Willingness-To-Pay vs Administrative Hurdles: Understanding Barriers to Social Insurance Enrollment in Thailand*

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September 13, 2024

Abstract

Many government social insurance policies have low take-up. To understand whether this is due to administrative barriers, information, or low valuation of the insurance, we study an unusual policy experiment in Thailand that offered a very large lump-sum incentive for informal workers in selected provinces to enroll in a voluntary workers' social insurance program. Using administrative data, we find that the temporary enrollment incentive increased coverage by 67 percentage points – from 6 percent of informal workers to 73 percent – within just a few months. However, 12 months later, only 13 percent of these new enrollees remained in the scheme, much lower than the retention rate of those who joined absent the incentive. By using new enrollees' choices among insurance tiers to back out a revealed valuation of insurance, we find that those that were induced to enroll by the incentives value insurance less than those who enrolled without. Combined, the results suggest that low social insurance enrollment may be the result of intentional low valuations of social insurance, rather than administrative barriers.

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1 Introduction

Social insurance schemes are challenging to implement in low- and middle-income countries. The typical financing strategy for such programs in high income countries – linking social insurance enrollment to payroll taxes – cannot be used to cover the large informal sector in low- and middle- income countries, who are outside the tax net. Although many countries have created an opt-in system for informal workers, who pay premiums directly, take-up rates have typically been low (Banerjee, Hanna, Olken, & Sverdlin-Lisker, 2024).

Understanding the reasons for this low take-up is crucial for designing policies to expand social insurance for informal workers. There are three broad classes of candidate explanations. First, administrative hassles may deter takeup; that is, enrollment may be cumbersome, due to the weak administrative capacity of the state (e.g. Banerjee et al. (2021)). Second, people may not value the type of insurance that typical government social insurance programs provide (e.g. Finkelstein, Hendren, and Shepard (2019)). Third, the insurance product may be a bad deal in an actuarial sense, even if people generally value insurance.

To study these questions, we examine an unusual policy experiment in Thailand that offered a large incentive for informal workers to enroll in a voluntary social insurance program. Specifically, in July-August 2021, as part of the government's COVID-19 response, the government distributed large lump-sum grants to help informal workers in 29 out of 77 provinces. Crucially for our purposes, these grants were distributed through the Thai Social Security System: in order to receive a grant, people needed to be actively enrolled in the social insurance scheme for informal workers, called Social Security Article 40.[1] Those who were not currently enrolled in Article 40 were given an opportunity to do so before the payments were disbursed.

These payments provided a substantial incentive to enroll in Article 40: informal workers who lived or worked in these 29 provinces were eligible to receive the grant - either THB 5,000 for one month (USD 134) or THB 5,000 for each of two months (USD 268 total), depending on the province. To put this in perspective, the Thai minimum wage is about THB 3000 per person per month. Those in other provinces were not eligible for the grant. Note that the typical monthly premium for Article 40 is between THB 70 and THB 300 (USD 2-8) per month, depending on the insurance tier (tiers with higher premium have higher insurance benefits).

This policy experiment allows us to answer three important questions. First, we examine whether there are substantial administrative barriers to social insurance enrollment. Given

[1] In addition, the government also temporarily reduced the Article 40 premium nationally at this time, as we discuss below. This price reduction affects all 77 provinces, not just those with incentive payments.

such a strong cash incentive, if administrative capacity is not a problem, and information was widespread, we would expect large numbers of people in eligible provinces to enroll. Second, once enrolled, do people remain enrolled in the scheme after the incentive period? If low enrollment is due to a one-time fixed enrollment cost, but people valued the insurance on an ongoing basis, then those induced to enroll by the incentive may stay enrolled; on the other hand, if they do not value the insurance, they may drop the insurance once the one-time incentive payments are over. Third, do those who enroll as a result of the incentive *expect in advance* that they are likely to drop the insurance as soon as they can? If so, we would expect these new enrollees to choose the plan with the least insurance coverage when they enroll, rather than a plan with more coverage that they do not value.

We use administrative data from the Thai Social Security Office (SSO). We have monthly, de-identified, individual-level administrative panel data from May 2011 to April 2024. We complement these data with information from the Thai Labor Force Survey.

The temporary incentives led to a dramatic increase in insurance enrollment. In just 2 months, over *6 million* people enrolled in Article 40. By contrast, during the 4 years prior to this, from 2017 to 2021, only about 30,000 people enrolled in a typical month from these provinces. We estimate that this dramatic enrollment spike increased the share of the informal workforce enrolled in these provinces from about 6 percent to 73 percent, in just 2 months. The fact that millions enrolled, in such a short window, suggests a remarkable administrative capacity of the Thai state, and implies that enrollment barriers were not sufficiently high to prevent enrollment.

Once enrolled, however, most people let their insurance lapse. Within six months, only 24 percent remained enrolled, much lower than the comparable retention rate for those who joined prior to the incentives (53 percent). After a year, only 13 percent of those who enrolled due to the incentives still paid the monthly premia, compared to 43 percent retention one year later for whose who enrolled during non-incentive periods. In aggregate, the incentives substantially increased total enrollment–simply because so many people enrolled. However, the much lower-than-usual retention rate suggests that those induced to enroll due to the incentives were not deterred by high enrollment costs; they seem to have a lower net valuation of the insurance product.

The lower retention rate could reflect a low net valuation of the insurance in two ways. First, those induced to enroll due to the incentives could discover, over time, that the insurance is less valuable to them, or that paying monthly is more challenging, than they expected. Or, they could have known from the start: that is, they knew they had a low valuation of the insurance, and hence never enrolled before the incentives were introduced. To investigate whether this reflects ex-ante knowledge, we exploit the fact that Article 40

comes in three different tiers, with higher tiers having both higher premia and benefits. For example, the top two tiers includes a retirement benefit, and the top tier includes a child allowance. Premiums for each tier are the same for everyone, but the expected tier benefits differ based on age and gender.

We model the benefits from each tier as a function of an indivdual's age and gender, and find that people are responsive to the relative benefits of the different tiers (similar in spirit to Landais and Spinnewijn (2021)). We then use this model to see whether those who are induced to enroll due to the incentive make systematically different choices than those who enroll without the subsidy. We find that they do: those who enroll sans subsidy make choices consistent with them valuing the insurance benefits much more than those who enroll during the incentive period. That is, the people induced to join by the large temporary incentives seem to know, ex-ante, that they value the insurance less, and choose accordingly.

In short, given a substantial financial incentive, one can enroll most informal workers into social insurance almost immediately: in this case, millions of people – more than 70 percent of the informal workforce – enrolled in a just matter of weeks. However, those that signed up did so knowing they were unlikely want to maintain the insurance post the incentive, they chose the least expensive insurance tier with fewest benefits, and then they dropped out at very high rates. The barriers to enrollment, therefore, seem to reflect a cost-benefit calculus on the part of potential beneficiaries, rather than reflecting high enrollment costs or administrative barriers.

This paper offers three contributions. First, while there is a growing literature on the demand for health insurance (e.g. Asuming, Kim, and Sim 2021; Banerjee et al. 2021; Malani et al. 2024; see Banerjee et al. 2024 for a review), we know very little about the demand for broader social insurance programs, particularly those that offer disability and workplace compensation. This paper shows that the demand for this type of insurance product is low. Second, and related, we explore how people make choices among different insurance products, and how changing the marginal person differs. In this sense, our study of how enrollment incentives affect plan choice is related to Shepard and Wagner (2022), who study how an increase in enrollment hassles affects the composition of individuals who sign up for health insurance in Massachusetts.

Finally, and perhaps most importantly, this paper examines the extent to which low insurance demand reflects administrative burdens versus low valuations. Even for health insurance, which is much more studied than broader social insurance programs in developing countries, and where a number of papers have begun to study these questions (e.g., Banerjee et al., 2021; Thornton et al., 2010), Das and Do (2023) reflect that "as of yet, no consensus has emerged on the extent to which low demand reflects low expected value rather than

administrative burdens; this remains very much at the frontier of the research on health insurance." This paper shows that, at least in this context, administrative barriers do not appear to be the main problem; rather, low demand appears to stem from low valuations.

The rest of the paper is organized as follows. Section 2 describes the context, program and data. Section 3 provides our estimates of the impact of the incentive on enrollment and retention, while Section 4 examines the take-up and insurance choice problem. Section 5 concludes.

2 Context, Program and Data

2.1 The Thai Social Security Scheme

In Thailand, about 64 percent of the labor force consists of informal workers, including agricultural and non-agricultural workers. As informal workers are outside the tax net, their social insurance payments cannot be linked to payroll taxes. Instead, social insurance programs for informal workers are structured on a voluntary basis, where workers enroll and pay monthly premia. Enrollment rates have been low, as in many other low and middle income countries.

Thailand has a range of social security and social insurance schemes to cover both formal and informal workers. We study the Thai Social Security program, operated by the Thai Social Security Office (SSO). The program provides a number of benefits, including compensation for lost income due to injury or sickness, disability payments, and old age benefits. We focus on the program for informal workers, referred to as Article 40, after the provision of the social security code that established it.[2] Thai citizens who are not a member of the other Social Security programs, who are not government employees, and who are younger than 65 are eligible to join Article 40.

