population Working Paper series WR-708.
- Auerbach, A.T., and L.J. Kotlikoff, 1989, How Rational is the Purchase of Life Insurance? *National Bureau of Economic Research*, Working paper no. 3063.
- Babbel, D. F., and E. Ohtsuka, 1989, Aspects of Optimal Multiperiod Life Insurance, *Journal of Risk and Insurance*, 56(3): 460-481.
- Beck, T., and I. Webb, 2003, Economic, Demographic, and Institutional Determinants of Life Insurance Consumption Across Countries, *World Bank Economic Review*, 17: 51-88.
- Beenstock, M., G. Dickinson, and S. Khajuria, 1986, The Determination of Life Premiums: An International Cross-section Analysis, *Insurance: Mathematics and Economics*, 5:

261-270.

- Berekson, L. L., 1972, Birth Order, Anxiety, Affiliation and the Purchase of Life Insurance, *Journal of Risk and Insurance*, 39: 93-108.
- Browne, M. J., and K. Kim, 1993, An International Analysis of Life Insurance Demand, *Journal of Risk and Insurance*, 60: 616-634.
- Burnett, J. J., and B. A. Palmer, 1984, Examining Life Insurance Ownership Through Demographic and Psychographic Characteristics, *Journal of Risk and Insurance*, 51: 453-467.
- Cai, H., Y. Chen, H. Fang, and L-A Zhou, 2015, The Effect of Microinsurance on Economic Activities: Evidence from a Randomized Field Experiment, *Review of Economics and Statistics*, 97(2): 287-300.
- Calvet, L., John Y. Campbell and P. Sodini, 2009, Measuring the Financial Sophistication of Households, *American Economic Review*, Volume 99, Issues 2, Pages 393-398.
- Campbell, R. A., 1980, The Demand for Life Insurance: An Application of the Economics of Uncertainty, *Journal of Finance*, 35: 1155-1172.
- Chang, F.-R., 2004, Life insurance, precautionary saving and contingent bequest, *Mathematical Social Sciences*, 48: 55-67.
- Chen, R., K. A. Wong, and H. C. Lee, 2001, Age, Period and Cohort Effects on Life Insurance Purchases in the U.S, *Journal of Risk and Insurance*, 68: 303-327.
- Cole, S., X. Giné, J. Tobacman, P. Topalova, R. Townsend, and J. Vickery, 2013, Barriers to Household Risk Management: Evidence from India, *American Economic Journal: Applied Economics*, 104-135.
- Feng, Lei, and Mark Seasholes, 2005, Do Investor Sophistication And Trading Experience Eliminate Behavioral Biases In Financial Markets? , *Review of Finance*, Volume 9, Issues 3, Pages 305-351.
- Ferber, R., and L.C. Lee, 1980, Acquisition and Accumulation of Life Insurance in Early Married Life, *Journal of Risk and Insurance*, 47: 713-734.
- Fischer, S., 1973, A Life Cycle Model of Life Insurance Purchase. *International Economics Review*, 14: 131-152.
- Fitzgerald, J., 1987, The Effects of Social Security on Life Insurance Demand by Married

-
- Couples, *Journal of Risk and Insurance*, 54: 86-99.
- Gandolfi, A. S., and L. Miners, 1996, Gender-Based Differences in Life Insurance Ownership, *Journal of Risk and Insurance*, 63: 683-693.
- Giesbert, L., S. Steiner and M. Bendig, 2011, Participation in Micro Life Insurance and the Use of Other Financial Services in Ghana, *Journal of Risk and Insurance*, 78: 7-35.
- Guiso, Luigi and Tullio Jappelli, 2008, Financial Literacy and Portfolio Diversification, EUI Working Paper ECO 2008/31.
- Hakansson, N.J., 1969, Optimal Investment and Consumption Strategies under Risk and under Uncertain Lifetime and Insurance. *International Economic Review*, 10: 443-466.
- Hammond, J. D., D. B. Houston, and E. R. Melander, 1967, Household Life Insurance Premium Expenditures: An Empirical Approach, *Journal of Risk and Insurance*, 34: 397-408.
- Headen, R. S., and F. L. Lee, 1974, Life Insurance Demand and Household Portfolio Behavior, *Journal of Risk and Insurance*, 41: 685-698.
- Hwang, T. and Simon Gao, 2003. The Determinants of the Demand for Life Insurance in an Emerging Economy – the case of China, *Managerial Finance*, 29: 82-96.
- Hwang, T., and B. Greenford, 2005. A Cross-Section Analysis of the Determinants of Life Insurance Consumption in Mainland China, Hong Kong, and Taiwan, *Risk Management and Insurance Review*, 8: 103-125.
- Lewis, F. D., 1989, Dependents and the Demand for Life Insurance, *American Economic Review*, 79: 452-467.
- Li, D., F. Moshirian, P. Nguyen and T. Wee, 2007, The Demand for Life Insurance in OECD Countries, *Journal of Risk and Insurance*, 74: 637-652.
- Lusardi, A., and O. Mitchell, 2008, Planning and Financial Literacy: How Do Women Fare? *American Economic Review* 98 (2): 413–17.
- Lusardi, A., and O. Mitchell, 2011a, Financial Literacy and Planning: Implications for Retirement Well-Being. In *Financial Literacy: Implications for Retirement Security and the Financial Marketplace*, edited by O. Mitchell and A. Lusardi, 17–39. Oxford and New York: Oxford University Press.
- Lusardi, A., and O. Mitchell, 2011b, Financial Literacy around the World: An Overview.

-
- Journal of Pension Economics and Finance* 10 (4):497–508.
- Lusardi, A., and O. Mitchell, 2014, The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Literature* 52(1):5-44.
- Ma, Y. L., and N. Pope, 2003, Determinants of International Insurers Participation in Foreign Non-Life Markets, *Journal of Risk and Insurance*, 70: 235-248.
- Mahdzan N. and S. Victorian, 2013, The Determinants of Life Insurance Demand: A Focus on Saving Motives and Financial Literacy. *Asian Social Science*, 9(5); 274-284.
- Mantis, G., and R. N. Farmer, 1968, Demand for Life Insurance, *Journal of Risk and Insurance*, 35: 247-256.
- McKinsey & Co. 2012, Growth under Uncertainty :Trends, Issues, and Outlook of China’s Life Insurance Industry. Greater China Insurance Practice.
- Munich Re Economic Research, 2014, Insurance Market Outlook, May.
- Outreville, J. F., 1996, Life Insurance Markets in Developing Countries, *Journal of Risk and Insurance*, 63: 263-278.
- Pissarides, C. A., 1980, The Wealth Age Relation with Life Insurance, *Economica*, 47: 451-457.
- Shi, X., H. J. Wang, and C. Xing, 2015, The Role of Life Insurance in An Emerging Economy: Human Capital Protection, Assets Allocation and Social Interaction, *Journal of Banking and Finance*, 50: 19-33.
- Showers, V. E. and J. A. Shotick, 1994, The Effects of Household Characteristics on Demand for Insurance: A Tobit Analysis. *Journal of Risk and Insurance*, 61:492-502.
- Truett, D. B., and L. J. Truett, 1990, The Demand for Life Insurance in Mexico and the United States: A Comparative Study, *Journal of Risk and Insurance*, 57: 321-328.
- The Economist, 2011, Insurance in China. Growing pains: Insurers are Struggling in a Potentially Lucrative Market. Available at:
<http://www.economist.com/node/21541056>.
- Van Rooij, M., A. Lusardi, and R. Alessie, 2011, Financial Literacy and Stock Market Participation, *Journal of Financial Economics*, 101: 449-472.
- Yaari, M. E. 1965, Uncertain Lifetime, Life Insurance, and the Theory of the Consumer. *The Review of Economic Studies*, 32: 137-150.

