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Subsidised Micro-Takaful and the Financial Well-Being of Low-Income Households in Malaysia: Evidence from the Perlindungan Tenang Voucher

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ABSTRACT

This paper evaluates the Perlindungan Tenang Voucher (PTV), a Malaysian government subsidy that enabled low-income households to buy micro-takaful and micro-insurance cover. Using a survey of 599 heads of household who reported on the periods before and after the intervention, a difference-in-differences model compares the change in health expenditure of PTV beneficiaries with that of non-beneficiaries, and the same comparison is made for households holding other takaful or insurance policies. Kaplan–Meier estimates and a Cox proportional hazards model describe the risk of a hospital visit, and a logit model identifies which households hold unsubsidised cover. Health expenditure fell for all households after the intervention, but by less among PTV beneficiaries than among non-beneficiaries, so the voucher did not by itself produce a measurable reduction in out-of-pocket spending; this is consistent with the very small number of claims made under the programme. Households with other takaful or insurance policies, by contrast, recorded a large relative fall. The risk of a hospital visit rises with household spending and chronic illness, and unsubsidised cover is more common among households with higher income, more education and more assets. Because pre-intervention values were recalled and households chose whether to use the voucher, the estimates are best read as associations. A premium subsidy alone is not enough: a renewed programme should simplify claims, tell beneficiaries what they are covered for and match benefits to the health costs that low-income households face.

Keywords: Micro-Takaful, Subsidy, Financial Well-Being, Out-of-Pocket Health Expenditure, Difference-in-Differences

1. INTRODUCTION

Households in Malaysia pay a large share of health costs directly. Out-of-pocket payments accounted for between 32 and 41 per cent of current health expenditure every year from 2000 to 2019 and stood at 34.6 per cent in 2019. This is about twice the world average of 18.0 per cent and well above the shares in Thailand, Brunei Darussalam, the United Arab Emirates, the United Kingdom and the United States (Figure 1). Within the region, Malaysia's share was below those of Indonesia and the Philippines throughout the period, although Indonesia's share had fallen almost to the Malaysian level by 2019

(Figure 2). High out-of-pocket payments expose households to catastrophic health spending (Van Doorslaer et al., 2007), and in Malaysia the burden falls most heavily on low-income households, some of which finance care by borrowing or selling assets (Said et al., 2020; Mohd Hassan et al., 2022). The COVID-19 pandemic made this exposure more visible and increased the demand for affordable protection.

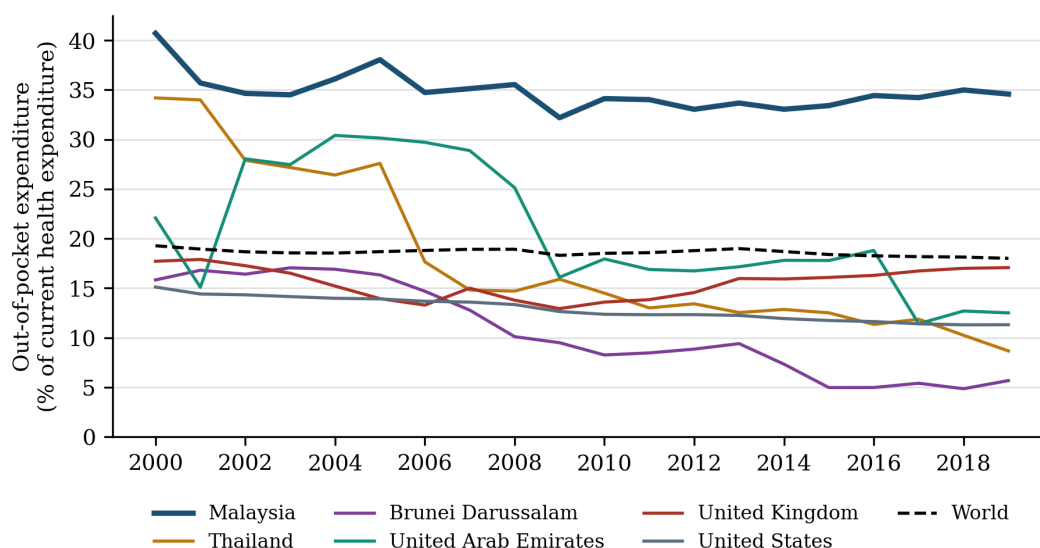


Figure 1. *Out-of-Pocket Health Expenditure: Malaysia and Selected Countries, 2000–2019*