As shown in Appendix Table 1, Article 40 features three-tiers of insurance: option 1 costs THB 70 per month (USD 1.9) and offers a basic package of compensation for loss of work income due to illnesses, disability benefits, and death benefits; option 2 costs THB 100 (USD 2.7) per month and adds a pension benefit whereby the beneficiary gets 50 percent of their contribution back at age 60; and option 3 costs THB 300 (USD 8) per month and adds a child allowance benefit for up to two children, and also provides higher coverage for the loss of work, disability, and death benefits.[3] For all three options, eligibility for insurance benefits requires a waiting period and regular premium payment.

[2]The SSO also operates Article 33 for formal workers and Article 39 for former Article 33 members.

[3]Note that Article 40 does not provide health insurance, as Thailand has a separate, universal health scheme.

Note that there are several other programs for informal workers. One that will be relevant for our analysis is the National Savings Fund (NSF), which is a matched contribution savings fund. Those who are not a member of formal social insurance or Article 40 (Options 2 and 3) may join NSF.

2.2 Cash Payments for Informal Workers and Article 40

In July 2021, during the COVID-19 crisis, Thailand introduced a policy of cash payments for informal workers in locked-down provinces. To be eligible to receive the cash payments, people needed to be enrolled in Article 40.

As shown in Appendix Table 2 and Appendix Figure 1, the incentive payments were provided to two sets of provinces. In 13 provinces ("Treatment I" provinces), informal workers enrolled in Article 40 were offered a one-time payment of THB 5,000 (USD 135); this was subsequently extended to a second month, for a total payment of THB 10,000 (USD 270). In the second set of 16 provinces ("Treatment II" provinces), workers were offered THB 5,000 once; Treatment II provinces started one month after Treatment I. These incentives are substantial; for example, the Thai poverty line is approximately 3000 THB per person per month.

Crucially, workers who were not already enrolled in Article 40 were allowed to join prior to the incentive payment cutoff date. There are a wide range of ways to enroll: the SSO's website, by telephone, at 7-Eleven stores (of which there were more than 10,000 in Thailand in 2021), at Bank for Agriculture and Agricultural Cooperatives branches, and in the stores of a large hypermarket chain (Big C). Monthly payments can also be made at any of the above locations, via automatic deduction from a bank account, or through advanced payment (up to 12 months) at a post office.

To receive the lump sum grant, the SSO required the members to have a bank account that was tied to their national identification (called "PromptPay"). The grant was transferred to an individual's bank account through PromptPay. Note that once the incentive was received, there was no requirement to continue paying the premia.

Finally, it is important to note that the Thai government also announced, in July 2021, a nationwide 40 percent reduction in the Article 40 premiums for 6 months (from August 2021 to January 2022). This affected all 77 provinces, not just those with the cash incentives. This temporary reduction included all existing and new members. It was then renewed for another six months, from February to July 2022. As all provinces received the temporary reduction in premiums regardless of whether the province received the lump sum incentive, we can still independently identify the impact of the lump sum transfer despite the premium

reduction.

2.3 Data

We use two types of data for this study.

Administrative data. We use administrative data from Article 40 from the Thai Social Security Office (SSO). We have monthly, de-identified, individual panel data starting from May 2011. The data include members' characteristics, such as birth date, gender, and their registered branch. Contribution information includes contribution dates, contribution amounts and the tier selected.[4]

Survey data. To estimate the size of the informal labor force, we use data from the Thai Labor Force Survey (LFS), a nationally representative, cross-sectional survey. In every third quarter, the LFS asks whether the respondent belongs to Article 33, Article 39, or Article 40. We classify Article 33 members as formal workers, and all others as informal workers. Based on these data, in 2018, the size of the Thai labor force was 37.7 million, of which 24 million were informal workers. Of these, there were 9.8 million informal workers in the 29 treatment provinces.

3 Incentive impacts on enrollment and retention

3.1 Enrollment

Did the incentive increase enrollment? In Figure 1a, we graph the number of new enrollees by provincial group. Prior to incentive announcement in July 2021, the scheme attracted an average of 29,245 new members per month between July 2017 and June 2021 in both Treatment I and II provinces.

After July 2021, enrollment skyrocketed. In just one month, July 2021, *2.9 million* people joined. In August 2021, there was an announcement that the incentive for the Treatment I provinces was extended for a second month (i.e. a second THB 5000 payment), and that the incentive was also available to Article 40 members in Treatment II provinces. In that month, an additional *2.1 million* people joined in Treatment II provinces, and an additional *1.1 million* people joining in Treatment I areas. In total, 6.1 million new members joined Article 40 in those two months alone, tripling the number of existing members.

We also observe a small increase in enrollment in other provinces (0.3 million). There are several explanations: it could be due to the national 6-month premium discount; a

[4]Most individuals keep the same tier: less than 0.5 percent changed tiers within a 12-month period.

misunderstanding of where the incentive was available; an expectation that the incentive may be available in the future; or proof of provincial residency in a Treatment province that differs from the registered social security branch. Nonetheless, the increase in other provinces was tiny relative to the incentive provinces.

It is also possible that the incentive provinces just had many more uncovered informal workers. We show that this is not the case. Figure 1b graphs Article 40 coverage by quarter, in both the treatment and other provinces, as a share of the total informal workforce. (In this figure and the subsequent analysis, since they follow similar patterns, we combine Treatment I and II provinces).

Figure 1b shows that between 2017 and 2020, Article 40's coverage increased approximately from 4.5 percent to 6 percent for both treatment and other provinces. During the third quarter of 2021, the coverage in the treatment provinces increased to 72.6 percent from 6 percent. Using a difference-in-difference methodology, controlling for both quarter and province effects, yields the estimate of the impact of cash incentive on enrollment – a 64 percentage point increase (p-value < 0.001) in coverage in just one quarter.

In sum, administrative capacity and procedures were not fundamental barriers to expanding social insurance coverage. Large incentives led to near-universal coverage in the treatment provinces very quickly.

3.2 Retention

Do informal workers who were incentivized to enroll stay enrolled?

In Figure 2, we plot retention rates by month since enrollment for those who joined in during the incentive period (i.e. the third quarter of 2021) in treated provinces. For comparison, we also plot those who joined in the third quarter of 2016, as it allows a similar follow-up period to the 2021 cohort prior to the incentives beginning. (Results using other cohorts are extremely similar; see Appendix Figure 2).

Figure 2 shows that those who joined in the incentive period stopped paying their premia at a faster rate than those who joined prior to incentives. Six months after enrollment, the retention rate of those who enrolled in 2021 was 24 percent, compared to 53 percent for those who enrolled in 2016. This large dropoff is even more remarkable considering that the premium was 40 percent cheaper for those who enrolled in 2021. After one year, only 13 percent of those who enrolled with incentives remained in the program, compared to 43 percent sans incentive. By two years post-enrollment, the retention rate for those enrolled due to incentives had fallen to only 7 percent, compared to 35 for those joining sans incentive.

We consider several alternate explanations for these lower retention rates. First, we check

that they are not due to differences in observable characteristics. Those who join due to the incentives are slightly younger (43 vs. 47 years old), and more male (46 percent vs. 40 percent), compared to those sans incentives. Perhaps older members and women are more likely to stay in the scheme, since they may expect higher benefits. In Appendix Figure 3, we plot the the retention rate for those joining in 2021Q3, where we re-weight to match the gender-age distribution of the 2016Q3 cohort. The weighted line is only slightly higher than the unweighted line, suggesting that differences in retention rates cannot be explained by observable characteristics.

Second, there may be differences in the degree to which people exit Article 40 because they obtain a job in the formal sector. Appendix Figure 4 redoes Figure 2, but defines enrollment as being in *any* Social Security scheme. Again, this does not explain our findings.

A third potential difference is the premium change. As we discuss above, the premium was reduced nationwide by 40 percent in August 2021. One might expect that when the premia were raised again in August 2022, there could be a noticeable drop in retention rates (especially if people are not forward looking or falsely believed the reduction was permanent). However, as shown in Appendix Figure 5, there is no change in retention rates around the price change, and so it is unlikely to drive the low retention.

In short, these dramatically lower retention rates suggest that it is not just one-time enrollment costs that resulted in low insurance coverage – even conditional on enrolling, those who enrolled due to the incentives were more than 5 times as likely to drop coverage compared to those who enroll without.

4 Take-up and insurance choice problems

We next explore whether those who sign up for insurance due to the incentives make systematically different plan choices, and use a simple model to quantify what those different choices imply in terms of their ex-ante valuation of insurance benefits.

When first enrolling, one must choose among the three tier options, where options with higher premia offer higher benefits. These benefits are differentially valuable depending on workers' age and gender, both of which affect the likelihood of different types of covered events. We use a simple model of insurance choice to understand how new members' tier choices vary between those who enroll with and without the incentives and to characterize their different ex-ante preferences.

4.1 A model of demand for insurance

4.1.1 Model framework

We consider a two-stage choice problem. First, we assume that a potential consumer considers all three tiers and assesses which is best based on each tier's expected benefit levels, which vary based on age and gender. Second, the consumer compares the utility derived from choosing the best tier to the enrollment cost, and decides whether to enroll.

Conditional on enrolling, the consumer chooses among three insurance options, $j = \{1, 2, 3\}$. The consumer chooses option j that maximizes her utility:

$$\max_j U_i^j = MRS_i \times E[B_i^j] - E[p^j] + \epsilon_i^j \tag{1}$$

where $E[B_i^j]$ and $E[p^j]$ are the expected benefits and expected premium from choosing option j. MRS_i captures the degree of risk-aversion; that is, $MRS_i = 1$ corresponds to a risk-neutral consumer who cares only about expected benefits and costs, while $MRS_i > 1$ captures a risk-averse agent who values risky benefits more than the certain premium payment. That is, if the risk is sufficiently low, MRS_i captures the marginal rate of substitution between income in the state where the risk occurs and the state when it does not occur, following Chetty (2006) and Landais and Spinnewijn (2021).