- Yean, D. 2013, The Growing Pains for China Life Insurance Industry. *Society of Actuaries International News*, 59: 17-21.
- Yin, Z., Song, Q., and Wu, Y., 2014, Financial literacy, trading experience and household portfolio choice. *Economic Research Journal* 4, 62-75 (in Chinese).
- Zietz, E., 2003, An Examination of the Demand for Life Insurance, *Risk Management and Insurance Review*, 6: 159-192.

Figures and Tables

Fig. 1. Insurance intensity and penetration rate of major economies in 2013

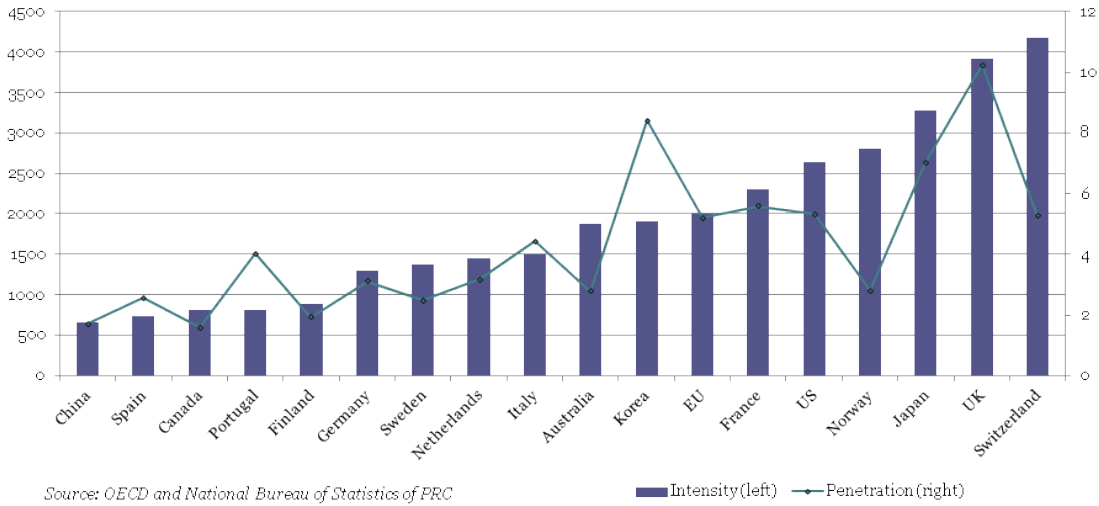
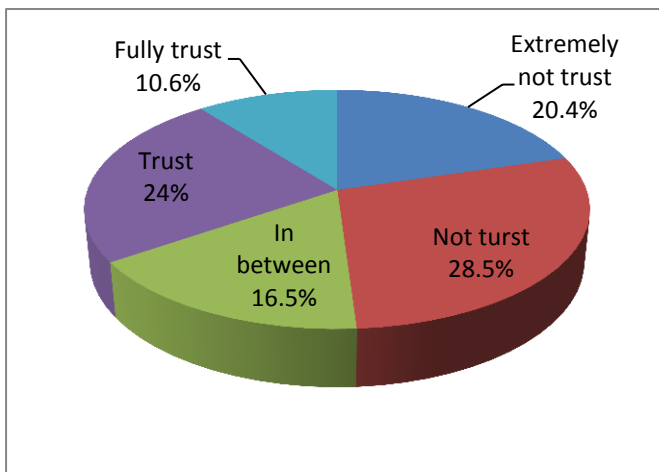
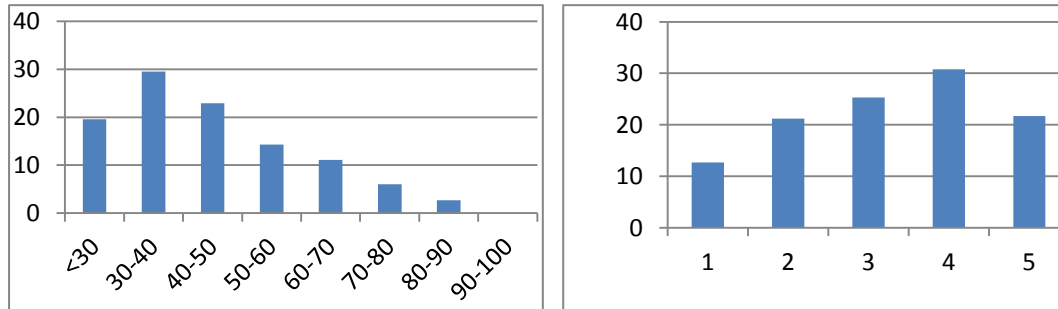


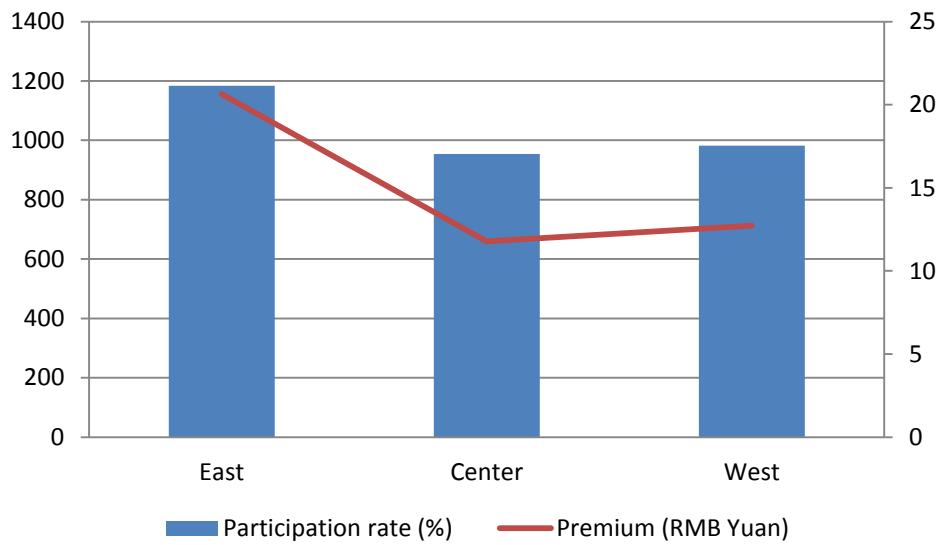
Fig. 2. Distribution of household attitude towards insurance products.



