The role of life insurance in an emerging economy: Human capital protection, assets allocation and social interaction ☆

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A R T I C L E   I N F O

A B S T R A C T

In this paper, we provide micro-econometric evidence on the determinants of life insurance demand in China, the largest emerging market in the world. We employ the China Household Income Project (CHIP) dataset for the year 2002 in the analysis. The timing is ideal, because of the nature of the less well developed capital markets and social security systems in China in 2002, which sets a suitable stage to study the insurance demand behavior of emerging markets. The results indicate that both the human capital protection motive and the asset allocation motive are important in explaining the purchase of life insurance in China. In addition, we present three empirical regularities: (1) the positive correlation between the returns to human capital and the returns to market portfolio decrease the demand for life insurance; (2) both the current wealth and future income of a household exert curvilinear impacts on life insurance demand; (3) the breadth of a households social connections has substantial impacts on life insurance demand.

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1. Introduction

Although considerable research has been devoted to the study of life insurance demand in developed countries, our understanding of such demand in emerging markets remains very limited. This void is unfortunate, not only because emerging markets provide ample growth opportunity for insurance companies, but also because from the theoretical point of view, life insurance should play a particularly important role in economies where the capital market is less developed (Mayers and Smith, 1983). The latter also indicates that the emerging market would be an ideal testing ground for various hypotheses of life insurance demand. In this paper, we use a unique dataset from China to test the life insurance demand hypotheses found in the literature. A straightforward hypothesis, based on a large body of literature, focuses on the

use of life insurance to smooth household consumption given the mortality risk of the main wage-earner (e.g., Campbell, 1980; Fischer, 1973; Pliska and Ye, 2007). At the same time, some literature emphasizes the substitutability/complementarity of life insurance compared to other financial assets over the policy holders life cycle, and investigates how the demand for the insurance/assets is affected by correlations between the returns (e.g., Chen et al., 2006; Huang and Milevsky, 2008). To our best knowledge, interesting hypotheses from the latter body of literature have not been subject to empirical tests. Thanks to a unique dataset, we are able to test many existing hypotheses of life insurance demand. In addition, we also propose and test a new hypothesis: that life insurance purchase is affected by the households participation in informal social networks.

Human capital, based on which labor income is derived, is one of the most important assets for a household to support consumption. Because human capital expires upon the death of the individual, household consumption faces uncertainty arising from the main wage earners uncertain life span. Yaari (1965) is among the first to consider the effect of random life span on the households consumption allocation problem, showing how life insurance can be used to remove uncertainty. Campbell (1980) argues that because of mortality risk, labor income uncertainty dominates capital income uncertainty for most households. He uses a model to

show the optimal insurance purchase under uncertain life spans and demonstrates how current wealth and future income affect optimal insurance. Later studies, including Pliska and Ye (2007), extend the model by relaxing assumptions and adopting more sophisticated modeling methods. This line of research highlights the relationship between the present value of human capital and the demand for life insurance, and how changes in the wealth and income affect purchase decisions.

It is also proposed in the literature that households use both the life insurance and (risky and riskless) financial assets to smooth consumption, and that the demand for the insurance and the assets are jointly determined in an asset allocation problem (Headen and Lee, 1974; Mayers and Smith, 1983; Doherty, 1984; Borch, 1990). In recent studies (e.g., Chen et al., 2006 and Huang and Milevsky, 2008), the asset allocation problem has been casted in a life-cycle model, where the allocation decision may change at different stages of the main wage -earners life cycle. One of the important implications derived from these models is that because of the correlations between the returns of human capital and other financial assets, the demand for life insurance would changes along with the financial market performance.

We employ the China Household Income Project (CHIP) dataset of the year 2002 to test the various hypotheses. Our purpose is not to test one theory against another. Quite contrary, since the literature provides complementary rather than competing hypotheses, our goal is to see how each of the hypotheses holds in the largest emerging market in the world China and to investigate the main determinants of life insurance purchase decisions in China.