ϵ_i^j is the unobserved utility shock of each tier choice, reflecting the preference of a consumer i on a choice j that is not captured by the expected benefit and premium terms. Note that in our dataset, while the expected benefits vary across age and gender, premiums are always the same for the same option over time, and we only observe consumers making one tier choice, so any unobservable choice-specific attributes are captured by ϵ_i^j rather than a plan-specific fixed effect.

The probability that a consumer i chooses choice j is:

$$\begin{aligned} P(y_i = j) =& P(U_i^j > U_i^k, \forall k \neq j) \\ =& P(MRS_i \times E[B_i^j] - E[p^j] + \epsilon_i^j > MRS_i \times E[B_i^k] - E[p^k] + \epsilon_i^k, \\ & \forall k \neq j). \end{aligned} \tag{2}$$

Assuming that $\epsilon_i^j \sim$ *i.i.d. extreme value* and substituting U_i^j into (2) yields the standard conditional logit choice probability:

$$P(y = j) = \frac{\exp\left(MRS_i \times E[B_i^j] - E[p^j]\right)}{\sum_k \exp\left(MRS_i \times E[B_i^k] - E[p^k]\right)}. \tag{3}$$

After knowing her optimal choice j_i^*, the consumer then compares the net benefit of the

best plan with the hassle cost of sign-up, c_i, and the incentive payment made conditional on signing up (if any), given by π_i (i.e. whether the sign-up is during the incentive period or not). The sign-up cost is heterogeneous across consumers, but identical for all plans. The consumer purchases insurance ($y^* = 1$) only if the expected net benefit from choosing plan j^* is greater than the sign-up cost less the incentive payment, i.e.

$$MRS_i \times E[B_i^{j^*}] - E[p^{j^*}] + \pi_i - c_i + \epsilon_i^{j^*} > 0 \tag{4}$$

Rearranging terms, we obtain:

$$MRS_i > \frac{E[p^{j^*}] - \pi_i + c_i - \epsilon_i^{j^*}}{E[B_i^{j^*}]} \tag{5}$$

Equation (5) shows that when we increase the selection incentive (i.e. increase π_i) the average MRS of those selecting into insurance should fall. Taking expectations yields:

$$P(y^* = 1) = \frac{\exp\left(MRS_i \times E[B_i^{j^*}] - E[p^{j^*}] + \pi_i - c_i\right)}{1 + exp\left(MRS_i \times E[B_i^{j^*}] - E[p^{j^*}] + \pi_i - c_i\right)} \tag{6}$$

We use these equations in two ways. First, equation (6) generates a demand-curve, whereby takeup is increasing in the expected benefits and the sign-up bonus, and decreasing in premiums and sign-up cost. We examine this in the data by plotting take-up as a function of expected benefits, and examining how this demand curve for insurance changes with and without incentives.

Second, we can estimate the choice among tiers of insurance using equation (3), for those who enroll both with and without the incentive. This allows us to test the prediction from equation (5) that ex-ante choices among tiers change with the incentives; that is, those induced to sign up by the incentives value benefits less (i.e. have lower MRS_i), and thus choose plan tiers accordingly.

4.1.2 Taking the model to the data

In taking this framework to the data, note that we do not observe c_i, but we observe take-up rates y_i^* and choices j_i^*. We also need to take a stand on how people think about expected benefits $E[B_i^j]$ and costs $E[p^j]$, given that duration on the program may vary across people. We assume that people who join expect the same contribution duration as people currently

on the program.[5] Expected benefits $B_i^j(t)$ are determined jointly by probabilities of getting each type of benefits, which vary as a function of age, gender, and the contribution time that determines benefit eligibility.

To calibrate this, denote by t the number of periods since the person first enrolled, and by $f(t)$ the empirical probability that someone is still enrolled in the program at time t. Expected discounted benefits of option j for an individual age m, gender k, and contribution time t can be written as:

$$E[B_{m,k}^j] = \int e^{-rt} B_{m,k}^j(t) f(t) dt, \tag{7}$$

where benefits are aggregated across benefits types. Likewise, the expected discounted price they pay for joining the program is given by:

$$E[p^j] = \int e^{-rt} p^j f(t) dt \tag{8}$$

We detail the expected benefits calculation in Appendix B. For the expected benefit calculation during the incentive period, we assume that the enrollees expected the price reduction for six months. Appendix Figures 8 and 9 plot expected benefits per month enrolled for each tier as a function of age; these are the upward sloping lines in the graphs, both using no discount and assuming a 3 percent discount rate. The horizontal lines in each graph indicate the monthly premium for each tier. The graphs show that expected benefits are increasing as a function of age when joining, and differ as a function of both age and gender across the three tiers. They also show that even without any risk-aversion, expected benefits exceed premiums above a certain age group.

4.2 Insurance take-up

To construct an empirical demand curve as suggested by equation (6), we plot the relationship between take-up rates and net prices, along the lines of Landais and Spinnewijn (2021). Each data point is the empirical take-up rate by each age-gender group for those who are aged 20-59 years, live in the 29 provinces, and who registered during the third quarter of either 2018 and 2021.[6]

To do so, we first calculate the 'net price.' As the 'net price' depends on which insurance tier the person chooses, we calculate the net price for the most advantageous plan for that age-gender cell, i.e. the choice j^* which solves (1) assuming $MRS_i = 1$, taking averages so that $E[\epsilon_i^j] = 0$.

[5] This will likely overstate expected benefits during the incentive period, when people had lower retention rates.

[6] We use 2018 data because the full set of current plan options started then.

The resulting demand curves for 2018 (first row) and 2021 (second row) are plotted in Figure 3 for women and men. We plot each point as a bin-scatter, and the demand curve from a locally-weighted regression.

The top panel of Figure 3 exhibits a downward sloping relationship between take-up rates and net expected prices in 2018, as expected: the higher the net expected price, the lower the take-up rate. This suggests that insurance demand is responsive to expected benefits. Interestingly, the slope is flatter for women than for men, suggesting a relatively higher valuation for women.

The demand curves look different with incentives (bottom row): we no longer observe a download sloping relationship between take-up and net expected prices. Note, however, the different x-axis scale – whereas the take-up rates vary from just above 0 to 1.5 percent without incentives, they vary from between 20-100 percent in the incentive period.

This is unsurprising for two reasons. First, we do not include the one-time incentive in the net benefit calculation. The grant is large compared to the monthly premia and expected benefits, so it is unsurprising that the valuation of the grant may swamp the smaller variation in expected benefits by age. Second, individuals who remained without insurance in 2021 are those who did not enroll in 2018. Therefore, they were people who did not value insurance, and their expected benefits might be lower than the average benefits used in the graph.

4.3 Insurance option choices

We next examine whether the incentives systematically selected in individuals with lower insurance valuations, as predicted by equation (5). We estimate equation (3) separately for both periods, using the variation in expected benefits across age-gender cells for identification. Substantively, this answers the question: do those induced to enroll by the incentives indeed have lower valuations of the insurance product, and do they know this *ex-ante* when they sign up?

Before estimating equation (3), we present some reduced form facts about the different insurance choices in different periods. Recall that Option 1 has the lowest premium, but also the lowest coverage, while Option 3 has both higher premiums and coverage. Figure 4 graphs option shares of enrollees by age groups, comparing those who joined sans incentive (the third quarter of 2018) with those who joined with the incentive (the third quarter of 2021). While we use 2018 as our control, this figure looks similar with other time periods as the control group (Appendix Figure 6).

Three important facts emerge from Figure 4. First, Option 2 (the red area) has the largest shares in both periods and for all age groups. Second, in 2018, enrollees rarely chose

Option 1 (less than one percent). One reason for this is that while Option 1 costs 30 THB less than Option 2 per month, Option 2 pays 50 THB back (with interest) as a lump sum pension when the member reaches the age of 60. Therefore, Option 2 dominates Option 1 in a simple calculation, unless individuals have a very high discount rate.

With incentives, however, Option 1's share increased to approximately 40 percent, suggesting that individuals who enroll during the incentive period discount the future at a very high rate. It is also possible that some people may not carefully evaluate the options or do not value them at all, and simply pick the cheapest option that allows them to get the incentive.

Third, the plan choices differ systematically by age; in particular, Option 2, which does not include child allowance benefits, declines from about 80% for the youngest workers in the scheme to about 55% for prime-age workers. The fact that age-related expected benefits predict option choices motivates the estimation of the MRS_i that rationalizes these choices, which we turn to next.

To estimate what this implies for insurance valuations, we estimate a conditional logit model, using Equation 3. The coefficient and marginal willingness to pay (MWTP), or MRS, estimates are presented in Table 1. The sample includes the new members aged 20-59 years who enrolled in July-Sep 2018 and Aug-Sep 2021.

The results confirm that those who enrolled without incentives value the insurance more than those who enrolled with incentives, as predicted by Equation (5). On average, someone who enrolled in 2018 is willing to pay 1.81 THB for a 1 THB value of insurance. In contrast, one who enrolled in 2021 is only willing to pay 1.03 THB for a 1 THB value of insurance.

It should also be noted that the magnitude of the coefficient estimates during 2021 are two to four times smaller than the magnitude of the estimates during 2018, implying that the variance of the unobserved components during the incentive period is much larger. In other words, the observed attributes (expected premium and expected benefit) do not explain choice behavior in 2021 as well as they do in 2018.