Source: CHFS survey

Fig. 3. Age, risk attitude and rate of insurance purchase

Note: The left panel presents data by age, and the right panel by risk attitude (whereby 1 stands for risk averse and 5 for risk lover). Source: CHFS survey data and authors' calculations.

Fig. 4 Participation rate and premium differences across regions

Source: CHFS survey and authors' calculations.

Table 1. Definition and description of financial literacy measures.

Variables title	Description
Atten.	Level of attention to financial/economical information
Grade	Number of correct answers to the three finance questions
Class	Dummy variable: 1 if the respondent took finance/economics classes before, and 0 otherwise
Index	Financial literacy index (constructed using factor analysis)
Instrumental variables	
Atten._avg.	Attention score averaged across the community
Grade_avg	Grade score averaged across the community
index_avg	Index score averaged across the community

Variables	Mean	Std. Dev.	Min	Median	Max	Obs.
Atten.	2.136	1.12	1	2	5	25156
Grade	0.571	0.734	0	0	3	25156
Class	0.0713	0.257	0	0	1	25156
Index	0	0.954	-1.115	0.0341	2.04	25156

Note: The index constructed via factor analysis has been standardized: It has therefore zero mean. See Section 3 and Table 3 for details about its calculation). Community is the smallest sampling unit in CHFS; 25-50 households are selected in each community.

Table 2. Some basic statistical evidence

		1	2	3	4	5
<i>Trust</i>	Insured rate	8.6	13.8	15.2	24.8	25.8
	Percentage of households	20.4	28.5	16.5	24.0	10.6
<i>Atten.</i>	Insured rate	10.4	19.0	23.7	25.9	25.3
	Percentage of households	36.2	27.1	24.9	7.9	3.9
		0	1	2	3	
<i>Grade</i>	Insured rate	12.4	23.1	27.9	29.3	
	Percentage of households	53.3	33.6	11.4	1.7	
		N		Y		
<i>Class</i>	Insured rate	16.3		36.3		
	Percentage of households	91.9		8.1		

Note: Data in this table are obtained from the CHFS and authors' calculations. Unit: %. The percentage of households in each category is calculated based on the number of households who answered the relevant question rather than the total number of households. *Trust* measures whether the respondents have faith on insurance products ranging from "extremely trust" (1) to "extremely distrust" (5). *Atten.*, *Grade* and *Class* are three alternative measures of financial literacy. The specific questions in the CHFS survey related to these measures are given in Appendix. Also see Table 1.

Table 3. Constructing a financial literacy index using factor analysis

Panel I. Factor analysis results								
	F1	F2	F3	F4	F5	F6	F7	F8
Eigenvalue	2.6155	0.9565	0.3698	0.2761	0.0728	0.0148	0.0014	-0.0002
Proportion	0.6073	0.2221	0.0859	0.0641	0.0169	0.0034	0.0003	-0.0001
Cumulative	0.6073	0.8294	0.9153	0.9794	0.9963	0.9997	1.0001	1.0000
Panel II. KMO test and factor loadings								
Variables	KMO test		Loadings		β_i			
F1. Atten.	0.8709		0.4408		0.0810			
F2. Class	0.8619		0.3293		0.0574			
F3. Quiz_interest_understand	0.7225		0.7002		0.2798			
F4. Quiz_interest_correct	0.7053		0.3312		0.0567			
F5. Quiz_inflation_understand	0.7293		0.6931		0.2560			
F6. Quiz_inflation_correct	0.6953		0.2877		0.0544			
F7. Quiz_risk_understand	0.6358		0.7907		0.3614			
F8. Quiz_risk_correct	0.6198		0.7241		0.2237			
Aggregate	0.6951							

Note: "Eigenvalues" in panel I show that the number of factors to be used is 1 (based on the rule according to which the number of factors equals the number of eigenvalues larger than 1). "Proportion" measures the contribution of each factor (i.e. its eigenvalue over the sum of all eigenvalues). "Cumulative" is simply the cumulative sum of proportions. Panel II reports the KMO (Kaiser-Meyer-Olkin measure of sampling adequacy) index, which ranges from 0 to 1 and indicates the extent to which the original variables can be factorized efficiently. The higher the KMO index, the more efficient the factorization. Interpretive adjectives for the KMO measure of sampling adequacy are: in the 0.90's, marvelous; in the 0.80's, meritorious; in the 0.70's, middling. The score β is also reported for each variable and is used to calculate our financial literacy index.

Table 4. Variable definition (excluding financial literacy)

Variable title	Description	
Dependent var.		
ins_hh	Dummy variable equal to 1 if the households has insurance, and 0 otherwise	
ln_pre*	log(annual average premium payment+1)	
Independent var.	Descriptions	Expected signs
Trust	Dummy variable equal to 1 if the respondent trusts insurance products, and 0 otherwise	+
Business	Dummy variable equal to 1 if the household has his/her own business, and 0 otherwise	?
ln_inc	Natural logarithm of the household's total income (we add 1 to avoid taking the log of zero values)	+
ln_net	Natural logarithm of the household's net wealth (we add 1 to avoid taking the log of zero values)	+
House	Share of housing value in total wealth	?
Fin_asset	Share of financial assets in total wealth	+
Age	Age of the respondent	+
Age^2	Squares of the age of the respondent	-
Gender	Gender of the respondent (1 for male, 0 for female)	-
Married	Marital status (1 for married/cohabiting, 0 otherwise)	-
Edu	Years of education	+
Hsize	Family size	+
Risk_averse	Dummy variable equal to 1 if the respondent is risk averse, and 0 otherwise	-
Risk_love	Dummy variable equal to 1 if the respondent is risk lover, and 0 otherwise	+
Health	Dummy variable equal to 1 if the respondent is healthy, and 0 otherwise	-
Pension	Dummy variable equal to 1 if the household has a pension, and 0 otherwise	-
Medical	Dummy variable equal to 1 if the household has medical insurance, and 0 otherwise	-
Rural	Dummy variable equal to 1 if the household is a rural resident, and 0 otherwise	-
Job	Dummy variable equal to 1 if the respondent has a job, and 0 otherwise	?

