Courant Research Centre
'Poverty, Equity and Growth in Developing and Transition Countries: Statistical Methods and Empirical Analysis'

Georg-August-Universität Göttingen
(founded in 1737)

Discussion Papers

No. 198

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Februar 2016

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Risk-type and preference-based selection and stability of funeral insurance associations in Thailand*

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Abstract

Funeral Aid Associations (FAAs) in Northeast Thailand offer micro funeral insurance at affordable premium levels while they barely risk-rate potential members. Due to the set-up of FAAs, high-risk individuals have a monetary incentive to join the insurance. Compared to many other micro insurance schemes, however, FAAs do not seem to face adverse effects of this unregulated selection of high-risk individuals into the schemes. We show that this is partly due to a counter-balancing selection of a sufficient number of low-risk individuals, who deliberately buy insurance despite what their risk types would advice. This is particularly the case for married individuals who self-select into the associations at relatively lower risks. We provide a theoretical framework showing that marriage may reduce mortality risk and at the same time increase insurance demand based on altruistic tendencies towards the spouse. Our results suggest that this preference based selection is able to balance 13 percent of the high-risk type selection based on age, health, and gender.

JEL Codes: D14, D82, G22, O12.
Keywords: Asymmetric Information, Adverse Selection, Advantageous Selection, Microinsurance, Thailand.

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* **Acknowledgements.** This research was funded by the German Research Council (DFG) in its RTG 1723 and FOR 756. The authors thank Attakrit Leckcivilize and Andreas Wagener as well as participants of the RTG 1723 Workshop 2014 for valuable comments and suggestions.

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1 Introduction

Adverse selection is a significant problem for the insurability of risks in community-base micro-insurance organizations, as it shifts premiums upwards and potentially destabilizes insurance schemes (Biener and Eling, 2012).[1,2] Classical insurance practices, like risk-rated premiums, signaling, or entry regulations, could help prevent this selection. However, they are often not applied in micro-insurance contexts, as collecting the necessary information is costly and organizational capacity is limited (Biener, 2013). Several solutions tailored to the micro-insurance context have been suggested to minimize adverse selection, e.g. coupling micro agricultural insurance to weather indices (Gine et al., 2008), providing micro health insurance only to entire households (Wang et al., 2006), and coupling micro life insurance to the take up of loans (Biener and Eling, 2012). While these innovative strategies are only partly successful to support insurance stability (mainly due to implementation difficulties), one line of micro insurance – namely funeral insurance – seems to get along without engaging in any such effort. In this study we take a closer look at Funeral Aid Associations (FAAs) in Northeast Thailand to shed light on the mechanisms that contribute to the stability of funeral insurance schemes.

FAAs in Thailand offer insurance at an equal premium to all irrespective of risk type. Naturally, they attract high-risk individuals who, under this set-up, expect to profit from membership in monetary terms. Insurance stability may be threatened by this selection, if the insurance does not simultaneously attract a sufficient number of low-risk individuals who are willing to pay more for the insurance compared to what their risk type would advise. In case the latter selection is not sufficient to counter-balance the former selection, the insurance would face an imbalance between expected liabilities and collected premiums. As a consequence the association would

[1]In a systematic review of the literature on micro-insurance, based on 131 studies Biener and Eling (2012) identify information asymmetries as the leading cause hindering the insurability of risks. Further, the authors note that insufficient resources to evaluate risks, small size of insurance groups, and high premiums seem to be prominent problems.

[2]Examples of studies that report on destabilized micro-insurance schemes or adverse selection in micro-insurance are, for instance, Wang et al. (2006), Criel and Waelkens (2003), De Allegri et al. (2006), Polonsky et al. (2009), Supakankunti (2000), Ito and Kono (2010), McCord and Osinde (2005), Morduch (2006), Giesbert et al. (2011).

likely become insolvent unless it raises premium levels, which may lead to a drop-out of lower-risk individuals who now perceive the insurance as too expensive, and so forth. This so called insurance death-spiral would eventually lead to a collapse of the insurance. Despite the absence of risk-rated premiums and strict entry regulations, however, funeral insurance schemes do not seem to face such adverse effects due to the inflow of high-risk individuals. Instead, FAAs have affordable premiums and stable or even rising member numbers (see e.g. McCord and Tatin-Jaleran, 2013). In their pioneering qualitative studies on funeral societies, Bryant and Prohmmo (2002) and Dercon et al. (2006) suggest strong intra-community ties as an explanation for this phenomenon.[3] The authors argue that social ties imply solidarity and inclusiveness and lead to a deliberate willingness of low-risk individuals to subsidize high-risk members of their community.

In this study, we provide an additional explanation for the stability of funeral insurance schemes at relatively low premium rates. We argue, that stability not necessarily relies on social cohesion (alone), but might as well be driven by altruistic feelings of married individuals towards their spouse. One or both partners may altruistically seek insurance driven by empathy for the other.[4] At the same time, marriage may impact on mortality risk, i.e. through social control of health practices (Umberson (1992), Lewis and Butterfield (2007)) and positive effects of social support on health (Robles et al. (2014)). To analyze these somewhat complex effects we adopt the standard theory for insurance demand as found e.g. in Rothschild and Stiglitz (1976) and adjust its determinants. We show that marriage may lead to insurance entry at relatively lower mortality risk levels. Based on this theoretical analysis we test the hypothesis that demand patterns of married individuals help to stabilize funeral insurance schemes. Our empirical strategy unfolds in three steps. First, we show that risk-type based selection into FAAs is present in the sample region. Second, we

[3]The authors investigate patterns of selection into funeral societies in Thailand, Ethiopia, and Tanzania. Dercon et al. (2006) find that larger households are relatively more represented in the funeral insurance schemes in Ethiopia and Tanzania and note that those households potentially benefit from the equal-contribution per household rule more than smaller households. Further, Bryant and Prohmmo (2002) provide evidence that certain riskier households are much more likely to receive money from funeral societies in Northeast Thailand, while paying equal premiums.

[4]See e.g. Batson and Coke (1981), who study empathy driven altruism.

show that low-risk preference-based selection into FAAs coexists, i.e. being married is related to higher insurance demand at relatively lower mortality risk levels on average. Finally, we show that this latter selection (partially) balances the former selection and investigate the magnitude of this effect.

The rest of this paper is organized as follows: In Section 2 we give an overview on funeral expenses, how funeral associations in Northeast Thailand emerged, and how they are set up. Next we provide a theoretical analysis in Section 3. We then turn to examine the stability and selection into the insurance empirically. The methods and data used in our empirical analyses are described in detail in Section 4.1 to 4.3. In Section 4.4 we provide evidence for the existence of risk-type and preference related selection. Particularly, we show (in line with our theoretical analysis) that stability in face of this selection seems to rely on a deliberate willingness of married individuals to pay more for insurance compared to what their risk type would suggest. Section 5 discusses the potential threats for future stability arising from these findings and briefly sketches policy implications.

2 Background

To facilitate the understanding of our theoretical and empirical analyses, it is important to become aware of some key features of the FAA insurance scheme. After briefly giving some background information for the great demand for funeral insurance in the region of our study, we will, therefore, provide details on how the FAA insurance mechanism is set up, on the characteristics and comparability of FAAs across the region, and eligibility criteria for FAA membership.