One additional potential explanation for why people may chose Option 1 is that some may already be enrolled in the National Savings Fund (NSF), another government subsidized retirement savings scheme. As described above, NSF members are not eligible to choose Option 2 or 3.[7] While we know the total number of NSF members in these provinces, we don't observe individual NSF membership. To gauge the potential impact of this, we assume that the same fraction of NSF members as the overall informal population signed up for Article 40. If so, this would imply that 47 percent of Option 1 enrollees were forced to

[7]Since options 2 and 3 provide a government subsidized savings contribution, NSF members can only choose Article 40's Option 1, which does not subsidize savings.

choose Option 1 because of NSF membership.[8] In Column 3, we therefore randomly drop 47 percent of Article 40 members who chose Option 1. In this case, the marginal willingness to pay for 1 THB value of insurance is 1.28 rather than 1.03. Even in this exercise, the average valuation of insurance among enrollees (i.e. MRS) is substantially lower during the incentive period than before.

Consistent with the idea that those choosing Option 1 value insurance less, we also find that those choosing Option 1 stopped their contribution sooner than those choosing the other options (Appendix Figure 7.)

5 Conclusion

Providing social insurance in developing countries is hard: large informal sectors imply that it is nearly impossible to collect premiums through payroll taxes, and so governments instead ask informal workers to voluntarily participate. However, take-up remains very low. Several potential reasons exist for this low take-up. Knowledge about insurance may be low. People may want to enroll, but the hassle costs of doing so may be high. Or, people may simply choose not to because they do not value the types of insurance products offered. Understanding the role of each of these explanations is important for improving social insurance policy design.

Studying a policy experiment in Thailand—which offered a large incentive for informal workers to enroll in social insurance-we find that the incentives raised coverage by 67 percentage points – from 6 percent of informal workers to 73 percent – within just two months. In the end, most of those who enrolled to receive the incentives dropped out: after a year, only 13 percent of those who enrolled with incentives were still paying monthly premia, compared to 43 percent without. Modeling enrollees' preferences through their insurance tier choices, we show that those that were induced to enroll by the incentives value the insurance less than those who enrolled without. In short, administrative enrollment barriers do not appear to drive low take-up; rather, the people who don't enroll without the incentives seem not to value the insurance very much.

This raises questions for both policy design and future research. Should governments re-evaluate the kinds of social insurance products that they offer? Or are people getting their insurance decisions wrong in other ways? Future research should do more to help us to distinguish between these questions.

[8]There are 1.68 NSF members in these provinces. 70% of them is 1.18 million people, or 47 percent of 2.5 million people who signed up for Option 1 in this period.

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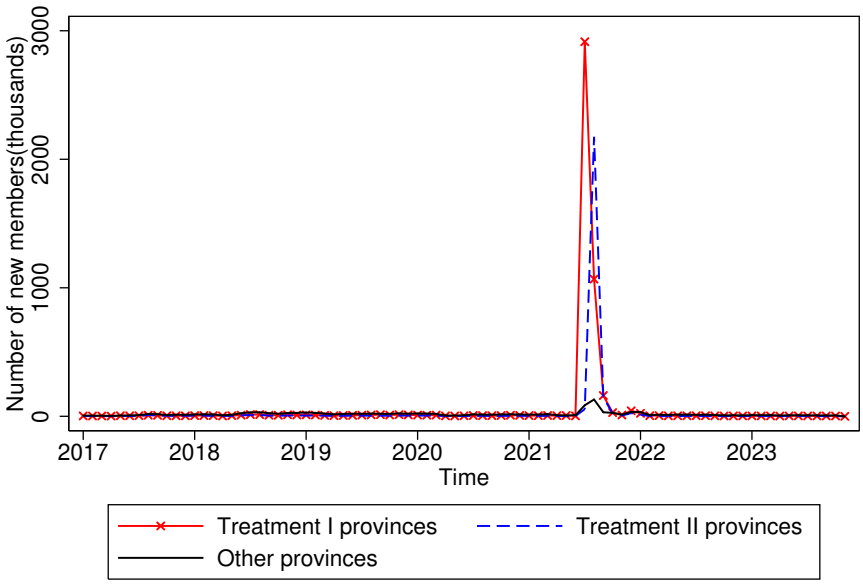
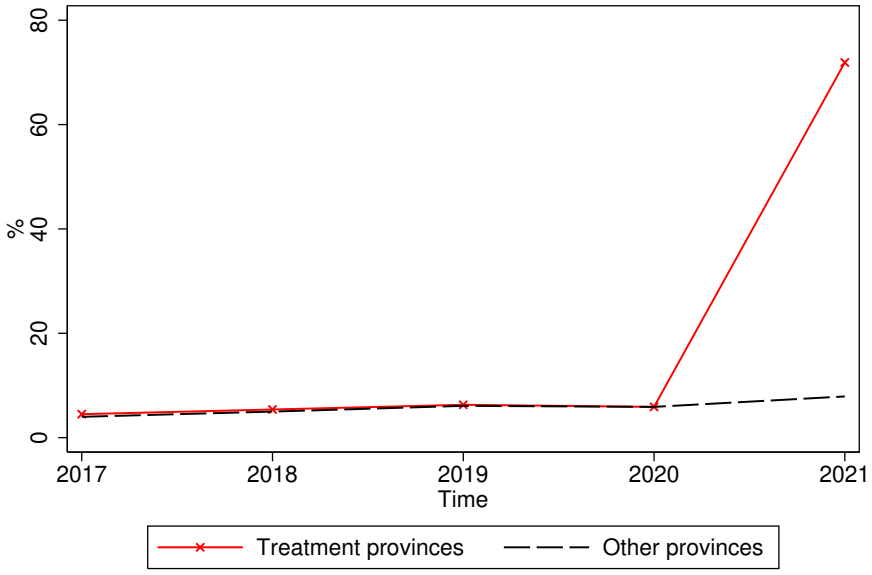
Figures and Tables



(a) Numbers of newly registering members over time



(b) Article 40's coverage over time

Figure 1: The Article 40 number of new members and coverage

Note: Panel A compares new registrants in the treated and other provinces using Social Security data. Panel B plots the quarterly coverage rates in the treatment versus other provinces. Note that the coverage rate is the ratio of the total members actively paying contribution from the Social Security data and the total number of informal workers obtained from the Thai Labor Force Survey.

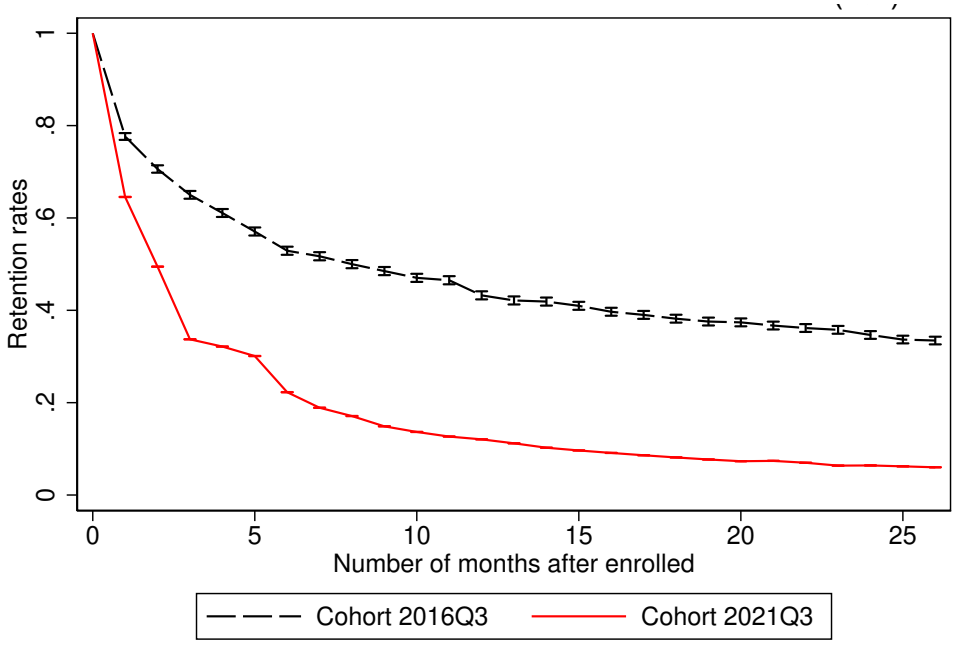


Figure 2: Retention rates of those joining Article 40 in the third quarter of 2016 and 2021

Note: This figure plots the monthly retention rate of those who enrolled in the 3rd quarter of 2021, compared to those who enrolled in the 3rd quarter of 2016. The retention rate in a given month is defined as the number of people who paid their premium that month divided by the total number of those who had initially joined. Error bars depict 95% confidence intervals.