Note: Expected signs are given following the existing literature. Household wealth is calculated by aggregating the value of household cash, bank deposits, stocks, bonds and other financial assets, business assets, real estate, cars and other non-financial assets.

Table 5. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Median	Max	Obs.
Ins_hh	0.177	0.382	0	0	1	25156
Premium	983.0	4602	0	0	64500	25156
Trust	0.206	0.404	0	0	1	25156
Business	0.186	0.389	0	0	1	25156
Ln_inc	10.31	1.386	0	10.55	17.73	25156
Ln_net	12.24	1.703	0	12.43	15.85	25156
House	0.610	0.334	0	0.719	0.996	25156
Fin_asset	0.140	0.208	0	0.0505	0.947	25156
Age	50.52	14.65	17	50	84	25156
Gender	0.549	0.498	0	1	1	25156
Married	0.844	0.363	0	1	1	25156
Edu	8.845	4.390	0	9	22	25156
Hsize	3.555	1.619	1	3	10	25156
Risk_averse	0.678	0.467	0	1	1	25156
Risk_love	0.107	0.309	0	0	1	25156
Health	0.444	0.497	0	0	1	25156
Pension	0.789	0.408	0	1	1	25156
Medical	0.924	0.265	0	1	1	25156
Rural	0.431	0.495	0	0	1	25156
Job	0.660	0.474	0	1	1	25156

Source: CHFS survey. See Table 4 for definitions of all variables.

Table 6. Baseline regressions (marginal effects)

	Probit 1	Probit 2	Probit 3	Probit 4	Tobit 1	Tobit 2	Tobit 3	Tobit 4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Atten	0.017*** (7.67)				0.138*** (6.91)			
Grade		0.015*** (4.94)				0.138*** (4.95)		
Class			0.045*** (5.81)				0.345*** (5.05)	
Index				0.033*** (11.09)				0.288*** (10.65)
Trust	0.081*** (14.49)	0.081*** (14.51)	0.082*** (14.65)	0.080*** (14.36)	0.701*** (13.92)	0.700*** (13.88)	0.706*** (14.01)	0.693*** (13.79)
Business	0.022*** (3.67)	0.022*** (3.73)	0.023*** (3.96)	0.021*** (3.61)	0.227*** (4.30)	0.231*** (4.37)	0.241*** (4.55)	0.224*** (4.25)
Ln_inc	0.015*** (6.85)	0.015*** (6.97)	0.015*** (6.91)	0.014*** (6.49)	0.132*** (6.79)	0.134*** (6.88)	0.133*** (6.85)	0.125*** (6.45)
Ln_net	0.040*** (18.78)	0.041*** (19.13)	0.041*** (19.37)	0.039*** (17.90)	0.363*** (18.32)	0.369*** (18.61)	0.373*** (18.86)	0.347*** (17.51)
House	-0.037*** (-3.56)	-0.038*** (-3.68)	-0.038*** (-3.70)	-0.037*** (-3.61)	-0.348*** (-3.74)	-0.360*** (-3.86)	-0.360*** (-3.87)	-0.353*** (-3.80)
Fin_asset	0.095*** (6.37)	0.097*** (6.50)	0.099*** (6.69)	0.088*** (5.89)	0.774*** (5.77)	0.787*** (5.86)	0.814*** (6.07)	0.707*** (5.27)
Age	0.014*** (11.64)	0.014*** (11.93)	0.014*** (12.05)	0.014*** (11.86)	0.129*** (11.93)	0.132*** (12.20)	0.133*** (12.30)	0.131*** (12.13)
Age^2	-0.000*** (-14.01)	-0.000*** (-14.23)	-0.000*** (-14.41)	-0.000*** (-13.99)	-0.002*** (-14.25)	-0.002*** (-14.46)	-0.002*** (-14.62)	-0.002*** (-14.24)
Gender	-0.032*** (-6.62)	-0.028*** (-5.81)	-0.028*** (-5.84)	-0.029*** (-6.03)	-0.331*** (-7.55)	-0.298*** (-6.83)	-0.299*** (-6.85)	-0.307*** (-7.03)
Married	-0.000 (-0.03)	0.001 (0.12)	0.003 (0.45)	0.000 (0.05)	0.066 (0.97)	0.074 (1.08)	0.094 (1.36)	0.070 (1.02)
Edu	0.006*** (8.45)	0.007*** (9.03)	0.006*** (8.47)	0.005*** (6.23)	0.057*** (8.27)	0.060*** (8.71)	0.057*** (8.30)	0.043*** (6.05)
Hsize	0.011*** (6.05)	0.010*** (5.94)	0.010*** (5.86)	0.011*** (6.48)	0.103*** (6.48)	0.102*** (6.40)	0.101*** (6.31)	0.110*** (6.92)
Risk_averse	-0.017*** (-2.97)	-0.020*** (-3.60)	-0.021*** (-3.63)	-0.015*** (-2.58)	-0.141*** (-2.78)	-0.167*** (-3.30)	-0.170*** (-3.37)	-0.119*** (-2.36)
Risk_love	0.001 (0.13)	0.004 (0.55)	0.002 (0.26)	0.002 (0.26)	0.014 (0.21)	0.041 (0.60)	0.024 (0.35)	0.021 (0.31)
Health	0.007 (1.44)	0.007 (1.51)	0.007 (1.49)	0.007 (1.43)	0.084* (1.94)	0.088** (2.01)	0.087** (1.99)	0.084* (1.94)

Pension	-0.005 (-0.71)	-0.004 (-0.68)	-0.005 (-0.70)	-0.007 (-1.06)	-0.051 (-0.88)	-0.051 (-0.86)	-0.050 (-0.85)	-0.072 (-1.24)
Medical	-0.009 (-0.97)	-0.008 (-0.88)	-0.008 (-0.87)	-0.008 (-0.93)	-0.102 (-1.28)	-0.095 (-1.19)	-0.095 (-1.19)	-0.099 (-1.25)
Rural	-0.029*** (-4.40)	-0.027*** (-4.12)	-0.028*** (-4.23)	-0.022*** (-3.42)	-0.255*** (-4.30)	-0.239*** (-4.03)	-0.245*** (-4.14)	-0.200*** (-3.38)
Job	-0.014** (-2.32)	-0.013** (-2.29)	-0.014** (-2.38)	-0.013** (-2.16)	-0.164*** (-3.14)	-0.162*** (-3.10)	-0.166*** (-3.19)	-0.156*** (-2.99)
province	yes	yes	yes	yes	yes	yes	yes	Yes
N	25156	25156	25156	25156	25156	25156	25156	25156
Pseudo R ²	0.149	0.148	0.148	0.152	0.073	0.073	0.073	0.074

Note: This table reports marginal effects. Standard errors are in brackets. See Tables 1 and 4 for definitions of all variables.