General. Funeral insurance is a popular financial service in rural Northeastern Thailand. The region is mainly populated by Buddhists, who traditionally spend great amounts of financial resources on funeral ceremonies. The costs for the religious ceremony held at the temple and other funeral-related expenses usually range between THB 50,000 and THB 100,000 (ADB, 2013) which exceeds the annual disposable income of an average household in the region by far.[5,6] Yet, funeral expenses are to a large extent socially enforced. A failure in keeping up with the tradition entails high social costs, i.e. families lose prestige and respect among their fellow villagers. As the timing of one's death is usually not predictable, households in the region highly value an insurance mechanism that mitigates the financial burden of unexpectedly having to arrange a funeral ceremony. To meet this need, based on traditional, informal village-based insurance groups, the Bank of Agriculture and Agricultural Cooperatives (BAAC) initiated the foundation of larger-scale, rather formal funeral aid associations (FAA) throughout the BAAC branch network, starting from 1980.[7,8] Nearly 5.5 million individuals were member of an FAA by the end of 2002. A total of 405 borrower FAAs and 116 depositor FFAs were reported to operate at that time all over the country (Sompadung, 2013).[9]

Insurance mechanism, premiums, and benefits. The main features of FAAs' insurance mechanism are their pay-as-you-go character, their policy of equal premiums for all, set according to average community risk, and their resolution to provide full insurance coverage to all (McCord and Tatin-Jaleran, 2013): FAAs follow a pay-as-you-go system, where the total amount of benefits paid out in a given period is divided by the total number of FAA members. The resulting share of costs is the premium each member

[5]Mangmeechai (2015) reports the minimum cost for a basic Theravada Buddhist funeral starting at USD 945 (THB 28,000) and for a Thai Mahayana Buddhist funeral starting at USD 1340 (THB 40,000).

[6]The average annual household income in our sample was THB 82,000 in 2008.

[7]The tradition of giving donations to the family of a deceased is deeply rooted in village communities. In many villages, it led to the establishment of semi-formal burial societies – village-based insurance groups relying on the principle of mutual aid. Typically, these groups are represented by an elected or selected board of members (often village authorities), which is responsible for collecting equal contributions from all members and making payments to the bereaved. The organizational structure and administrative costs are kept at a minimum. For a detailed description of an example of a village-based burial society, see the qualitative study of Bryant and Prohmmo (2002).

[8]Initially, the bank's rationale was to offer insurance as a financial service coupled to BAAC loans to secure repayments in case a borrower or spouse passed away. Funeral associations became so popular, though, that they attracted demand independent of BAAC loan status. Consequentially, the bank promoted the establishment of additional funeral associations for depositors from 1992 onwards (Sompadung, 2013).

[9]A total of 90.3 percent of all insured individuals are members of a borrower FAA. The average number of members is 12300 for borrower FAAs and 4600 for depositor FAAs (Sompadung, 2013).

has to pay for the respective period.[10] The insured sum, i.e. the benefits subsequently paid out at the event of death, is usually THB 100,000 per person (which is sufficient to cover typical funeral costs in the region).[11] Some FAAs prefix a higher eventual payment. Yet, within one FAA, the benefit payment is equal for each member. Hence, the FAA premium is a linear function of the insured sum and a contribution parameter which represents the average mortality risk in the community for a given period (1.2 percent as of 2002). Most importantly to note here, FAAs do not pursue any activities to set premiums according to individual risk types (e.g. screening, signaling, risk classification, etc.).

Comparability of FAAs. Our later analysis is based on the assumption that FAAs are comparable to a large extend in the way they operate. In general, BAAC-supported FAAs are non-profit insurance groups which are independent and self-organized. Yet, the BAAC acts as a promoter and supporter of FAAs by providing office space for rent, guidance in administration and management, and payment services. Further, all BAAC-supported FAAs are based on the legal foundation of the Funeral Association Act (initially issued in 1974, recent version 2002) that regulates the organizational structure and procedures, upper limits of administrative fees, etc.[12] Due to the technical assistance of the bank and the regulatory framework, FAAs are quite comparable across the country. They might differ, however, in levels of premiums (also due to differences in administrative efficiency), the number of members, and average member characteristics. While these differences across FAAs are of no concern for our theoretical analysis (our conclusions are transferable across FAAs varying in the above characteristics), we have to take them into account when investigat-

[10]Further, all members share the limited administrative costs of the association equally.

[11]When a member passes away, the insured sum is paid out to pre-assigned beneficiaries through the BAAC system. Beneficiaries are assigned by each member in an official document deposited with the FAA. The decision how to utilize the compensation is left to the recipients. Most importantly, BAAC does not have any legal claims on the proceeds to cover outstanding loan re-payments. Most members honor their debts with the bank, though. Nevertheless, out of the THB 6.7 billion which were paid out in 2002, only 18 percent were used for debt settlements (Sompadung, 2013).

[12]See Sompadung (2013) and the Funeral Association Act,B.E. 2545 (2002) on http://www.lawreform.go.th.

ing FAAs empirically. We will do so by offering an alternative specification that allows for a variation in FAA characteristics (as described in more detail in Section 4.3).

Eligibility for membership. Our analysis below further relies on the assumption that membership in an FAA is voluntary, permitted, and accessible for (almost) everybody. Membership in a funeral association is available, but not compulsory, for BAAC clients (borrowers and depositors) and their spouse (McCord and Tatin-Jaleran, 2013). Not being a BAAC customer – although formally being a requirement for membership in many BAAC-supported FAAs – is not a de facto restriction for membership, though. BAAC clients are allowed to remain members of the FAA when their relationship with the bank ends. Anecdotal evidence suggests that individuals that are not yet with the BAAC strategically open bank accounts or take small loans (a service practically available to any resident of rural areas) to become eligible for FAA membership. In an official report the bank states that for many people, FAA membership is more important than the loan itself (Sompadung, 2013). Further, eligibility is officially restricted to healthy individuals between the age of 20 and 65 (McCord and Tatin-Jaleran, 2013). Good health has to be certified by a physician, yet, no in-depth health examinations are necessary. In fact, only severely ill individuals are rejected when applying for membership. In addition, there is reason to believe that membership is accessible for the majority of the population in the region. To show this, we will provide statistics on several factors that potentially may restrict FAA accessibility along with the description of our data in Section 4.1. To sum up, membership is widely accessible, membership decisions are made voluntarily and applications are usually accepted. The few supply-side restrictions restrictions – age above 65 and extreme illness – will be accounted for in our analysis below.

3 Theoretical Analysis

To substantiate our empirical findings below we seek to derive three key messages relevant for the stability of an FAA in the theoretical analysis unfolding in this section: First, according to the FAA set-up certain high-risk individuals have a monetary incentive to join the insurance scheme. Second, this selection is a potential threat to the FAA's stability if it is not counter-balanced by a sufficient number of low-risk types, who select into the insurance scheme despite losing in expected monetary terms. Third, this latter selection is possibly achieved due to increased individual preferences for insurance (other than risk aversion) that draw individuals into FAA insurance schemes at relatively lower risk levels. By inducing a downward shift in the average mortality risk of the attracted member pool this selection may contribute to FAA stability at relatively low premium levels. To understand how we arrive at these conclusions, it is necessary to take a closer look on the condition under which an FAA is stable and how this stability rests on the premium set by the FAA as well as the individual factors that shape membership decisions. We will explore these determinants below.