We are the first to use the CHIP dataset to test life insurance demand hypotheses presented in the literature. This dataset is known for its high quality and rich information on household income, asset portfolios, consumption, and social networks. Owing to the social and economic conditions in the early 2000s in China, the 2002 dataset is particularly suitable for testing the demand for life insurance. In the early 2000s, China's country-wide social security system was still poorly developed,[3] while at the same time the insurance market in China was thriving. China's annual growth rate of insurance premiums peaked in 2002, at an unprecedented 37% during the period from 1998 to 2012.[4] Life insurance products were also fully developed in 2002, and they remained in the market in the following decade. With an inadequate social security system to protect human capital and a less than well-developed capital market to diversify the risk, the insurance market was an attractive alternative that drew strong demand. This background sets up an ideal stage for testing the hypotheses in the literature.

Consistent with the classic theory, we find that the need to protect the wage earner's human capital underlies the demand for life insurance in China. The demand increases with the return to education as well as the education level of the household head, with experience and health status controlled. The evidence also points to asset allocation as another important factor affecting the household's purchase of life insurance in China. In particular, we find in our sample that life insurance complements rather than substitutes other financial assets, such as stocks, bonds, and deposits. This finding echoes the insight of Headen and Lee (1974) that insurance demand tends to be positively correlated with the demand for other financial assets, particularly during periods of rapid economic growth.

The rich information in the CHIP 2002 dataset enables us to uncover three novel empirical regularities of life insurance purchase in China. The first is that *the positive correlation of returns to human capital and market portfolio decreases the demand for life insurance.* The result supports the central claims of Chen et al. (2006) and Huang and Milevsky (2008), and may indicate the household's desire to diversify portfolio risk. We are perhaps the first to provide empirical evidence supporting this novel theoretical result.

The second empirical regularity is that *a household's current wealth and future income have curvilinear impacts on life insurance demand.* This finding validates Pliska and Ye's (2007) argument that the effects of current wealth and future income should be distinguished in studying life insurance demand. Our results show that wealth and income have hump-shape effects on life insurance demand. An implication is that there may exist threshold levels of wealth and income beyond which the demand for life insurance may be reversed. The finding also calls for modeling strategies for both theoretical and empirical research that would take into account the nonlinear effects of income and wealth when studying life insurance demand.

The third empirical regularity is that *social connections have substantial impacts on life insurance demand in China.* This new finding introduces a novel behavioral perspective on life insurance demand. It suggests that behavioral factors also play substantial roles in insurance markets in an emerging economy. Also, this empirical finding poses a challenge to the current modeling of life insurance demand, which largely fails to account for social interactions.

This paper makes two important contributions to the literature on life insurance demand. First, we provide micro-econometric evidence on the life insurance demand in China, a topic that has largely escaped academic scrutiny thus far. The prevailing literature centers on industrial and developed countries such as the US (e.g., Fitzgerald, 1989; Bernheim, 1991; Showers and Shotick, 1994; Holtz-Eakin et al., 2001; Lin and Grace, 2007), with only a few studies on developing countries (Babbel, 1981; Truett and Truett, 1990; Outreville, 1990; Outreville, 1996; Chen et al., 1998). Although a small number of studies have been conducted on the topic of China's life insurance demand, they are aggregate data-based and are not undertaken at the household level (e.g., Hwang and Gao, 2003; Hwang and Greenford, 2005). Informative micro-econometric evidence on China is virtually missing from the discussion. Since China is the largest and most rapidly growing emerging market in the world, it is essential to understand the Chinese market in order to form a full picture of life insurance demand on a global scale.

Second, we provide new evidence to contribute to the empirical literature on life insurance demand, most notably the three aforementioned empirical regularities. We provide supporting evidence for recent theoretical advances, as seen in Pliska and Ye (2007), Huang and Milevsky (2008), and Chen et al. (2006). Methodologically, we add to the literature by proposing the addition of square terms of income and current wealth variables to the insurance demand regression to identify curvilinear effects, for which we find significant evidence.

The rest of the paper is arranged as follows: Section 2 recaptures the theories on life insurance demand and states the hypotheses to be tested. Section 3 presents data, defines variables, and explains the econometric methods. Section 4 reports the main results and discusses how the particularities of China's institutions affect the results. Section 5 conducts various robustness checks. Section 6 concludes the paper.

2. Hypotheses

It is widely accepted that a basic motive of for holding life insurance is to protect the household from mortality risk (i.e., lifetime

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