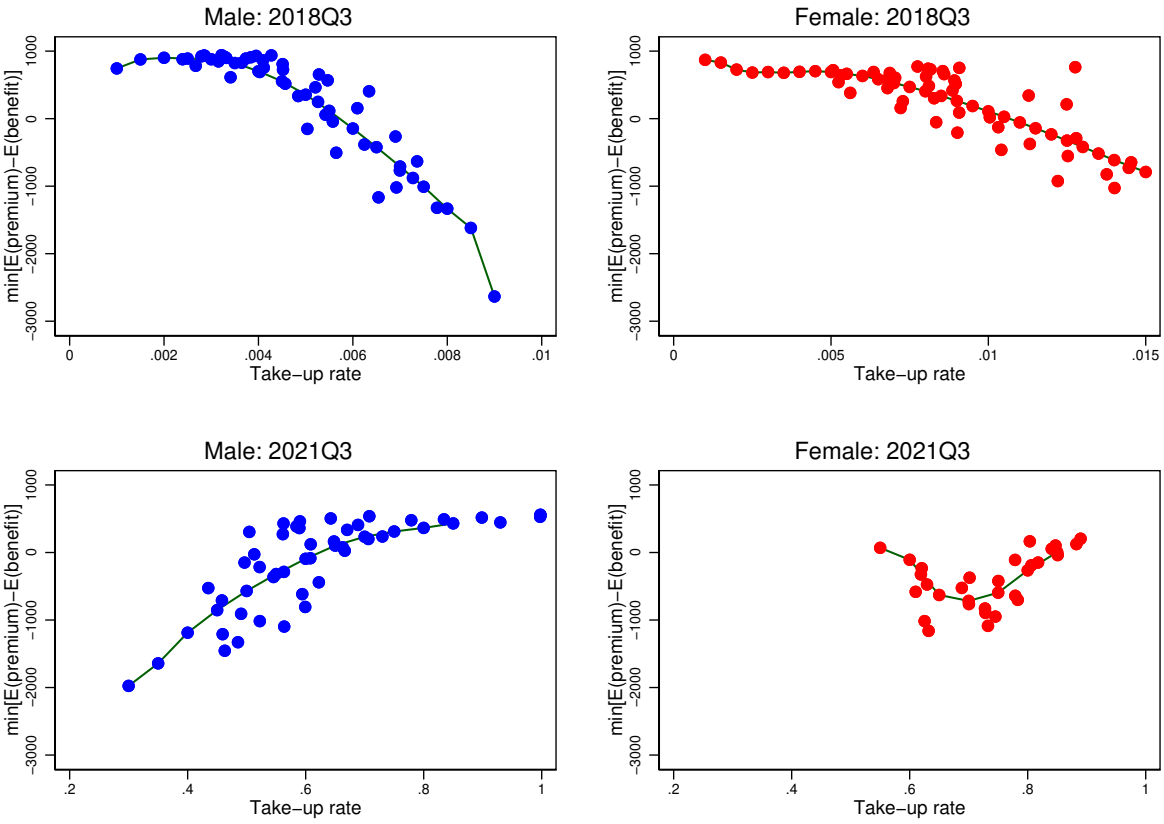
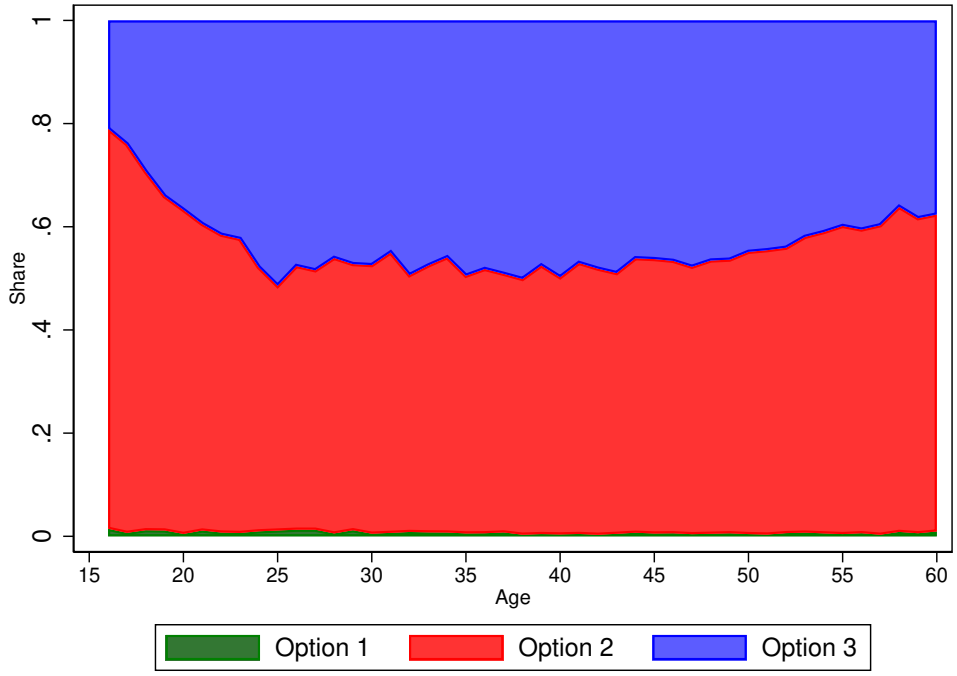
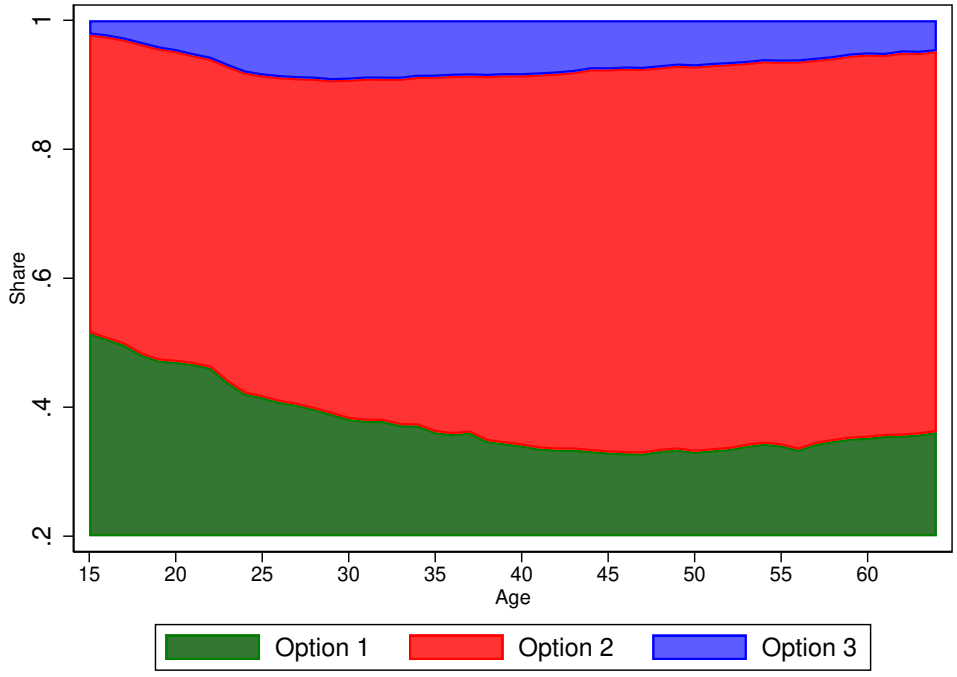


Figure 3: Take-up rates and expected net prices

Note: This figure plots the relationship between take-up and expected net price (expected benefit-expected premium) for the third quarter of 2018 (top panel) and 2021 (bottom panel) by gender. Note that expected net price is based on the best tier choice of each age and gender group.



(a) Cohort 2018Q3



(b) Cohort 2021Q3

Figure 4: Option shares by age, treatment provinces

	Pre-incentive period	Incentive period	
	[1]	[2]	[3]
Expected benefit	0.0041	0.00119	0.0022
	(0.000032)	(0.000002)	(0.000002)
Expected premium	-0.0023	-0.00117	-0.0017
	(0.000018)	(0.000001)	(0.000001)
Marginal WTP	1.81	1.03	1.28
	(0.0016)	(0.0006)	(.0004)
Sample	Full	Full	NSF Adjusted
Observations	56,816	5,165,881	4,277,081

Table 1: Conditional logit estimates

Note: We estimate a conditional logit model using Equation 3. The pre-incentive period in Column 1 is 2018Q3, while the incentive period in Columns 2 and 3 is 2021Q3. In Column 3 ('NSF Adjusted'), we randomly dropped 47 percent of observations who chose Option 1, assuming these members were constrained to choose Option 1 due to being National Savings Fund members.