3.1 FAA budget constraint

For an FAA insurance scheme to be in a stable equilibrium, the accumulated premiums c of all members $j \in M(c)$ need to be equal to or greater than total payments made to the beneficiaries in a specific period. I.e. the insurance scheme is stable when

$$\sum_{j \in M(c)} r_j b \leq \sum_{j \in M(c)} c \tag{1}$$

holds, where r_j is the mortality risk of member j, and b is the equal-for-all benefit payment in the event of death. Further, $M(c)$ is the pool of members attracted to the insurance at a given premium level c. As described above, FAAs aim to provide full insurance coverage. Hence, b is predetermined and fixed to the usual costs needed in order to arrange a funeral in the region. The balance of Equation (1), therefore, depends on the endogenous relationship of the premium level c with the average mortality risk $\bar{r}$ across all FAA members $j \in M(c)$.[13] To keep to the budget constraint, the average

[13]The endogeneity of the relationship arises because, on the one hand, the FAA sets

risk of the attracted member pool must fulfill the condition

$$\bar{r} \leq \frac{c}{b}. \quad (2)$$

For the purpose of the remaining analysis we define low-risk individuals as those for whom $r_i \leq \bar{r}$ and high-risk individuals as those for whom $r_i > \bar{r}$.

As we mentioned earlier, FAAs in the region of our study appear to set the premium level in a way that Equation (1) is balanced at a reasonably low rate.[14] We are interested in how this stability is maintained. Therefore, below we will explore the formation of the left hand side of Equation (2) – that is shaped by the risk pool attracted to the insurance – once a premium level is set. In particular, we will analyze what determines insurance membership of low- and high-risk individuals at a given premium level.

3.2 Determinants of membership decision

We adopt the standard framework for insurance demand as found e.g. in Rothschild and Stiglitz (1976). In the classical model, insurance demand is determined by individual risk type, preferences, and initial wealth. We modify the traditional model in three ways. First, we add an altruistic motive to the determinants. In case the individual is married, the spouse would be among the relatives who, naturally, suffer the most from the burden of an unexpected funeral (i.e. experience monetary or reputational damage). In our model, individuals care about the wealth of this potential spouse. Therefore, they may seek funeral insurance coverage to prevent their spouses from a socially or economically uncomfortable situation in the

the premium level according to the average mortality risk of its member pool (see the pay-as-you-go structure of the scheme, described in Section (2)). On the other hand, the average mortality rate in an FAA depends on the pool of members attracted to the insurance at a given premium level.

[14]Finding a stabilizing premium level when initially setting up the insurance is not trivial. The insurer needs to anticipate the risk pool it attracts at a potential premium level without being able to ground considerations on previous experience, e.g. number of claims or member characteristics of previous years. For the FAAs in our sample it appears that the average mortality risk was set according to the population mortality rate of the relevant age group in the region. This reasonable low rate makes the insurance attractive even for lower-income individuals.

future.[15] We, second, adjust the model by introducing a parameter that represents the protective effect that marriage may have on individuals' mortality risk – another channel through which marriage might affect insurance demand. Finally, apart from the negative impact of an unfunded funeral on the spouse the individual may as well suffer a personal loss when passing away in the uninsured state. It may manifests itself as feelings of guilt and embarrassment when not complying with religious or social norms, respectively. As people may differ in how much they care about these norms, we introduce a parameter that indicates how important it is for the individual to obey them.

Individual $i \in I$ will sign up in a funeral association for a specific period if the expected utility of becoming a member of the association is greater than the expected utility of not being a member for that period. Hence, the pool of insurance members j (given the premium level c) is defined as

$$M(c) := \{j \in I | EU_{i1} > EU_{i0}\}. \tag{3}$$

The expected utility of an uninsured individual not insured can be expressed by

$$EU_{i0} = (1 - r_i)U_i(W_i + \beta_i W_s) + r_i U_i(W_i - \alpha_i L + \beta_i(W_s - L)), \tag{4}$$

where $r_i = p_i - \pi_i p_i$ is the individual's probability to pass away in that period depending on the initial mortality risk p_i, where $0 \leq p_i \leq 1$, and the parameter π_i. The latter represents the favorable effect which marriage may have on mortality risk, e.g. due to higher relative well-being based on increased social support, less depression originating from loneliness, and social control of health practices. We define $0 < \pi_i < 1$ when an individual is married, and zero otherwise. U_i is the individual's utility function, where individuals are assumed to be von Neumann-Morgenstern expected utility maximizers and risk averse. We, further, assume that individuals care about the welfare of their spouse s by weighting the spouse's initial wealth

[15] To keep our analysis simple, below we focus on the impact of marriage on insurance demand. However, the model could be easily extended to more than one social relationship as well as other types of social relationships, while the main conclusions drawn would remain the same.

W_s in their own utility function with the factor β_i. The latter can be interpreted as the altruistic tendency of the individual towards the spouse.[16] It is $0 < \beta_i \leq 1$ for married individuals, and zero otherwise. Further, W_i is the initial level of wealth held by the individual. The loss L materializes when the individual dies and is not a member of a funeral insurance.[17] It affects the individual twice (directly and indirectly) in his or her membership decision. The direct effect refers to the possible emotional cost the individual faces when knowing that he or she goes without a "proper" funeral at the time when death is close. They may origin from reputational considerations, guilty feelings of not fulfilling religious traditions (which Buddhists may even care about beyond death), or pure feelings of sadness to not end life with a feasible celebration. These costs are weighed in the individual's utility with the parameter α_i, where $0 < \alpha_i \leq 1$, indicating how much the individual cares. Moreover, the indirect effect refers to the social or monetary cost that is imposed on a spouse who is unable to afford a funeral ceremony for his or her partner that satisfies expectations by the local community. The spouse may face a loss of reputation among fellow villagers or may have to take emergency loans at extreme interest rates, resulting in a decrease in the spouse's wealth which affects individual's utility weighed by β_i.

To keep the following analysis simple and intuitive, we assume that the individual values an additional unit of spouse's wealth W_s equally to an increase in own wealth W_i weighed by β_i. Equation (4) can therefore be rewritten as

$$EU_{i0} = (1 - r_i)U_i(W_{hh}) + r_i U_i(W_{hh} - (\alpha_i + \beta_i)L), \tag{5}$$

where $W_{hh} = W_i + \beta_i W_s$, the weighed initial wealth that is relevant for the utility of i aggregated at the household level.

The expected utility of an individual who is member of an FAA may be

[16] It could as well be interpreted as the rate at which the disposable income or wealth of an individual rises when having a spouse compared to being single. This possible upward shift origins from sharing goods or assets and the respective costs that otherwise would have been paid for by the individual alone.

[17] For simplicity we assume her that becoming member of a funeral insurance is the only way to financially prepare for an individual's funeral.

represented by

$$EU_{i1} = (1 - r_i)U_i(W_{hh} - c) + r_iU_i(W_{hh} - c - (\alpha_i + \beta_i)(L - b)), \qquad (6)$$

where c is the premium paid to the insurance and b the benefit payment as stated above. As FAAs provide full insurance, b is equal to L. Hence, Equation (6) can be rewritten as

$$EU_{i1} = U_i(W_{hh} - c). \qquad (7)$$

Whether Equation (7) is greater than Equation (5) – the condition for enrolling in an FAA (see Equation (3)) – is determined by several variables. We will take a closer look on how a change in each of these variables (ceteris paribus) determines the probability of joining an FAA insurance scheme below.