Source: World Development Indicators

The Government of Malaysia responded with the Perlindungan Tenang Voucher (PTV) programme, launched in September 2021. In 2021, eligible recipients of Bantuan Prihatin Rakyat (BPR) received a RM50 voucher to purchase a Perlindungan Tenang product from a licensed insurer or takaful operator. From 1 January 2022, eligible recipients of Bantuan Keluarga Malaysia (BKM) received a RM75 voucher to purchase a new Perlindungan Tenang product or renew an existing plan, and the 2022 vouchers remained valid until 31 December 2022 (MyPTV, n.d.-a, n.d.-b). Perlindungan Tenang products are designed around five principles: affordability, accessibility for target segments, adequate protection value, ease of understanding and purchase, and simple nomination and claims processes. The initiative was intended to widen the supply and quality of products for underserved households and to strengthen their financial resilience (Fauzi & Laldin, 2022). Takaful operators responded with new products. FWD Takaful, for example, offers FWD Kasih, an online micro-takaful plan for the bottom 40 per cent of households by income (B40) that accepts the voucher and provides four levels of cover ranging from RM10,000 to RM40,000 for people aged 19 to 54 (FWD Takaful, n.d.-a, n.d.-b).

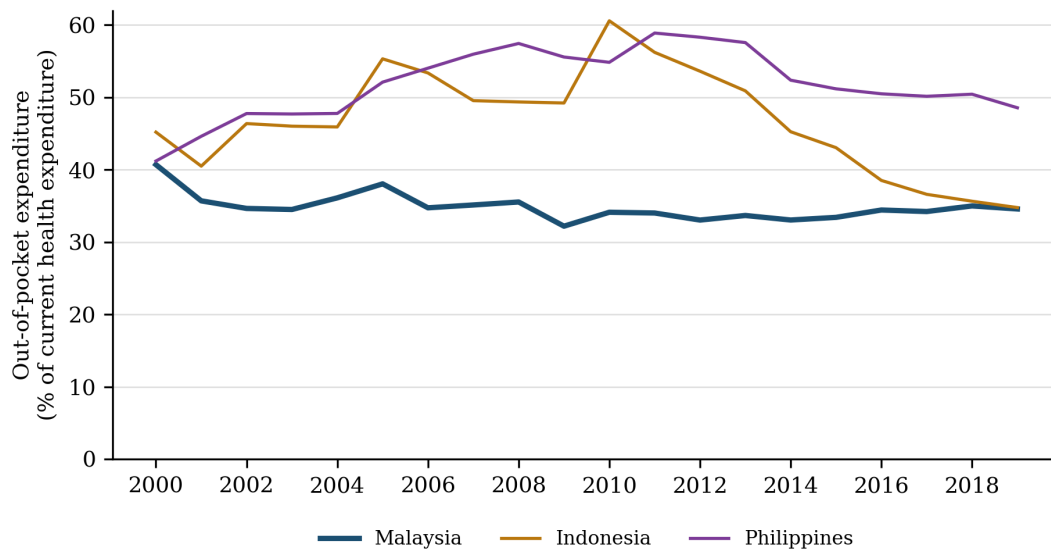


Figure 2. *Out-of-Pocket Health Expenditure: Malaysia, Indonesia and the Philippines, 2000–2019*
Source: World Development Indicators (World Bank, n.d.).

Two questions about the programme remain open. The first is whether subsidised cover reduced what low-income households pay for health care. Buying a plan does not guarantee it will be used when awareness is low. The second is whether households will keep their cover once they must contribute themselves. Retention matters for households, which lose protection when a plan lapses, and for takaful operators, whose solvency and growth depend on a stable pool of participants and on sound risk management (Haron & Taylor, 2009; Alokla et al., 2023). Retention in family takaful has been linked to trust, commitment and satisfaction with service from purchase to termination (Arifin et al., 2020).

This paper addresses both questions with a survey of 599 heads of household. It has three objectives: (1) to estimate the effect of the PTV on household health expenditure by comparing beneficiaries with non-beneficiaries before and after the intervention; (2) to compare the risk of a hospital visit between insured and uninsured households and to identify the household characteristics associated with that risk; and (3) to identify the characteristics of households that hold takaful or insurance without a subsidy, as an indication of who is likely to continue after the voucher ends.

The results do not support a simple reading of the programme as a success. Health expenditure fell for all households between the two periods, but it fell by less among PTV beneficiaries than among non-beneficiaries. Households that hold other takaful or insurance policies, in contrast, recorded a large relative fall. We interpret this difference as evidence that the subsidy brought households into cover without bringing them to use it, and we draw implications for the design of any renewed programme. The paper contributes household-level evidence on a recent Malaysian intervention. It applies survival analysis, which is well established in banking and insurance research, to examine takaful participants' exposure to health events.

The rest of the paper is organised as follows. Section 2 reviews the related literature. Section 3 describes the data and methods. Section 4 presents the results, and Section 5 discusses them. Section 6 concludes with policy implications, limitations and directions for future research.