Online Appendix

A Supplementary figures and tables

	Option 1	Option 2	Option 3
Contribution rate (THB/month)	70	100	300
Government matched contribution (baht per month)	30	50	150
Benefits			
1) Compensation for income loss due to injury or sickness			
(Eligibility: Contribute 3 of 4 months prior to the month in which injuries or illnesses occurred)			
A) In-patient admitted to the hospital for >1 day (THB/day)	300	300	300
B) No admission (doctor's certificate to rest for >3 days) (THB/day)	200	200	200
Limits of A) + B)	<=30 days/year	<=30 days/year	<=90 days/y
C) Out-patient visit (doctor's certificate to rest <= 2 days) (THB/time)	50 <= 3 times/year	50 <= 3 times/year	Not covere
2) Disability			
(Eligibility and cash benefit vary			
Contribute 6/10, 12/20, 24/40, 36/60 months prior to disability will get 500, 650, 800, 1000 THB/month respectively)			
Receive periodical cash benefits (years)	15	15	lifelong
Funeral grant if death occurs while receiving cash benefits (THB)	20,000	20,000	40,000
3) Death			
(Eligibility: Contribute 6 of 12 months prior to the month of death)			
Funeral grant (THB)	25,000	25,000	50,000
Death benefits (if contribute >60 months prior to the month of death) (THB)	8,000	8,000	Not covere
4) Old age			
(Eligibility: reach 60 years old)			
Lump-sum benefit (THB)	not covered	50 x months	150 x montl
5) Child allowance			
(Eligibility: Contribute 24 of 36 months)			
Monthly child allowance per new-born child (up to 2 children)	not covered	not covered	200 THB/mo age 0-6

Appendix Table 1: Details of Article 40 benefits

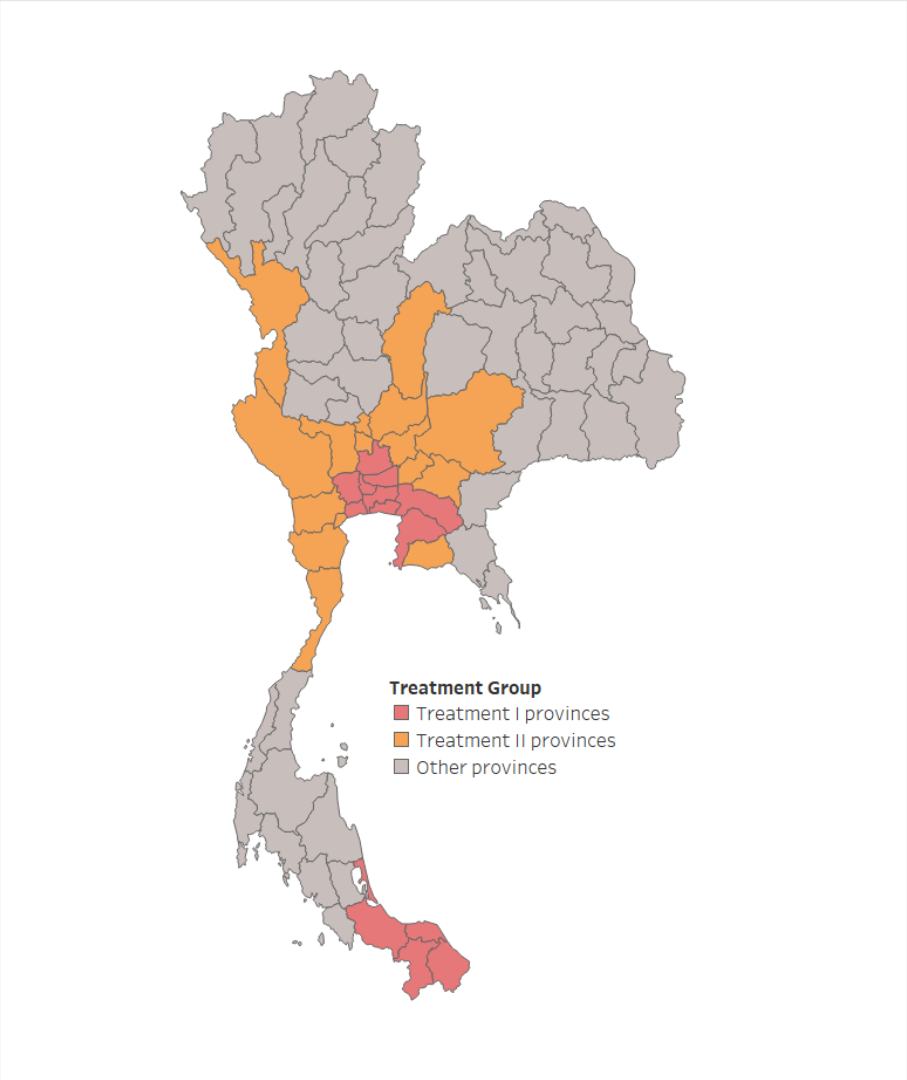
Province group	Group	Registration date	Date transfer		Amount	No. beneficiary
			Round 1	Round 2		
Treatment I (13 provinces)[1]	1	before Jul 31	Aug 24-26	Sep 22-23	2mth x THB 5000	4 million
	2[3]	Aug 4-24	Sep 28		1mth x THB 10,000	0.34 million
Treatment II (16 provinces)[2]	1	before Aug 3	Aug 24-26		1mth x THB 5000	
	2	Aug 4-24	Sep 20-21		1mth x THB 5000	2.3 million

[1] include Bangkok, Nakhon Pathom, Nonthaburi, Pathum Thani, Samut Prakan, Samut Sakhon, Pattani, Yala, Narathiwat, Songkhla, Chonburi, Chachoengsao, and Phra Nakhon Si Ayutthaya

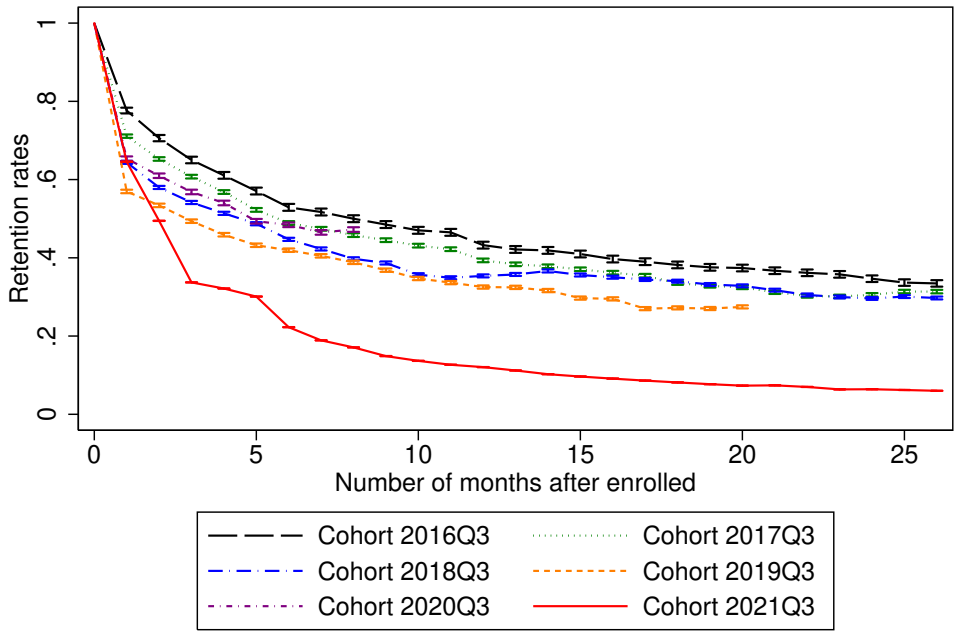
[2] include Nakhon Ratchasima, Rayong, Ratchaburi, Saraburi, Suphan Buri, Kanchanaburi, Lopburi, Phetchabun, Prachuap Khiri Khan, Prachinburi, Phetchaburi, Tak, Ang Thong, Nakhon Nayok, Samut Songkhram, and Sing Buri

[3] only include people who did not registered before July 31, 2021 in three of the 13 provinces, namely Chonburi, Chachoengsao, and Phra Nakhon Si Ayutthaya