Mortality risk. The first derivative of $EU_{i1} - EU_{i0}$ with respect to r_i is positive indicating that a rise in mortality risk increases the probability that EU_{i1} is greater than EU_{i0}, i.e. $\frac{\partial(EU_{i1}-EU_{i0})}{\partial r_i} > 0$. Hence, the higher the effective risk (r_i), e.g. the older or more sick an individual becomes, the higher should be the probability of FAA membership, ceteris paribus.[18] This effect is boosted by an increase in the initial mortality risk p_i and may be mitigated by a rise in the marital protection parameter π_i in case the individual is married, ceteris paribus.

Wealth. Everything else equal, we expect richer individuals to be relatively less likely to become FAA members compared to poorer individuals. For individuals for whom $c > r_i(\alpha+\beta)L$ a rise in W_{hh} leads to a decreasing probability of seeking insurance, i.e. $\frac{\partial(EU_{i1}-EU_{i0})}{\partial W} < 0$. For the opposite case, i.e. $c < r_i(\alpha + \beta)L$, the effect of a rise in W_{hh} on $EU_{i1} - EU_{i0}$ is unclear. However, when $c < r_i(\alpha + \beta)L$ also $EU_{i1} > EU_{i0}$, which implies

[18] In the most extreme case, the preferred time for insurance entry might be just before death. Many FAAs, therefore, couple eligibility for benefit payments to a minimum membership period – a few weeks or months.

that the individual is always member of the insurance irrespective of the value of W_{hh}.

Preference. *Risk aversion.* The more risk averse the individual is (i.e. the more concave the utility function) the higher is his or her willingness to pay a risk premium in order to gain certainty about future income (i.e. to avoid the possible loss L). Therefore, the probability to insure in an FAA should rise with increasing individual risk aversion, ceteris paribus.

Obeying religious/social norms. An increase in the obeying-norms parameter α_i puts more weight on the direct loss and leads to a larger drop in individual utility, ceteris paribus, in the case where the individual passes away without being insured. Therefore, the probability of seeking insurance should rise with increasing α_i, i.e. $\frac{\partial(EU_{i1}-EU_{i0})}{\partial\alpha_i} > 0$

Altruistic tendencies towards spouse. How a change in the altruistic tendency towards a spouse β_i affects $EU_{i1} - EU_{i0} > 0$ is less clear. Two opposing effects are at play. First, a rising β_i places a higher weight on the indirect loss (i.e. the loss of the spouse which is incorporated in the individual's utility function), increasing the probability to insure. Second, it places a higher weight on the spouse's initial wealth in the individual's utility function, potentially decreasing the probability to insure. Whether or not individuals with higher altruistic tendencies demand more insurance, therefore, largely remains an empirical question.

Marital status. In our model, marital status affect the probability of seeking insurance through three opposing channels, as π_i and β_i switch from 0 for unmarried individuals to $0 < \pi_i < 1$ and $0 < \beta_i \leq 1$ for married individuals. We will refer to these channels as the mortality, wealth, and the loss channel. First, the marital protection parameter π_i will decrease the effective mortality risk r_i for individuals who have a spouse compared to single individuals (remember $r_i = p_i - \pi_i p_i$). Second, by weighing the spouse's initial wealth level the weighed household utility W_{hh} is greater for married individuals compared to singles (remember $W_{hh} = W_i + \beta_i W_s$). Third, when β_i is activated also the L suffered by the spouse becomes relevant in the utility function of the individual. The first two channels affect the probability that $(EU_{i1} - EU_{i0}) > 0$ negatively, while the third effect affects the probability positively. It is not clear whether the latter channel outweighs the former two channels. We will further investigate the question whether married individuals seek insurance at relatively lower risk levels empirically in Section 4.4.

3.3 Stability

For insurance stability, two conditions must hold: (a) the budget constraint developed in Equation (2) and (b) the condition for membership decision in Equation (3). From the latter we can obtain the range of r_i necessary for an individual wanting to join an FAA:

$$\frac{U_i(W_{hh} - c) - U_i(W_{hh})}{U_i(W_{hh} - (\alpha_i + \beta_i)b) - U_i(W_{hh})} < r_i(\leq \bar{r}) \leq 1. \tag{8}$$

This particularly includes all individuals who profit from the insurance in expected, weighed monetary terms, i.e. those for whom

$$c < (\alpha_i + \beta_i)br_i \tag{9}$$

and $\alpha_i + \beta_i \leq 1$. The selection of these high-risk individuals into the insurance scheme may be a threat to the stability of the insurance if it is not counter-balanced by a sufficiently large volume of low-risk individuals. Despite losing in expected monetary terms, the latter may voluntarily want to select into the insurance based on "inflated" preferences and, therefore, may help to stabilize the insurance scheme (given the fixed premium level).

More precisely, combining Equation (2) and (8) we get the static condition for stability (assuming c and b to be fixed as stated above):

$$\frac{1}{N} \sum_{j \in M(c)} \frac{U_j(W_{hh} - c) - U_j(W_{hh})}{U_j(W_{hh} - (\alpha_i + \beta_i)b) - U_j(W_{hh})} < \frac{c}{b}, \tag{10}$$

where N is the number of members in $M(c)$. Equation (10) shows that the stability of an FAA depends, in a possibly complex way, on the parameters of the model. It conveys, however, that stability is possible even though the FAA is particularly attractive for certain high-risk individuals. With an increase in the individual's tendencies α_i to suffer from disobeying social norms or an increase in an individual's risk aversion, the left hand side of Equation (10) becomes smaller, ceteris paribus, and a stable situation becomes more likely. Most importantly for the focus of this paper, married individuals possibly further transform the risk pool in a favorable way. Assuming that an altruistic tendency towards a spouse β_i is always greater than zero, married individuals may be drawn into the insurance at relatively lower mortality-risk levels (loss effect), ceteris paribus, decreasing the left hand side of Equation (10). However, this effect may be mitigated or even over-compensated because of the utility the individual gains from spouse's initial wealth (wealth effect), i.e. the left hand side of Equation (10) may as well stay equal or rise. Moreover, the impact of the marital protection parameter π_i is unclear, as it simultaneously affects both sides of the Equation (10). An increased π_i of insurance members decreases the average mortality risk of the insurance pool on the right-hand side. On the left-hand side, however, the probability of somebody with a lower risk to seek insurance may drop if not over-compensated by the mentioned loss effect.

To sum up, in this section we investigated possible determinants of funeral insurance demand and stability in the absence of risk-rated premiums and no strict entry regulations. As by Equation (9) at any level of premium the FAA would naturally attract high-risk individuals. If this selection is not counter-balanced by a sufficient selection of low-risk individuals into the insurance the budget constraint in Equation (1) would not be fulfilled, potentially leading to adverse effects on insurance stability. The necessary stabilizing selection may (partly) materialize through risk-averse lower-risk individuals who are willing to pay a risk premium. We, further, derived the testable hypothesis that greater insurance demand of married individuals at lower risk levels may play a role in stabilizing FAA insurance schemes. Our theoretical framework helps to understand possible channels through which marital status may affect insurance stability. Yet, it does not conclusively reveal the eventual direction of the effect. We will, therefore, investigate this question further in our empirical analysis below.