2. RELATED LITERATURE

Impact evaluation asks what happened to the people a programme served compared with what would have happened without it. It has become a standard part of the assessment of social programmes for low-income groups (Gertler et al., 2016). When random assignment is not possible, the difference-in-differences design compares the change in an outcome among participants with the change among non-participants, assuming that the two groups would otherwise have followed the same trend (Fredriksson

& Oliveira, 2019). The design has been applied to health insurance reforms; Miao et al. (2018), for example, use it to evaluate the effects of a higher outpatient reimbursement ratio in rural China.

The evidence on subsidised health cover for low-income households is mixed. Enrolment does not always lead to use: Shah et al. (2022) examine how far households in Nepal enrolled in a social health security scheme make use of it, and Thomas et al. (2024) ask whether government health subsidies in India reach the people they are meant for. Insurance also does not always reduce what households pay. Wagstaff and Lindelow (2008) show that health insurance in China was associated with a higher risk of large out-of-pocket payments, because insured people sought more care and more costly care. Whether a subsidy improves financial well-being therefore depends on what the plan covers and whether participants claim it.

Research on takaful has concentrated on the supply side: product design for low-income households (Fauzi & Laldin, 2022), risk management (Haron & Taylor, 2009), solvency (Alokla et al., 2023), management soundness (Salami et al., 2024) and customer loyalty (Arifin et al., 2020). Evidence on how a public subsidy for takaful affects the households that receive it is scarce.

Survival analysis has a long history in finance. Lane et al. (1986) introduced the Cox (1972) proportional hazards model to the study of bank failure. Later work used it for early warning (Whalen, 1991), for bank failures and acquisitions (Wheelock & Wilson, 2000) and for comparing Islamic with conventional banks (Aliyu & Yusof, 2017; Pappas et al., 2017). Insurers use the same methods to model lapse, time to claim and mortality (Aziz & Razak, 2019). They have rarely been applied to takaful participants. This paper applies them to the risk that a household member needs hospital care, which is the event that turns health risk into out-of-pocket cost.

3. DATA AND METHODS

3.1 Data and Sample

The data come from a questionnaire survey of heads of household in Malaysia, which produced 599 usable responses. We purposively sampled respondents from the beneficiaries' records and administered the survey directly in Bahasa Malaysia across different ethnic groups nationwide. Respondents reported household health expenditure, hospital visits, and other characteristics for the period before and after the intervention, yielding two observations per household and 1,198 household-period observations over the one year before and after the intervention.

A household is classed as a PTV beneficiary if 'it redeemed the voucher for a Perlindungan Tenang plan'. A second indicator identifies households that hold a takaful or insurance policy other than a PTV plan. The outcome in the impact analysis is household health expenditure, measured as the natural logarithm of the respondent's annual income in ringgit, for the 2020-2021 period; therefore, the magnitudes of the coefficients and constants in Tables 2 and 3 suggest a log scale. The covariates are the spouse's age and education, household income, general household expenses, house location, ownership of a television, jewellery, and a car, hospital visits before and after the intervention, and indicators for asthma, heart disease, hypertension, and kidney disease in the household.

3.2 Difference-in-Differences

The effect of the voucher on health expenditure is estimated with the model.

$$y_{it} = \alpha + \gamma \text{Treated}_i + \lambda \text{Post}_t + \delta (\text{Treated}_i \times \text{Post}_t) + X_{it}'\beta + \varepsilon_{it} \quad (1)$$

where y_{it} is the health expenditure of household i in period t , Treated_i equals one for PTV beneficiaries, Post_t equals one in the period after the intervention, X_{it} is the vector of covariates, and ε_{it} is the error term. The coefficient γ measures the difference between beneficiaries and non-beneficiaries before the intervention, and λ measures the change over time among non-beneficiaries. The coefficient of interest

is δ , the difference-in-differences estimate: the change among beneficiaries over and above the change among non-beneficiaries. A negative value means that the voucher is associated with lower health expenditure.

The estimate has a causal interpretation only if beneficiaries and non-beneficiaries would have followed the same trend without the voucher. With two periods, this assumption cannot be tested, and households decided for themselves whether to use the voucher, so we treat δ as an adjusted comparison and discuss alternative explanations in Section 5. The model is estimated with and without covariates. For comparison, the same model is estimated with the treatment indicator replaced by an indicator for holding other takaful or insurance, which indicates whether cover that households pay for themselves is associated with a different change in spending.

3.3 Survival Analysis

The second objective concerns exposure to health events. The event is a hospital visit, which marks the point at which a health risk becomes a household cost, and analysis time is the respondent's age. The survivor function $S(t)$ is therefore the probability that a respondent has reached age t without the event; it does not refer to mortality. It is estimated without parametric assumptions by the Kaplan–Meier estimator (Kaplan & Meier, 1958; Kalbfleisch & Prentice, 2002):

$$S(t) = \prod_{i: t_i \leq t} \left(1 - \frac{d_i}{n_i}\right) \quad (2)$$

where t_i are the ages at which events are observed, d_i is the number of events at t_i and n_i is the number of respondents still at risk just before t_i . Respondents who report no hospital visit are treated as right-censored at their current age. Survivor curves are compared between insured and uninsured respondents, and between respondents whose health expenditure is at or above the sample mean and those below it.