*** Denotes statistical significance at 1% level.

** Denotes statistical significance at 5% level.

* Denotes statistical significance at 10% level.

Table 7. IV regression results instrumenting for the financial literacy variables

	lvprobit 1 (1)	lvprobit 2 (2)	lvprobit 3 (3)	lvtobit 1 (4)	lvtobit 2 (5)	lvtobit 3 (6)
Atten	0.062*** (6.14)			0.545*** (5.49)		
Grade		0.091*** (6.22)			0.817*** (5.47)	
Index			0.090*** (7.68)			0.820*** (7.09)
Trust	0.076*** (13.18)	0.073*** (12.39)	0.074*** (13.03)	0.677*** (13.06)	0.658*** (12.50)	0.663*** (12.82)
Business	0.019*** (3.27)	0.020*** (3.35)	0.019*** (3.22)	0.213*** (3.91)	0.219*** (4.00)	0.209*** (3.86)
Ln_inc	0.013*** (5.81)	0.013*** (5.98)	0.011*** (5.14)	0.118*** (5.86)	0.122*** (6.06)	0.105*** (5.18)
Ln_net	0.036*** (14.79)	0.036*** (14.73)	0.032*** (12.99)	0.333*** (15.66)	0.338*** (15.95)	0.303*** (13.62)
House	-0.030*** (-2.93)	-0.032*** (-3.15)	-0.032*** (-3.12)	-0.303*** (-3.15)	-0.324*** (-3.36)	-0.317*** (-3.31)
Fin_asset	0.082*** (5.41)	0.080*** (5.34)	0.068*** (4.42)	0.684*** (4.92)	0.683*** (4.87)	0.551*** (3.89)
Age	0.013*** (10.84)	0.014*** (11.95)	0.014*** (11.95)	0.125*** (11.37)	0.136*** (12.28)	0.135*** (12.23)
Age^2	-0.000*** (-13.15)	-0.000*** (-13.90)	-0.000*** (-13.60)	-0.002*** (-13.76)	-0.002*** (-14.38)	-0.002*** (-14.03)
Gender	-0.041*** (-7.94)	-0.026*** (-5.35)	-0.030*** (-6.17)	-0.422*** (-8.45)	-0.290*** (-6.42)	-0.321*** (-7.16)
Married	-0.004 (-0.56)	0.001 (0.08)	-0.000 (-0.00)	0.032 (0.45)	0.072 (1.02)	0.067 (0.95)
Edu	0.004*** (3.92)	0.004*** (4.17)	0.001 (0.67)	0.035*** (4.02)	0.037*** (4.27)	0.006 (0.59)
Hsize	0.012*** (6.73)	0.012*** (6.76)	0.014*** (7.55)	0.117*** (7.05)	0.119*** (7.06)	0.133*** (7.83)
Risk_averse	-0.002 (-0.35)	-0.009 (-1.48)	-0.001 (-0.15)	-0.015 (-0.24)	-0.073 (-1.31)	0.003 (0.05)
Risk_love	-0.008 (-0.94)	0.003 (0.35)	-0.003 (-0.36)	-0.062 (-0.85)	0.029 (0.41)	-0.022 (-0.32)
Health	0.005 (1.11)	0.006 (1.29)	0.006 (1.22)	0.072 (1.61)	0.081* (1.80)	0.076* (1.71)
Pension	-0.007 (-1.10)	-0.009 (-1.33)	-0.013* (-1.92)	-0.076 (-1.26)	-0.090 (-1.48)	-0.127** (-2.07)

Medical	-0.011 (-1.21)	-0.009 (-0.97)	-0.010 (-1.11)	-0.124 (-1.51)	-0.106 (-1.29)	-0.116 (-1.42)
Rural	-0.030*** (-4.67)	-0.023*** (-3.51)	-0.014** (-2.01)	-0.277*** (-4.55)	-0.214*** (-3.48)	-0.126** (-2.00)
Job	-0.013** (-2.30)	-0.013** (-2.25)	-0.011** (-1.98)	-0.166*** (-3.11)	-0.165*** (-3.07)	-0.150*** (-2.81)
Provincial dummies	Y	Y	Y	Y	Y	Y
N	25156	25156	25156	25156	25156	25156
Anderson LM	1209.219***	1138.914***	1612.164***	1209.219***	1138.914***	1612.164***
Cragg-Donald F	1267.806***	1190.599***	1719.202***	1267.806***	1190.599***	1719.202***
Wald	19.937***	25.981***	24.195***	18.177***	22.349***	23.242***
KP_LM	1081.416***	1041.969***	1429.431***	1081.416***	1041.969***	1429.431***

Note: This table reports marginal effects. Standard errors are in brackets. The Wald statistic is distributed as chi-square under the null of exogeneity. The Cragg-Donald F statistic is used to test for weak identification. KP refers to the Kleibergen-Paap statistic. The Anderson canonical correlation statistic and the KP- LM statistic are distributed as chi-square under the null that the equation is unidentified. See Tables 1 and 4 for definitions of all variables.

*** Denotes statistical significance at 1% level.

** Denotes statistical significance at 5% level.

* Denotes statistical significance at 10% level.

Table 8 IV regressions instrumenting for the financial literacy variables, as well as for income, wealth and financial assets