Table 1: Descriptive statistics

	Total (Mean)	Total (SD)	Non-member (Mean)	Non-member (SD)	FAA-member (Mean)	FAA-member (SD)	Difference (T-test)
Passed away between 2008 and 2013	0.062	(0.241)	0.061	(0.239)	0.065	(0.247)	0.004
FAA member in 2008	0.198	(0.398)	0.000	(0.000)	1.000	(0.000)	1.000
Age	49.072	(15.342)	47.518	(15.835)	55.374	(11.119)	7.856***
Older or equal 65	0.171	(0.376)	0.162	(0.368)	0.206	(0.405)	0.044***
Male	0.460	(0.498)	0.444	(0.497)	0.523	(0.500)	0.079***
Can read and write	0.920	(0.271)	0.918	(0.274)	0.926	(0.261)	0.008
Illness	0.248	(0.432)	0.230	(0.421)	0.319	(0.466)	0.089***
Severe illness	0.024	(0.153)	0.023	(0.150)	0.028	(0.165)	0.005
Subjective health: feels healthy	0.604	(0.489)	0.627	(0.484)	0.511	(0.500)	-0.117***
Subjective health: can manage	0.245	(0.430)	0.231	(0.422)	0.303	(0.460)	0.071***
Subjective health: feels sick	0.150	(0.357)	0.141	(0.348)	0.187	(0.390)	0.045***
Marital status: Married	0.792	(0.406)	0.769	(0.422)	0.886	(0.318)	0.117***
Marital status: Widow	0.090	(0.286)	0.089	(0.285)	0.092	(0.289)	0.003
Marital status: Divorced	0.022	(0.146)	0.026	(0.158)	0.007	(0.085)	-0.018***
Marital status: Never married	0.097	(0.296)	0.117	(0.321)	0.015	(0.120)	-0.103***
Household wealth, quartile 1 (top)	0.250	(0.433)	0.266	(0.442)	0.185	(0.389)	-0.080***
Household wealth, quartile 2	0.241	(0.428)	0.265	(0.441)	0.147	(0.354)	-0.118***
Household wealth, quartile 3	0.251	(0.434)	0.242	(0.428)	0.289	(0.454)	0.047***
Household wealth, quartile 4 (lowest)	0.257	(0.437)	0.228	(0.419)	0.378	(0.485)	0.151***
Travel time to BAAC (in minutes)	24.883	(13.508)	25.007	(13.766)	24.381	(12.398)	-0.626
Household has car/motorcycle	0.869	(0.337)	0.867	(0.340)	0.879	(0.327)	0.012

4 Empirical Analysis

We use household panel data, representative for rural households of Northeastern Thailand. Our empirical strategy unfolds in three steps. First, we show that risk-type based selection into FAAs is present in the sample region. Second, we show that low-risk preference-based selection into FAAs coexists. Particularly, we focus on married individuals and show that being married is related to higher insurance demand at relatively lower mortality risk on average. Finally, we show that this latter selection (partially) balances the former selection.

4.1 Data

The household panel we use consists of 2113 households, including 4970 individuals of age 20 or older.[19,20] The data set features rich information on individual demographics as well as household wealth and finance. We provide summary statistics in Table 1. A share of 20 percent of the individuals in our sample were members of an FAA in 2008. In the subsequent five years, 6.2 percent of them passed away. Ex-post mortality did not significantly differ comparing members (6.5 percent) and non-members (6.1 percent) – a first indication that a potential risk-type based selection into FAAs may be balanced by low-risk preference-based selection.

4.2 Method

To investigate risk-type and preference-based selection and the balance between these two types of selection we adopt two methods from the literature on formal insurance markets.

Testing for risk-type and preference-based selection. For the first series of tests, we follow Finkelstein and McGarry (2006) and run two probit models:

$$\Pr(Insured = 1) = \Phi(X\beta_{\mathbf{1}} + \beta_2 Z), \tag{11}$$

$$\Pr(Died = 1) = \Phi(X\delta_{\mathbf{1}} + \delta_2 Z), \tag{12}$$

where $Insured$ is a binary variable equalling 1 for members of funeral association in 2008 and zero for non-members. *Died* is a binary variable

[19] The survey was carried out as part of the project "Impact of shocks on the vulnerability to poverty – consequences for the development of emerging Southeast Asian economies" (FOR 756, German Research Foundation). A three-stage cluster sampling strategy was applied, selecting two villages each in 49 sub-districts representative for the rural population of Northeastern Thailand in 2007. In each of the 98 sample villages, ten households were randomly selected. Households were followed over four subsequent survey waves (data was collected in the years 2007, 2008, 2010, and 2013). For a detailed description on the sampling strategy see (Hardeweg et al., 2013).

[20] We drop individuals from the sample who are of age 19 or younger in 2008 as the minimum age for becoming an FAA member is 20.

that equals 1 for individuals who passed away during the period of 2008 to 2013 and zero otherwise. Further, X is a vector of confounding characteristics (described in more detail below). The explanatory variables of interest are the characteristics Z. To test for possible drivers of selection we add one characteristic at a time to both equations. This approach allows us to observe whether characteristics that inherit private information on risk type or preferences significantly drive both, ex-post mortality and insurance coverage.

First, we will use this approach to test for selection related to risk type. A positive and significant coefficient δ_2 in Equations (11) would indicate that the respective characteristic Z is a driver of ex-post mortality. In case β_2 in Equations (12) is positive and significant as well, i.e. Z is also a driver of insurance demand, the private information on risk type that is implicit with the particular characteristic may have been used in the decision whether or not to join the insurance. Hence, such a constellation would be a strong indication of the presence of risk-type based selection.

Second, we will use this approach to test for selection based on preferences. In this opposite case, we test whether a characteristic is negatively correlated with mortality ($\delta_2<0$) but positively correlated with insurance coverage ($\beta_2>0$). Under such a constellation private information on insurance preferences (that are unrelated to risk-type) must play a role for insurance demand. Hence, this constellation would be a strong indication for the presence of preference-based selection.

Balance of the two types of selection. The second approach we adopt is the classical positive correlation test. We use it to test whether mortality risk is balanced across FAA members and non-members.[21] In other words, the test provides evidence whether selections patterns of high- and low-risk individuals, as found in the first series of tests described above, (partly) off-set each other. We run the following probit regression

[21]The test was initially suggested by Chiappori and Salanié (2000) and has traditionally been used to elicit whether insurance coverage and the ex-post realization of the insured risk are (conditionally) independent. We use a slightly different version of the test that is more intuitive for our purpose, as for instance suggested in He (2009).

$$\Pr(Insured = 1) = \Phi(X\alpha_{\mathbf{1}} + \alpha_2 Died). \quad (13)$$

The estimate of interest is the coefficient α_2. A significant and positive α_2 would suggest that a higher mortality risk overall predicts FAA membership – a sign of unbalanced high-risk selection, possibly due to asymmetric information or information that was observed by the insurer but has been "neglected" in insurance pricing.[22] An α_2 that is close to zero and insignificant, in turn, would reject this hypothesis. By adding characteristics that have been identified in the previous test to be driving risk-type or preference-based selection we obtain information on how important these drivers are for the balance between high- and low-risk selection and, hence, for insurance stability.