Appendix Table 2: Timeline

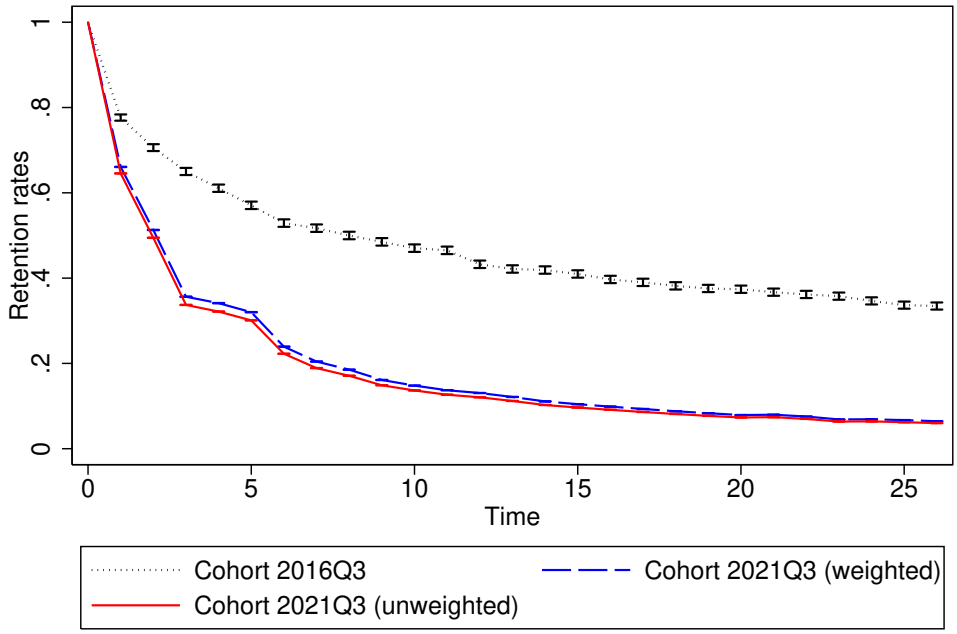


Appendix Figure 1: Map of treatment and other provinces



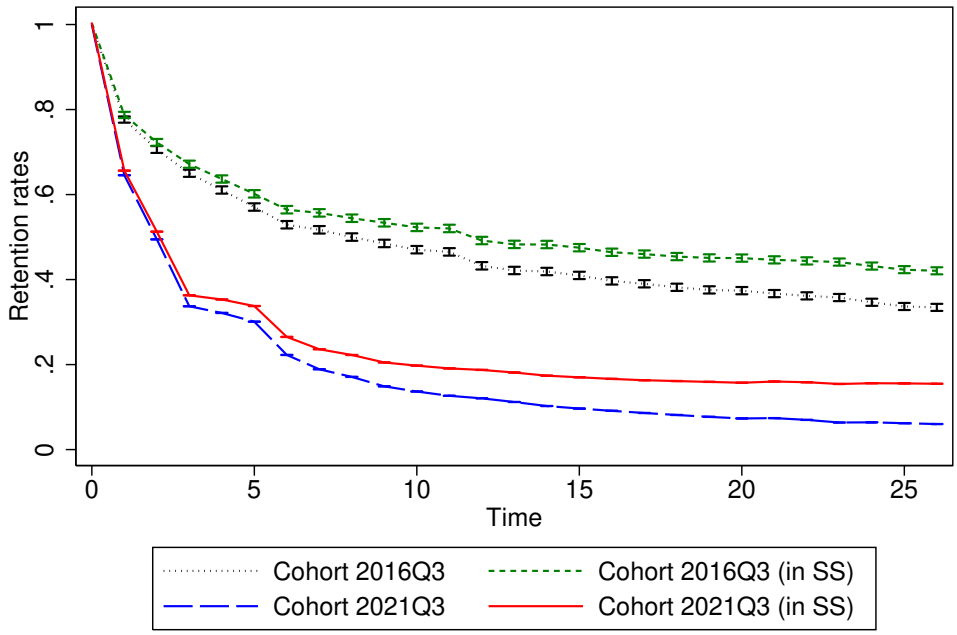
Appendix Figure 2: Retention rates of different cohorts

Note: Error bars depicting the 95% confidence intervals for the mean retention rates. Data of cohort 2019Q3 and 2020Q3 is truncated due to its overlapping with the incentive period.



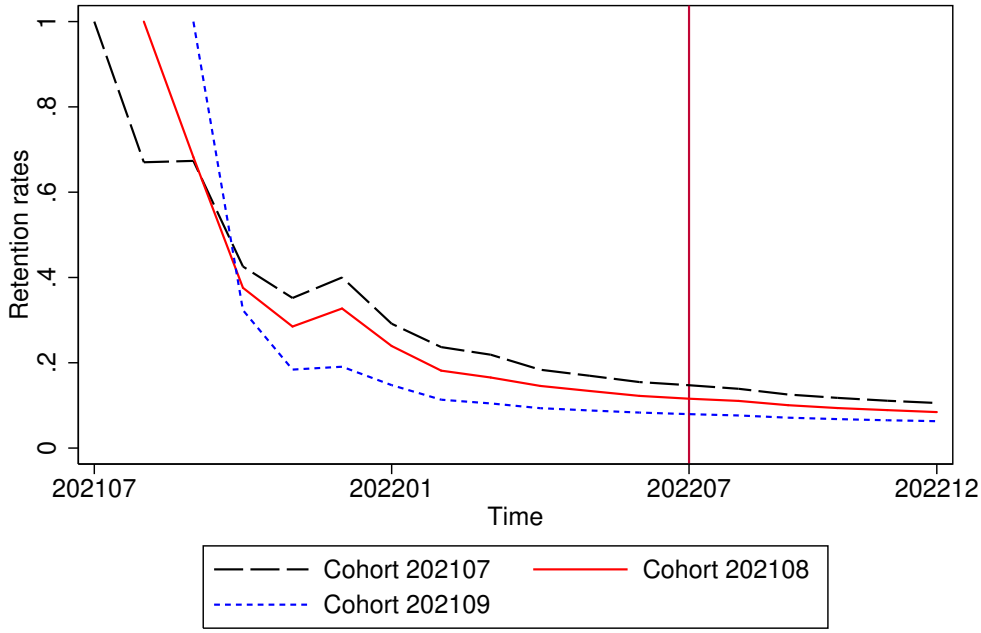
Appendix Figure 3: Retention rates after controlling for age and gender differences

Note: Error bars depicting the 95% confidence intervals for the mean retention rates. Weighted retention rates are calculated using weights by the gender-age of 2016Q3 cohort.



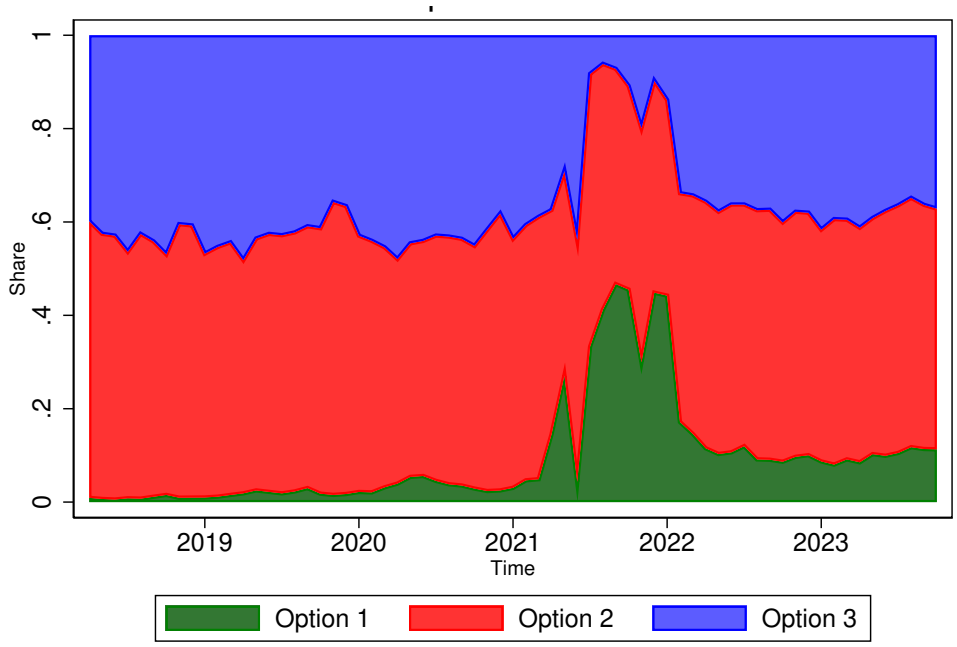
Appendix Figure 4: Retention rates for remaining in the entire social security system

Note: Error bars depicting the 95% confidence intervals for the mean retention rates. Remaining in social security includes Article 40 members who exited to Article 33.

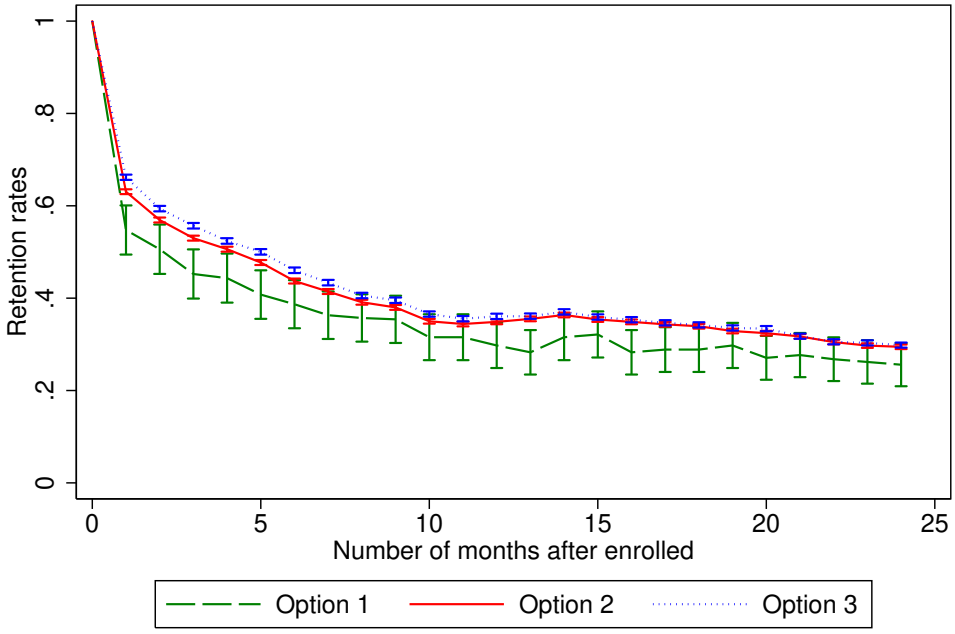


Appendix Figure 5: Retention rates for incentive cohorts, showing the period when the premium reduction ended

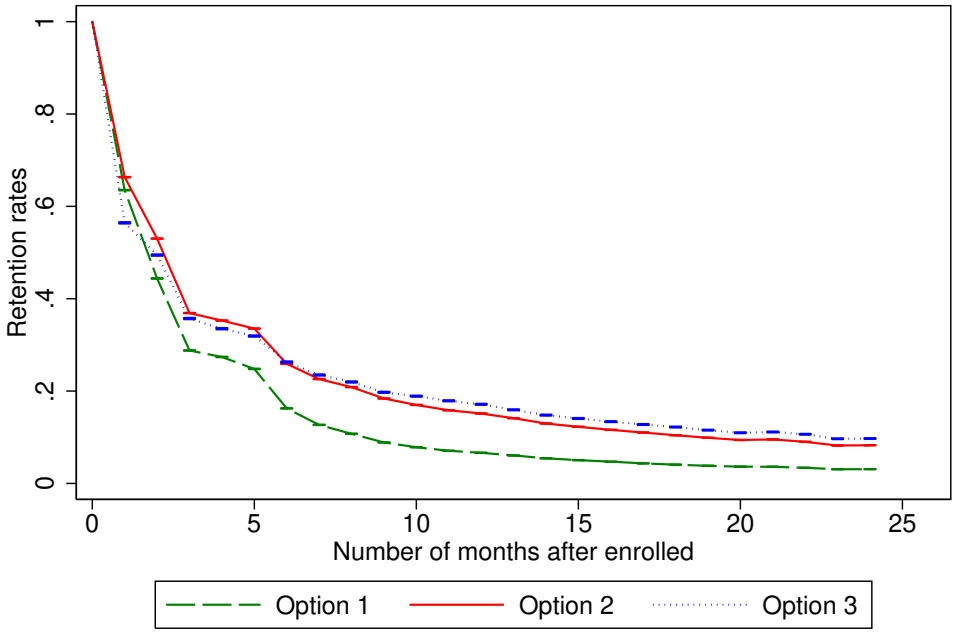
Note: The vertical line indicates the month when the premium discount ended.