	Ivprobit1	Ivprobit2	Ivprobit3	Ivprobit4	Ivtobit1	Ivtobit2	Ivtobit3	Ivtobit4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Atten	0.045*** (4.62)				0.388*** (4.13)			
Grade		0.063*** (4.22)				0.537*** (3.72)		
Class			0.037*** (4.64)				0.280*** (3.86)	
Index				0.069*** (5.59)				0.612*** (5.24)
Belief	0.076*** (13.31)	0.075*** (12.83)	0.080*** (14.30)	0.076*** (13.28)	0.685*** (13.09)	0.673*** (12.71)	0.709*** (13.77)	0.673*** (12.96)
Business	0.024*** (3.19)	0.025*** (3.35)	0.028*** (3.77)	0.024*** (3.22)	0.274*** (3.97)	0.285*** (4.12)	0.308*** (4.49)	0.274*** (3.99)
Ln_inc	0.039*** (3.30)	0.038*** (3.27)	0.042*** (3.59)	0.034*** (2.86)	0.414*** (3.80)	0.417*** (3.80)	0.440*** (4.07)	0.374*** (3.38)
Ln_net	0.037*** (4.86)	0.036*** (4.69)	0.040*** (5.25)	0.031*** (4.01)	0.306*** (4.31)	0.296*** (4.18)	0.327*** (4.67)	0.248*** (3.50)
House	0.010 (0.39)	0.008 (0.29)	0.012 (0.47)	-0.002 (-0.08)	0.111 (0.46)	0.085 (0.35)	0.128 (0.53)	-0.001 (-0.00)
Fin_asset	0.194*** (2.82)	0.184*** (2.66)	0.221*** (3.17)	0.137** (1.98)	1.638** (2.55)	1.549** (2.41)	1.844*** (2.88)	1.111* (1.74)
Age	0.013*** (10.89)	0.014*** (11.77)	0.014*** (11.79)	0.014*** (11.80)	0.129*** (11.43)	0.137*** (12.16)	0.136*** (12.17)	0.136*** (12.16)
Age^2	-0.000*** (-13.24)	-0.000*** (-13.87)	-0.000*** (-14.19)	-0.000*** (-13.61)	-0.002*** (-13.81)	-0.002*** (-14.34)	-0.002*** (-14.54)	-0.002*** (-14.06)
Gender	-0.035*** (-6.62)	-0.024*** (-4.91)	-0.025*** (-5.13)	-0.027*** (-5.57)	-0.361*** (-7.22)	-0.268*** (-5.88)	-0.274*** (-6.07)	-0.293*** (-6.47)
Married	-0.007 (-0.86)	-0.003 (-0.35)	-0.001 (-0.11)	-0.002 (-0.30)	0.011 (0.16)	0.043 (0.59)	0.057 (0.79)	0.047 (0.65)
Edu	0.002 (1.61)	0.002** (2.16)	0.003*** (3.42)	0.000 (0.21)	0.016 (1.55)	0.021** (2.06)	0.030*** (3.26)	0.001 (0.08)
Hsize	0.008*** (2.62)	0.008*** (2.63)	0.006** (2.19)	0.009*** (3.15)	0.070*** (2.61)	0.070*** (2.59)	0.058** (2.20)	0.086*** (3.12)
Risk_averse	-0.005 (-0.72)	-0.010* (-1.73)	-0.018*** (-3.08)	-0.004 (-0.65)	-0.039 (-0.66)	-0.090 (-1.61)	-0.149*** (-2.86)	-0.030 (-0.51)
Risk_love	-0.007 (-0.81)	0.001 (0.18)	0.000 (0.02)	-0.002 (-0.32)	-0.052 (-0.71)	0.016 (0.23)	0.008 (0.11)	-0.019 (-0.27)
Health	0.002 (0.44)	0.003 (0.69)	0.004 (0.71)	0.004 (0.80)	0.046 (0.98)	0.057 (1.21)	0.058 (1.24)	0.061 (1.31)

Pension	-0.021*** (-2.87)	-0.020*** (-2.86)	-0.020*** (-2.77)	-0.021*** (-2.90)	-0.210*** (-3.10)	-0.209*** (-3.09)	-0.201*** (-3.00)	-0.211*** (-3.15)
Medical	-0.014 (-1.57)	-0.012 (-1.34)	-0.012 (-1.34)	-0.012 (-1.34)	-0.155* (-1.85)	-0.138* (-1.65)	-0.136* (-1.65)	-0.136 (-1.64)
Rural	-0.010 (-1.27)	-0.007 (-0.83)	-0.007 (-0.86)	-0.004 (-0.44)	-0.090 (-1.20)	-0.058 (-0.77)	-0.059 (-0.80)	-0.031 (-0.41)
Job	-0.016** (-2.48)	-0.015** (-2.45)	-0.016** (-2.55)	-0.014** (-2.24)	-0.197*** (-3.37)	-0.196*** (-3.35)	-0.199*** (-3.43)	-0.183*** (-3.15)
Province	yes	yes	yes	yes	yes	yes	yes	yes
N	25156	25156	25156	25156	25156	25156	25156	25156
Anderson LM	604.468***	599.629***	605.327***	600.618***	604.468***	599.629***	605.327***	600.618***
Cragg-Donald F	154.536***	153.269***	206.348***	153.528***	154.536***	153.269***	206.348***	153.528***
Wald	34.345***	38.653***	25.143***	31.517***	36.593***	39.549***	29.063***	34.514***
KP_LM	508.976***	511.275***	511.911***	508.038***	508.976***	511.275***	511.911***	508.038***

Note: This table reports marginal effects. Standard errors are in brackets. The Wald statistic is distributed as chi-square under the null of exogeneity. The Cragg-Donald F statistic is used to test for weak identification. KP refers to the Kleibergen-Paap statistic. The Anderson canonical correlation statistic and the KP- LM statistic are distributed as chi-square under the null that the equation is unidentified. See Tables 1 and 4 for definitions of all variables.

*** Denotes statistical significance at 1% level.

** Denotes statistical significance at 5% level.

* Denotes statistical significance at 10% level.