Basic and alternative specifications. Both described approaches are usually performed conditional on the set of known characteristics X that have been used by the insurance provider for risk classification and pricing of individual insurance contracts. As mentioned previously, FAA premiums are not set according to risk-classification. In our basic specification we, therefore, do not include any control variables. However, the level of FAA premiums is subject to community risk-rating, i.e. premium levels are set according to mortality rates in the respective communities. Also administrative efficiency across FAA might differ. Hence, while equal within one particular FAA, the price for insurance between FAAs might differ. To allow for differing premiums across districts – the administrative unit an FAA usually operates in – we run a second specification including district dummies in our empirical model. This ensures that our estimates do not capture the variation in insurance demand that is due to district level

[22]By "neglected" information we mean asymmetrically used rather than asymmetrically distributed information, i.e. individual demographic characteristics the funeral association possesses based on the registration form but does not use for risk-rating. The term "asymmetrically used" information was coined by Finkelstein and Poterba (2014). The authors found that insurers in the UK annuity market did not use certain known characteristics of policy holders for setting insurance premiums, although those characteristics were correlated both with subsequent claims and insurance demand. They emphasize that disregarding this information in the process of underwriting created market inefficiencies similar to those that arise when holders of annuities have private information about their mortality risk.

characteristics, e.g. differing average mortality rates and administrative costs.

Further, we know that FAAs may reject applicants based on personal characteristic (e.g. severe illness or old age). Additionally, demand for FAA membership might be affected by transaction costs and individual restrictions. Several factors might play a role, e.g. distance to the next FAA office (usually in the neighborhood of a BAAC branch), mobility, and literacy. The travel time to the next BAAC office is 25 minutes for an average individual in our sample. A total of 13 percent of the individuals live in households that do not own a car or motorcycle and, therefore, might have a harder time reaching an FAA. Moreover, 8 percent of the individuals in our sample are illiterate, and would depend on help filling in the application form.[23] Yet, non of these characteristics are statistically different when comparing insured and non-insured individuals applying a t-test (see Table 1 above). This suggests that, non of the mentioned factors harm access to FAA membership. We will, nevertheless, verify our results by providing a third specification in which we control for these membership restricting characteristics.

4.3 Measures

To test for risk-type related selection, we focus on three potential characteristics – age, health, and gender – which are often used as risk-rating variables by providers of mortality-risk related insurance.[24] Our data set does not provide detailed illness information. It includes, however, self-reported statements about how healthy a person feels ("healthy", "can manage", or "sick") and whether the person reports to suffer from illness in 2008.[25] To-

[23]However, application forms are kept simple. They consist of one to two pages asking for name, date of birth, age, nationality, name of spouse, and contact information. Further, they ask for contact information of the individuals who are authorized by the applicant to manage the funeral and receive the benefits in case of death.

[24]See e.g. Finkelstein and McGarry (2006) for the long-term care insurance market in the US, Finkelstein and Poterba (2014) for the annuity market in the UK, and He (2009) for the life insurance market in the US.

[25]Suffering from illness might or might not increase mortality risk, depending on how fatal the particular disease is. Additionally, the actual mortality risk caused by the disease might depend on the overall health condition of an individual. Therefore, we make use of both measures as they complement each other in a favorable way.

gether these measures proxy private information about health-related mortality risk in a very condensed way. If our health measures (partly) predict mortality then they serve as sufficient proxies to test for a health-related correlation between private mortality-risk information and FAA membership decision. To capture the altruistic motives, we use marital status as it has frequently been done in the literature on bequest and life insurance demand.[26] Further, we measure household wealth as the total asset value owned by the household net of total loans owed by the household.

4.4 Results

In this section, we report the results of our empirical analysis in three steps, as described above. In the first step, we document risk-type related selection into the insurance scheme using the first test described in Section 4.3. In the second step, we use the same test to investigate preference-based selection related to marital status. In the final step, we examine the overall balance of insurance membership across risk types using the second test described in Section 4.3. Further, we investigate how the previously identified drivers of risk-type and preference-based selection affect this balance.

4.4.1 Risk-type related selection

Table 2 reports estimates of marginal effects from the probit models in Equations (11) and (12). In Panel A we report results from adding each characteristic separately to the two equations. As expected, the older an individual is in 2008 the more likely he or she is to pass away between 2008 and 2013 (odd columns). More importantly, older individuals are also more likely to be insured in an FAA in 2008 (even columns). Further, individuals who report to suffer from illness in 2008 are more likely to pass away in the subsequent five years. The same seems to be true for individuals who report to feel sick. The less healthy an individual feels in 2008 the higher his or her probability to pass away between 2008 and 2013 (odd columns). At the same time, suffering from illness or not feeling healthy (irrespective of the intensity) is correlated with higher probability of being insured in

[26] See e.g. Liebenberg et al. (2012), Bernheim (1991), and Sauter (2012).

Table 2: The relationship of demographic and health characteristics with mortality risk and FAA membership

	Panel A						Panel B			
	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Age (2008)	0.004***	0.005***	0.004***	0.005***	0.003***	0.010***	0.002***	0.009***	0.002***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
Illness (2008)	0.073***	0.072***	0.070***	0.064***	0.038***	0.062***	0.003	0.024	0.004	0.027
	(0.007)	(0.014)	(0.007)	(0.013)	(0.007)	(0.014)	(0.010)	(0.018)	(0.009)	(0.018)
Subjective health (2008):	-	-	-	-	-	-	-	-	-	-
Feels healthy (omitted)	-	-	-	-	-	-	-	-	-	-
Can manage	0.062***	0.077***	0.061***	0.069***	0.031***	0.071***	0.018**	0.002	0.021***	0.008
	(0.009)	(0.016)	(0.009)	(0.015)	(0.008)	(0.015)	(0.007)	(0.015)	(0.007)	(0.015)
Feels sick	0.126***	0.078***	0.126***	0.069***	0.075***	0.069***	0.055***	-0.014	0.058***	-0.010
	(0.014)	(0.019)	(0.014)	(0.018)	(0.011)	(0.018)	(0.014)	(0.021)	(0.014)	(0.021)
Male	0.018***	0.050***	0.019***	0.050***	0.025***	0.047***			0.029***	0.047***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.006)	(0.008)			(0.006)	(0.008)
District dummies			x	x	x	x	x	x	x	x
Restricting characteristics					x	x	x	x	x	x

Notes: Sample is limited to individuals who are at least 20 years old. The table reports marginal effects from probit regressions, heteroskedasticity-consistent standard errors adjusted for clustering at the household level in parentheses. Each cell in Panel A reports results from a separate regression. *Died (2008 - 2013)* indicates whether an individual passed away during the period of 2008 to 2013. *Insured (2008)* indicates FAA membership in 2008. *Illness* indicates whether an individual self-reports to suffer from illness. *Subjective health* was determined by asking how healthy the individual is: feels sick, can manage, or feels healthy. The left out category is *Feels healthy.* Panel B reports probit regressions on the respective variables in each column. Models in Columns (3) to (10) include district dummies. Models in Columns (5) to (10) control for restricting characteristics (*Severe illness*, *Can read and write*, *Travel time to next BAAC branch*, *Household owns car or motorbike*, and *Age is 65 or older*). ***, **, * denote statistical significance at the 1-percent, 5-percent, and 10-percent level, respectively. Means of *Died (2008 - 2013)* and *Insured (2008)* are 0.06 and 0.20, respectively.