Appendix Figure 6: Share of new members by option over time



(a) Retention rates by option, 2018Q3, treatment provinces



(b) Retention rates by option, 2021Q3, treatment provinces

Appendix Figure 7: Retention rates by option

Note: Error bars depicting the 95% confidence intervals for the mean retention rates

B Calculation of Article 40's expected benefits

The expected benefit of option j for an individual age m, gender k with length of contribution t years is calculated as follows.

$$\begin{aligned} E[B_{mk}^{j}(t)] =& (1-\Pi_{mk})(\lambda_1 * BenOP_{mk}^{j}(t) + \lambda_2 BenIP_{mk}^{j}(t) \\ &+ \lambda_3 BenDis_{mk}^{j}(t) + \lambda_4 BenChild_{mk}^{j}(t) \\ &+ \lambda_5 BenPension_{mk}^{j}(t)) + \Pi_{mk}\lambda_6 BenDead_{mk}^{j}(t) \end{aligned} \tag{9}$$

where Π_{mk} is the probability of dying at age m for gender k; $(1-\Pi_{mk})$ is the survival probability; λ_j for $j = 1, ..., 6$ are preference weights on each type of benefits. We assume equal weights for all benefit types because we do not have any prior knowledge on people's preferences.

- $BenOP_m, k^j(t)$ and $BenIP_m, k^j(t)$ are components of income loss compensation due to illnesses. The expected benefits are calculated from expected outpatient and inpatient visits, respectively. The average number of visits per year by age and gender are from the Universal Healthcare Coverage Scheme 2017. The distributions of length of stay (at home for outpatient or at the hospital for inpatient) are calculated from the Health and Welfare Survey (2019). The waiting period is 3 months, implying that for $t < 4/12$, $BenOP_m, k^j(t)$ and $BenIP_m, k^j(t)$ are zero for all options. For $t = 4/12$ or higher, the benefits for options 1 and 2 are the same. Option 3 has a higher benefit for those taking a rest or staying in hospital for longer than 30 days.

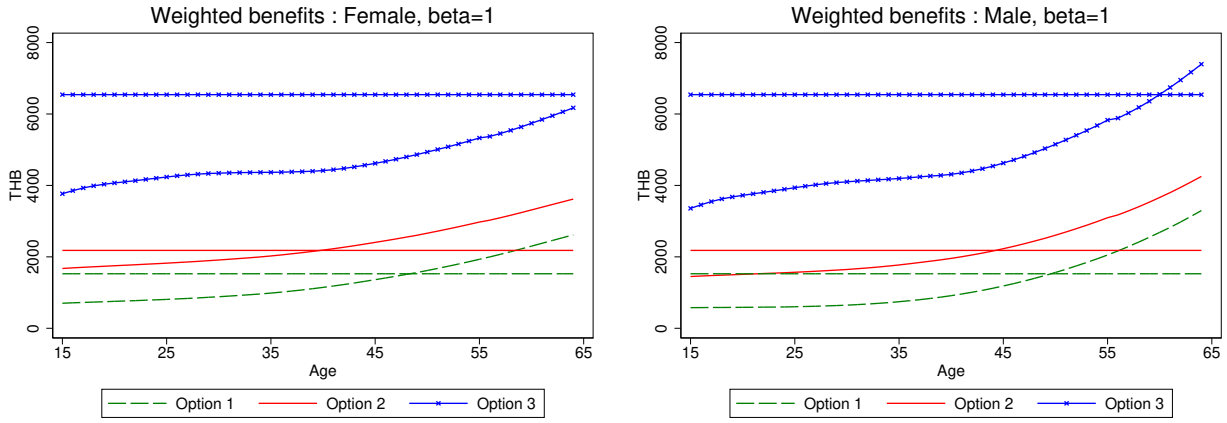
- $BenDis_{mk}^{j}(t)$ is the disability benefit with a waiting period of 6 months. For $t < 7/12$, $BenDis_{mk}^{j}(t) = 0$. Disability benefit goes up by the length of contribution, 500 THB for 7-12 months, 650 THB for 13-24 months, 800 THB for 25-36 months and 1000 THB for 37 months or longer. Options 1 and 2 pay disability benefit for 15 years whereas Option 3 pays the benefit for lifelong. The disability rates by age and gender are from the Social Security 2020. We assume those with disability live for 20 years after the incident.

- $BenChild$ is the child allowance benefit, available only for Option 3 with a waiting period of 24 months. The fertility rate is from the UN. Since either father or mother can claim child allowance benefits, we assume the same fertility rates for both genders. We assume no children were born before the 25th month.

- $BenPension$ is the old-age income benefit, available for Options 2 and 3 and equals to $t * 12 * 50$ for option 2 and $t * 12 * 150$ for option 3. We assume that everyone claims at the age of 60. We have an option in this formula on whether people discount each year before they reach 60, $\beta^{(60-m)}$, and whether they expect any interest rate. In the main result, we assume $\beta = 1$ and $r = 0$.

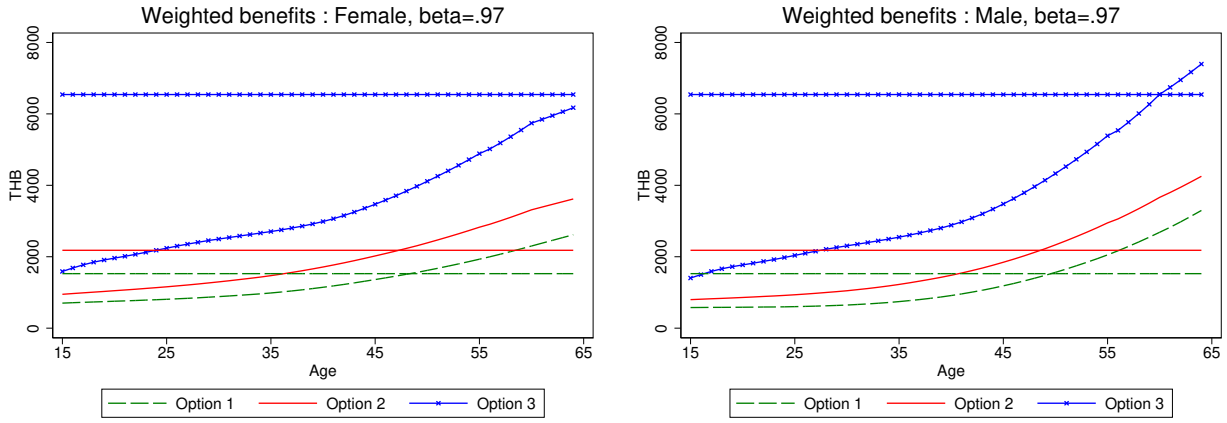
- *BenDead* is the death benefit, 25000 THB for Options 1 and 2; and 50000 THB for Option 3 with a waiting period of 6 months. The mortality rates by age and gender are are from the UN.

For all types of benefits, we fit polynomial functions to smooth the data and extrapolate to older ages for the case of disability rate. Figure 8 and 9 present the expected benefit over age for female and male respondents during the pre-incentive period. The expected benefits are weighted over the distribution of the period existing members staying on the scheme. Figure 8 assumes that $\beta = 1$, and figure 9 assumes that $\beta = .97$.



(a) (b)

Appendix Figure 8: benefit evaluation



(a) (b)

Appendix Figure 9: Benefit evaluation, beta = 0.97

In all figures, expected benefits increases with age as the likelihood of being sick and disabled increase with age. For option 3, although the benefit of child allowance was highest for those aged 25-45 years, other benefits which increase with age dominate. Females have

higher expected benefits than male when young, primarily due to their higher probabilities of hospital visits. The horizontal lines of the same patterns are their expected costs. If the expected benefit lines above the horizontal line, a risk neutral consumer would prefer that option to having no insurance. Regarding the choice of β, for a smaller value of β, the more consumer discounts the future, which means that the lump sum pension available for options 2 and 3 value less for them.

The table below presents the conditional logit estimate with the assumption of $\beta = .97$.

	Pre-incentive period	Incentive period	
	[1]	[2]	[3]
expected benefit	0.00106	0.00097	0.0015
	(0.00002)	(0.000002)	(0.000002)
expected premium	-0.0003	-0.00079	-0.00096
	(0.000007)	(0.000001)	(0.000001)
Marginal WTP	3.45	1.23	1.59
	(0.03)	(0.0013)	(0.0009)
Sample	Full	Full	NSF Adjusted
No. of obs.	56,186	5,165,881	4,277,913

Appendix Table 3: Conditional logit estimates with $\beta = .97$.

Note: See notes to Table 1.