Table 9. Differentiating the effects of financial literacy by income groups

	lvprobit 1 (1)	lvprobit 2 (2)	lvprobit 3 (3)	lvprobit4 (4)	lvtobit 1 (5)	lvtobit 2 (6)	lvtobit 3 (7)	lvtobit 4 (8)
Index	0.089*** (6.25)				0.845*** (6.11)			
Index_income	-0.000 (-0.02)				-0.056 (-0.54)			
Grade		0.077*** (4.55)				0.669*** (4.01)		
Grade_income		0.020** (2.01)				0.199** (2.14)		
Atten			0.056*** (5.42)				0.482*** (4.79)	
Atten_income			0.010*** (3.14)				0.103*** (3.54)	
class				0.088*** (5.83)				0.757*** (5.63)
class_income				-0.056*** (-3.29)				-0.527*** (-3.53)
Trust	0.075*** (13.08)	0.073*** (12.45)	0.075*** (13.15)	0.082*** (14.68)	0.664*** (12.85)	0.658*** (12.53)	0.674*** (13.03)	0.708*** (14.05)
business	0.019*** (3.20)	0.021*** (3.52)	0.020*** (3.42)	0.023*** (3.85)	0.206*** (3.78)	0.230*** (4.19)	0.222*** (4.09)	0.235*** (4.44)
Ln_inc	0.012*** (5.11)	0.010*** (3.71)	0.007*** (2.63)	0.016*** (7.38)	0.108*** (5.25)	0.091*** (3.67)	0.062** (2.41)	0.146*** (7.37)
Ln_net	0.033*** (13.10)	0.036*** (14.80)	0.035*** (14.63)	0.041*** (19.39)	0.304*** (13.67)	0.338*** (15.97)	0.330*** (15.50)	0.373*** (18.88)
House	-0.032*** (-3.13)	-0.034*** (-3.28)	-0.032*** (-3.06)	-0.038*** (-3.67)	-0.317*** (-3.31)	-0.338*** (-3.51)	-0.319*** (-3.32)	-0.357*** (-3.83)
Fin_asset	0.068*** (4.45)	0.079*** (5.28)	0.078*** (5.21)	0.099*** (6.68)	0.554*** (3.92)	0.671*** (4.79)	0.651*** (4.67)	0.813*** (6.06)
Age	0.014*** (11.96)	0.014*** (12.05)	0.013*** (10.92)	0.014*** (12.04)	0.134*** (12.20)	0.137*** (12.37)	0.126*** (11.46)	0.133*** (12.29)
Age^2	-0.000*** (-13.61)	-0.000*** (-14.03)	-0.000*** (-13.27)	-0.000*** (-14.40)	-0.002*** (-13.98)	-0.002*** (-14.50)	-0.002*** (-13.89)	-0.002*** (-14.60)
Gender	-0.030*** (-6.12)	-0.026*** (-5.31)	-0.041*** (-7.84)	-0.029*** (-5.88)	-0.321*** (-7.14)	-0.287*** (-6.38)	-0.416*** (-8.34)	-0.301*** (-6.89)
Married	0.000 (0.01)	-0.000 (-0.03)	-0.005 (-0.61)	0.004 (0.57)	0.070 (0.99)	0.065 (0.91)	0.028 (0.40)	0.102 (1.48)
Edu	0.001 (0.75)	0.004*** (4.22)	0.004*** (3.82)	0.006*** (8.42)	0.007 (0.66)	0.037*** (4.32)	0.034*** (3.91)	0.057*** (8.25)

Hsize	0.014*** (7.52)	0.012*** (6.77)	0.012*** (6.63)	0.010*** (5.84)	0.132*** (7.75)	0.119*** (7.07)	0.115*** (6.93)	0.100*** (6.30)
Risk_averse	-0.001 (-0.20)	-0.009 (-1.48)	-0.002 (-0.33)	-0.021*** (-3.70)	-0.001 (-0.02)	-0.074 (-1.32)	-0.014 (-0.23)	-0.174*** (-3.45)
Risk_love	-0.003 (-0.34)	0.003 (0.38)	-0.007 (-0.94)	0.002 (0.22)	-0.021 (-0.30)	0.031 (0.44)	-0.062 (-0.84)	0.022 (0.32)
Health	0.006 (1.22)	0.006 (1.27)	0.005 (1.02)	0.007 (1.46)	0.076* (1.70)	0.079* (1.77)	0.067 (1.50)	0.085** (1.96)
Pension	-0.012* (-1.89)	-0.008 (-1.28)	-0.007 (-1.08)	-0.005 (-0.72)	-0.125** (-2.05)	-0.086 (-1.42)	-0.074 (-1.23)	-0.050 (-0.86)
Medical	-0.010 (-1.10)	-0.009 (-0.98)	-0.010 (-1.19)	-0.008 (-0.85)	-0.116 (-1.41)	-0.106 (-1.29)	-0.121 (-1.47)	-0.093 (-1.16)
Rural	-0.013** (-1.99)	-0.022*** (-3.38)	-0.029*** (-4.45)	-0.028*** (-4.24)	-0.125** (-1.98)	-0.205*** (-3.35)	-0.263*** (-4.31)	-0.246*** (-4.15)
Job	-0.011* (-1.96)	-0.014** (-2.42)	-0.014** (-2.42)	-0.013** (-2.28)	-0.146*** (-2.70)	-0.176*** (-3.25)	-0.175*** (-3.26)	-0.160*** (-3.07)
Province	Yes	yes	yes	yes	yes	yes	yes	yes
N	25156	25156	25156	25156	25156	25156	25156	25156
Pseudo R ²				0.149				0.073
Anderson LM	1618.154***	1141.583***	1209.240***		1618.154***	1141.583***	1209.240***	
Cragg-Donald F	862.980***	596.737***	633.889***		862.980***	596.737***	633.889***	
Wald stat.	25.976***	35.138***	27.911***		24.851***	32.338***	28.440***	
KP_LM	1432.945***	1044.552***	1082.462***		1432.945***	1044.552***	1082.462***	

Note: This table reports marginal effects. Standard errors are in brackets. Index_income, grade_income, atten_income, and class_income represent interactions of the financial literacy proxies with a dummy equal to 1 for households with income above the median, and 0 otherwise. The Wald statistic is distributed as chi-square under the null of exogeneity. The Cragg-Donald F statistic is used to test for weak identification. KP refers to the Kleibergen-Paap statistic. The Anderson canonical correlation statistic and the KP- LM statistic are distributed as chi-square under the null that the equation is unidentified. See Tables 1 and 4 for definitions of all variables.

*** Denotes statistical significance at 1% level.

** Denotes statistical significance at 5% level.

* Denotes statistical significance at 10% level.

Table 10. Differentiating the effects of financial literacy by region

	lvprobit 1	lvprobit 2	lvprobit 3	lvprobit 4	lvtobit 1	lvtobit 2	lvtobit 3	lvtobit 4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Index	0.078*** (5.85)				0.714*** (5.52)			
Index_middle	0.009 (0.73)				0.091 (0.78)			
Index_west	0.030** (2.41)				0.282** (2.48)			
Grade		0.063*** (3.57)				0.563*** (3.25)		
Grade_center		0.032 (1.46)				0.301 (1.46)		
Grade_west		0.074*** (3.40)				0.696*** (3.38)		
Atten			0.051*** (4.00)				0.445*** (3.65)	
Atten_center			0.010 (0.61)				0.086 (0.58)	
Atten_west			0.029* (1.81)				0.295** (1.99)	
Class				0.038*** (3.60)				0.287*** (3.13)
class_center				0.041** (2.28)				0.271* (1.72)
class_west				-0.008 (-0.47)				-0.017 (-0.11)
Trust	0.075*** (13.09)	0.073*** (12.40)	0.076*** (13.16)	0.083*** (14.77)	0.686*** (13.16)	0.682*** (12.75)	0.702*** (13.31)	0.723*** (14.38)
Business	0.027*** (4.63)	0.028*** (4.79)	0.028*** (4.80)	0.035*** (6.01)	0.280*** (5.16)	0.294*** (5.34)	0.292*** (5.35)	0.340*** (6.53)
Ln_inc	0.016*** (7.04)	0.018*** (8.27)	0.018*** (7.93)	0.021*** (10.10)	0.157*** (7.69)	0.183*** (9.02)	0.175*** (8.64)	0.202*** (10.55)
Ln_net	0.017*** (10.36)	0.018*** (11.37)	0.018*** (11.54)	0.022*** (14.11)	0.159*** (10.91)	0.178*** (12.17)	0.176*** (12.21)	0.197*** (14.23)
House	-0.022** (-2.17)	-0.021** (-2.12)	-0.018* (-1.74)	-0.024** (-2.30)	-0.230** (-2.42)	-0.229** (-2.37)	-0.191** (-1.99)	-0.232** (-2.52)
Fin_asset	0.040*** (2.73)	0.050*** (3.44)	0.054*** (3.68)	0.069*** (4.72)	0.324** (2.34)	0.429*** (3.08)	0.459*** (3.34)	0.573*** (4.35)