2008 (even columns). These results suggest that private (or "neglected") information on mortality risk derived from age and health status may have translated into increased insurance demand. Finally, men in our sample had a higher ex-post mortality risk than women (odd columns), a result confirmed by a United Nations study that finds the life expectancy of Thai women to be three years higher than that of Thai men at age 60 (UN 2012). At the same time the probability for insurance membership in 2008 is significantly higher for men (even columns).[27]

Overall, most estimates remain relatively unchanged both in terms of their magnitude and significance in our second specification (with district dummies controlling for differences in FAA characteristics). Further, including those characteristics in the equations that possibly restrict FAA membership we see a notable change in the correlation of age with insurance membership (upwards) as well as in the correlation of the health measures with ex-post mortality risk (downwards).[28] Even in this conservative specification correlation coefficients stay robust and quantitatively meaningful.

In summary, our results suggest that higher-risk individuals are more likely to select into FAA-provided insurance, as predicted in our theoretical analysis. The results in Table 2 provide clear evidence of private and insurer-neglected information on risk type that is positively correlated with insurance demand. As this high-risk selection is not reflected in insurance pricing for the individual members it may have adverse effects on the sta-

[27]The latter result, however, might be due to different level of disposable income in men and women in our sample, which we cannot test for as information on individual income is not available. Sauter (2012) controls for intra-household reallocation motives using the income differential within a household. He finds that before the German reunification, women in East Germany were more likely to have life insurance than men. Previous studies not controlling for income levels had found an opposite effect. Gandolfi and Miners (1996) report that in 1984, women in the US were less insured compared to men. Chen et al. (2001) provide evidence for gender-based differences in life cycle effects. They find that age effects on purchasing rates of life insurance are larger for men compared to women. However, also in this study the authors attribute their finding mainly to the different roles men and women traditionally played in the family.

[28]These changes may be due to conditioning on the indicator variables for age of 65 years and above and for severe health condition (both measured in 2008), two characteristics which may have (but not necessarily did) lead to being rejected from FAA membership in 2008. The change in the first coefficient suggests that age matters for risk-type related selection even in younger years. The change in the second coefficient suggests that severe health condition is indeed driving selection and that restriction policies may be less effective as intended.

bility of FAAs if not balanced by a sufficient number of low-risk individuals selecting into the insurance schemes.

4.4.2 Preference-related selection

To investigate selection based on altruistic preferences towards a spouse, we again estimate Equations (11) and (12). This time we include binary variables indicating whether an individual is married, separated/divorced or widow. Individuals who had never been married serve as the base category. All three specifications additionally control for age and gender. The results are reported in Table 3. Married individuals are less likely to die within the next five years relative to individuals that were never married, a finding confirming previous evidence (see Section 1) and corroborating the assumption we made on the relationship of marriage and mortality risk in our theoretical analysis. Further, married individuals tend to be more likely to have insurance coverage. This is a central finding in our study. In our theoretical analysis we were not able to clearly predict, whether married individuals would demand more insurance as marriage had three opposing effects on the difference between the (expected) utility of the insured and uninsured state.[29] The empirical results in Table 3 suggest that married individuals demand more insurance despite having a lower average mortality risk, while the unmarried are less insured despite a relatively higher mortality risk. Our interpretation of these results is that the negative effect of the spouse's loss (loss effect) on the utility of the average individual in our sample is strong enough to overcompensate the other two effects (wealth and mortality effect) that marriage may have on insurance demand. In other words, altruistic motives within married couples may matter for insurance stability, as discussed further below.

[29] Our findings are, however, in line with previous empirical literature. Applying a dynamic analysis of insurance demand, Liebenberg et al. (2012), for instance, provide evidence for a positive relation of being (newly) married and insurance uptake for the case of whole life insurance. Bernheim (1991) finds a negative relation of being widow and having insurance coverage which he attributes to the conversion of insurance to cash when a spouse passes away. Further, he finds a positive relation of being single and being insured which he interprets as the presence of a strategic bequest motive: the promise of bequest in return for looking after the policy holder in his old age. Sauter (2012) finds no effect of marital status on insurance demand. He argues, however, that his findings are due to the strong role of the welfare state in pre-unified East Germany.

TABLE 3: THE RELATIONSHIP OF MARITAL STATUS WITH MORTALITY RISK AND FAA MEMBERSHIP

	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)	Died (2008 - 2013)	Insured (2008)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Marital status: Married	-0.049***	0.168***	-0.048***	0.168***	-0.048***	0.165***	-0.043***	0.144***
	(0.020)	(0.016)	(0.020)	(0.016)	(0.019)	(0.015)	(0.018)	(0.018)
Marital status: Widow	-0.021	0.076***	-0.021	0.081***	-0.024	0.084***	-0.020	0.082***
	(0.023)	(0.023)	(0.023)	(0.023)	(0.022)	(0.023)	(0.022)	(0.025)
Marital status: Divorced/Separated	-0.050	0.025	-0.050	0.029	-0.050	0.026	-0.043	0.015
	(0.029)	(0.029)	(0.029)	(0.029)	(0.028)	(0.028)	(0.028)	(0.031)
Marital status: Never married (omitted)	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
Household wealth quartile: Top			-0.001	-0.151***	-0.002	-0.114***	-0.004	-0.109***
			(0.009)	(0.019)	(0.009)	(0.018)	(0.009)	(0.018)
Household wealth quartile: Second			0.004	-0.177***	0.004	-0.151***	0.003	-0.133***
			(0.009)	(0.019)	(0.009)	(0.018)	(0.009)	(0.018)
Household wealth quartile: Third			-0.002	-0.065***	-0.004	-0.054***	-0.006	-0.045**
			(0.009)	(0.020)	(0.009)	(0.019)	(0.009)	(0.019)
Household wealth quartile: Bottom (omitted)	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-
Age	x	x	x	x	x	x	x	x
Male	x	x	x	x	x	x	x	x
District dummies					x	x	x	x
Restricting characteristics							x	x

Notes: Sample is limited to individuals who are at least 20 years old. The table reports marginal effects from probit regressions, heteroskedasticity-consistent standard errors adjusted for clustering at the household level in parentheses. *Died (2008 - 2013)* indicates whether an individual passed away during the period of 2008 to 2013. *Insured (2008)* indicates FAA membership in 2008. *Married*, *Widow*, and *Divorced/Separated* indicate whether an individual is married, widow, or divorced/separated, respectively. The left out category is *Never married. Wealth quartiles* are based on household value of assets subtracted by household debt. Left out category is the bottom quartile. All models control for risk-type related characteristics (*Age* and *Male*). Models in Columns (5) to (8) include district dummies. Models in Columns (7) and (8) control for restricting characteristics (*Severe illness*, *Can read and write*, *Travel time to next BAAC branch*, *Household owns car or motorbike*, and *Age is 65 or older*). ***, **, * denote statistical significance at the 1-percent, 5-percent, and 10-percent level, respectively. Means of *Died (2008 - 2013)* and *Insured (2008)* are 0.06 and 0.20, respectively.

The reported associations stay essentially unchanged when controlling for household wealth quartiles, see Columns (3) and (4). Moreover, observing household wealth reveals that wealth status drives selection beyond what risk types would suggest. Belonging to the top three wealth quartiles is negatively associated with insurance choice compared to the bottom wealth quartile (Columns (4)), while mortality risk is not significantly different across all wealth quartiles in our sample (Columns (3)). This could be interpreted as evidence that richer individuals are relatively less risk averse and, therefore, are less likely to demand insurance as predicted in the theoretical section of this study. In other words, poorer people may join FAAs at a relatively lower risk level, while richer individuals join at relatively higher risk levels. Yet, it is not clear whether this type of selection is relevant for improving insurance stability. We will investigate this question further below. All results remain quantitatively and qualitatively robust when controlling for district dummies and restricting characteristics (Columns (5)-(8)).

4.4.3 Stability

Finally, we turn to investigate how the selection patterns detected above impact on insurance stability. Table 4 shows the marginal correlation of ex-post mortality on insurance coverage from Equation (13). The test rejects the hypothesis that high-risk individuals are overall more likely to be insured than low-risk types in our sample (Columns (1) to (3)). This implies that risk-type driven and preference driven (see Table 2) and preference driven (see Table 3) demand for insurance counter-balance each other in a way that the average ex-post mortality of the member pool is not significantly different from the pool of individuals who are not members of an FAA. These results confirm that the insurance scheme seems to be in a stable equilibrium at a relatively low premium level.

To see the magnitude of this balancing effect we subsequently add the drivers of both selection types to the regression in Table 4. Controlling for the evident drivers of high mortality risk reveals a significant partial negative correlation between FAA membership and mortality risk (Column (4)). In other words, within a group of individuals that are equal in terms of age,

Table 4: Correlation of mortality risk and FAA membership controlling for drivers of risk-type and preference-based selection

	(1)	(2)	(3)	(4)	(5)	(6)
Coefficient from probit regression of *Insured (2008)* on *Died (2008 - 2013)*	0.011 (0.025)	0.008 (0.024)	-0.012 (0.024)	-0.062** (0.024)	-0.054** (0.024)	-0.052** (0.024)
District dummies		x	x	x	x	x
Restricting characteristics			x	x	x	x
Age				x	x	x
Illness				x	x	x
Subjective health				x	x	x
Male				x	x	x
Marital status					x	x
Household wealth						x

Notes: Sample is limited to individuals who are at least 20 years old. The table reports marginal effects from probit regression of *Insured (2008)* on *Died (2008 - 2013)*, heteroskedasticity-consistent standard errors adjusted for clustering at the household level in parentheses. *Died (2008 - 2013)* indicates whether an individual passed away during the period of 2008 to 2013. *Insured (2008)* indicates FAA membership in 2008. Models in Columns (2) to (6) include district dummies. Columns (3) to (6) control for restricting characteristics (*Severe illness*, *Can read and write*, *Travel time to next BAAC branch*, *Household owns car or motorbike*, and *Age is 65 or older*). Models (4) to (6) add risk-type related characteristics (*Age*, *Illness*, *Subjective health*, and *Male*). Models (5) and (6) subsequently add the set of dummies indicating *Marital status* and *Household wealth quartiles.* ***, **, * denote statistical significance at the 1-percent, 5-percent, and 10-percent level, respectively. Means of *Died (2008 - 2013)* and *Insured (2008)* are 0.06 and 0.20, respectively.

gender, and health status, individuals of residual lower risk are more likely to self-select into membership relative to those with residual higher risk by 6.2 percentage points. Adding marital status to the regression partly attenuates this negativity of the conditional relationship between mortality risk and insurance coverage (Column (5)). We interpret these results as a confirmation that altruistic motives affect the balance of high- and low-risk selection into FAAs and, hence, positively impact on FAA stability. However, a large share of what is balancing the risk-type related selection into FAAs remains unexplained. As presumed above wealth status does not play a quantitatively relevant role for stability (Column (6)). Our theoretical analysis suggests that further characteristics seem to drive selection into FAA at relatively lower risk, e.g. risk averse preferences or the tendency to care about social and religious norms. Unfortunately, due to data limitations, we are not able to test empirically whether these characteristics additionally play a role.

5 Discussion and conclusion

In this study we provide theoretical and empirical evidence that high-risk (older, sick, male) individuals are relatively more likely to be a member of a funeral aid association (FAA) in Northeastern Thailand than low-risk (younger, healthy, female) individuals. We show that despite these findings, the traditional positive correlation test fails to detect adverse selection, i.e. FAA membership status is overall balanced across risk types in our sample suggesting insurance stability. When controlling for characteristics that drive risk-type related selection the conditional correlation of FAA membership and mortality turns negative, implying the co-existence of low-risk preference-based selection. We investigate whether marital status is (partly) driving this positive selection. Indeed, we find that being married is associated with relatively lower mortality risk but greater insurance demand. In a theoretical framework we show that this selection may be based on altruistic motives within married couples and the protective effect that marriage may have on health. An alternative interpretation would be that married individuals are more risk averse. They, therefore, might have higher preference for insurance and simultaneously may engage in activities protecting their health (e.g. regular health check ups, careful driving, healthy life style, etc.). However, we lack data to test this hypothesis. Regardless of the underlying mechanisms, our data suggests that married individuals in our sample have a deliberate willingness to pay more for insurance on average than what their risk type would advise. We find that this selection is one of the drivers of insurance stability at low premium levels in the face of an unregulated selection of high-risk types into FAA insurance schemes.

Although, the balance between risk-type and preference-based selection led insurance prices to settle down at a reasonable level resulting in large FAA membership numbers our findings raise concerns for future stability of FAAs. Our results suggest that the lasting stability of FAAs is based on a cross-subsidization of high risk members by low-risk high-preference members. The latter might have become FAA members due to a lack of alternative providers that base premiums on risk-rating. Once another provider offers the same service at actual risk-rated premiums those individuals would have a great incentive to switch providers. Such a shift of low-risk individuals out of FAAs would lead to a sharp increase in membership prices and possibly a continuous decline in membership numbers. Also known as adverse selection "death spiral", this dynamic may lead to the eventual collapse of an insurance scheme.[30] It might, therefore, be advisable for the FAAs to consider the introduction of risk-rated premiums.

A question arising from our finding is, why risk-rating is not common despite the fact that adverse selection is present and could possibly be prevented. On the one hand, associations might find that exact underwriting on cohort-based death probabilities is inapplicable due to high additional costs. On the other hand, a simple linear pricing scheme based on age and gender would seem practical even in very small insurance associations. In Table 2 Panel B we jointly include health measures and age (Columns (7) and (8)) as well as gender (Columns (9) and (10)). The results suggest that gender and age seem to be the most relevant information for risk-rating, as the health measures turn insignificant for predicting insurance demand once conditioning on age. For a basic but informative risk-classification of (potential) FAA policy holders it may, therefore, be sufficient to consider individuals' age and gender. However, making insurance more costly depending on age might not seem acceptable since respect for the elderly is a crucial part of Thai culture. In addition, political economy explanations might be at play. As the insurance committee often consist of elderly male individuals, the committee has negative monetary incentives to raise the insurance price along those dimensions.

[30]For real-life examples of adverse selection death spirals see e.g. Cutler and Zeckhauser (1998) and Butler (2002).

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