Age	0.015*** (12.56)	0.015*** (12.61)	0.013*** (11.27)	0.015*** (12.87)	0.137*** (12.56)	0.141*** (12.66)	0.127*** (11.53)	0.137*** (12.80)
Age^2	-0.000*** (-14.08)	-0.000*** (-14.42)	-0.000*** (-13.52)	-0.000*** (-15.19)	-0.002*** (-14.27)	-0.002*** (-14.69)	-0.002*** (-13.92)	-0.002*** (-15.12)
Gender	-0.029*** (-6.13)	-0.025*** (-5.29)	-0.043*** (-8.35)	-0.028*** (-5.73)	-0.296*** (-6.60)	-0.265*** (-5.81)	-0.425*** (-8.41)	-0.269*** (-6.20)
Married	0.002 (0.21)	0.002 (0.24)	-0.003 (-0.39)	0.006 (0.76)	0.018 (0.26)	0.020 (0.29)	-0.020 (-0.28)	0.055 (0.81)
Edu	0.001 (0.90)	0.005*** (4.76)	0.004*** (4.40)	0.008*** (10.16)	0.009 (0.87)	0.043*** (4.93)	0.041*** (4.61)	0.069*** (10.15)
Hsize	0.014*** (7.91)	0.012*** (7.14)	0.012*** (6.95)	0.010*** (5.97)	0.145*** (8.51)	0.132*** (7.78)	0.127*** (7.60)	0.107*** (6.76)
Risk_averse	-0.001 (-0.21)	-0.009 (-1.54)	-0.002 (-0.25)	-0.023*** (-4.10)	-0.006 (-0.11)	-0.082 (-1.44)	-0.013 (-0.21)	-0.203*** (-4.04)
Risk_love	-0.001 (-0.18)	0.005 (0.69)	-0.007 (-0.91)	0.004 (0.52)	-0.012 (-0.16)	0.052 (0.72)	-0.066 (-0.89)	0.040 (0.59)
Health	0.008 (1.59)	0.008* (1.70)	0.007 (1.53)	0.010** (2.06)	0.098** (2.18)	0.104** (2.29)	0.096** (2.12)	0.115*** (2.66)
Pension	-0.011* (-1.71)	-0.007 (-1.15)	-0.005 (-0.84)	-0.002 (-0.36)	-0.106* (-1.73)	-0.073 (-1.18)	-0.052 (-0.86)	-0.020 (-0.35)
Medical	-0.010 (-1.11)	-0.008 (-0.93)	-0.011 (-1.26)	-0.007 (-0.81)	-0.103 (-1.26)	-0.091 (-1.10)	-0.117 (-1.42)	-0.079 (-0.99)
Rural	-0.016** (-2.40)	-0.026*** (-4.06)	-0.036*** (-5.61)	-0.034*** (-5.28)	-0.166*** (-2.61)	-0.265*** (-4.27)	-0.353*** (-5.78)	-0.321*** (-5.47)
Job	-0.013** (-2.26)	-0.015** (-2.57)	-0.015*** (-2.63)	-0.016*** (-2.81)	-0.133** (-2.47)	-0.151*** (-2.77)	-0.153*** (-2.83)	-0.157*** (-3.03)
Province	yes	Yes	yes	yes	yes	yes	yes	yes
N	25156	25156	25156	25156	25156	25156	25156	25156
Pseudo R ²				0.149				0.073
Anderson LM	1600.137***	1137.047***	1208.826***		1600.137***	1137.047***	1208.826***	
Cragg-Donald F	568.465***	396.153***	422.424***		568.456***	396.153***	422.424***	
Wald	32.609***	40.432***	29.719***		32.157***	36.431***	28.584***	
KP_LM	1405.372***	1033.677***	1088.024***		1405.372***	1033.677***	1088.024***	

Note: This table reports marginal effects. Standard errors are in brackets. Middle (western) denotes a dummy variable equal to 1 if the household leaves in the middle (western) part of China, and 0 otherwise. The Wald statistic is distributed as chi-square under the null of exogeneity. The Cragg-Donald F statistic is used to test for weak identification. KP refers to the Kleibergen-Paap statistic. The Anderson canonical correlation statistic and the KP- LM statistic are distributed as chi-square under the null that the equation is unidentified. See Tables 1 and 4 for definitions of all variables.

*** Denotes statistical significance at 1% level.

** Denotes statistical significance at 5% level.

* Denotes statistical significance at 10% level.

Appendix

A1. Questions in the CHFS related to financial literacy

The answers to question A4002a and A4002b are respectively used to construct the variables *Atten.* and *Class.*

A4002a *How much do you pay attention to Economics and Finance related information?*

1. Extremely
2. A lot
3. Occasionally
4. Rarely
5. Not at all

A4002b *Have you ever attended Economics/Finance classes?*

1. Yes
2. No

The answers to the following three quizzes relate to the calculation of the variable *Grade*, which is obtained by summing the number of correct answers given. If the respondent chooses the answers ‘Do not know how to calculate’ or ‘Never heard both’, they will be considered not familiar with these financial terms. People choosing these answers are likely to have lower financial literacy than those who do not give correct answers but understand the basic concepts. As discussed in Section 3, we take this into account into the calculation of our index of financial literacy.

A4003 *You have been given 100 Yuan, and the annual interest rate in a bank is 4%. If you deposit this money in the bank for 5 years now, how much will you get in 5 years time?*

1. Less than 120 Yuan
2. More than 120 Yuan
3. Equal to 120 Yuan
4. Do not know how to calculate

A4005 *You have been given 100 Yuan, and the annual interest rate in a bank is 4% and the inflation rate is 3%. The amount of things you can buy one year from now if you deposit this money in the bank will be:*

1. more than what you can buy now
2. the same as what you can buy now
3. less than what you can buy now
4. Do not know how to calculate

A4007 *Do you think buying a stock is riskier than buying equity funds?*

1. Yes

2. No

3 Never heard of 'stocks'

4 Never heard of 'equity funds'

5. Never heard of both