The association between household characteristics and the risk of a hospital visit is estimated with the Cox (1972) proportional hazards model,

$$h(t | X_i) = h_0(t) \exp(X_i' \beta) \quad (3)$$

where $h_0(t)$ is the baseline hazard, which is left unspecified, and X_i contains the number of children, general and health expenditure, and indicators for asthma, diabetes, heart disease, hypertension, poor health in the household and mild illness in the family. Results are reported as hazard ratios, $\exp(\beta)$: a ratio above one means that the characteristic is associated with a higher risk of a hospital visit at any given age (Cleves et al., 2010).

3.4 Likelihood of Holding Cover Without a Subsidy

The survey cannot observe whether PTV beneficiaries renewed their plans after the vouchers expired. The third objective is therefore approached indirectly, by asking which households hold takaful or insurance that they pay for themselves. The logit model is

$$\ln\left(\frac{p_i}{1-p_i}\right) = \theta_0 + Z_i' \theta, \quad p_i = \Pr(C_i = 1 | Z_i) \quad (4)$$

where C_i equals one if household i holds a takaful or insurance policy other than a PTV plan and zero if it holds none, and Z_i contains religion, income, general expenses, education, health conditions, assets and housing characteristics. The coefficients are log-odds; odds ratios are reported alongside them. The characteristics that predict unsubsidised cover indicate which beneficiaries are most likely to continue when the subsidy is withdrawn.

4. RESULTS

4.1 Sample Characteristics

Table 1 summarises the sample. Respondents are spread across age groups: the largest group is aged 46 and above (28.2 per cent; 169 respondents), followed by those aged 20 to 25. Spouses are older, with 45.7 per cent aged 46 and above. Employment is divided almost evenly between the private sector (31.2 per cent), self-employment (31.4 per cent) and the public sector (26.5 per cent), and about 10 per cent of respondents are unemployed. The most common qualification is the Sijil Pelajaran Malaysia (SPM), held by 38 per cent of heads of household and of spouses, and about one in five holds a degree. FWD Kasih, the plan described in Section 1, accepts participants aged 19 to 54, so respondents aged 55 and above in the oldest group fall outside that plan's age range; all age groups are included in the analysis.

Table 1

Characteristics of Respondents (per Cent of 599 Respondents)

Characteristic	Head of household	Spouse
Age (years)		
20–25	21.5	3.5
26–30	13.2	8.5
31–35	14.0	12.0
36–40	11.7	11.7
41–45	10.4	10.0
46 and above	28.2	45.7
Not disclosed	1.0	8.5
Education		
Primary	5.2	4
SRP/PMR/PT3	8	6
SPM	38.2	38
STPM/STAM/Diploma	24.2	22
Degree	19	18
Other	5.5	7
Not disclosed	0.2	5
Occupation		
Public sector	26.5	—
Private sector	31.2	—
Self-employed	31.4	—
Unemployed	10	—
Not disclosed	1	—

4.2 The Voucher and Health Expenditure

Table 2 reports the difference-in-differences estimates for the PTV. Three results stand out in column (1). First, health expenditure fell between the two periods for households that did not receive the voucher: the coefficient on the post-intervention period is -0.753 , a fall of about 53 per cent if the outcome is in logarithms. This change is common to the comparison group and cannot be attributed to the programme. Second, PTV beneficiaries spent more on health than non-beneficiaries before the intervention (0.856). Third, the difference-in-differences estimate is positive and significant at the 1 per cent level (0.541). Health expenditure among beneficiaries still fell by $-0.753 + 0.541 = -0.212$ log points, or about 19 per cent, but by much less than among non-beneficiaries. The estimates therefore do not show that the voucher reduced out-of-pocket health spending.

The result does not depend on the specification. Adding covariates in column (2) leaves the estimate almost unchanged (0.535), and columns (3) and (4) reproduce the estimate and the period effect. Among the covariates, health expenditure is higher in households with an older or better-educated spouse, higher income, a television or jewellery, and a member with asthma (0.850, significant at the 1 per cent level). Hospital visits before and after the intervention are both associated with higher spending. Car ownership and house location are associated with lower spending. Heart disease, hypertension and

kidney disease have positive but insignificant coefficients. These coefficients describe which households spend more on health; they are not effects of the voucher.

Table 2

Difference-in-Differences Estimates: PTV and Health Expenditure

	(1)	(2)	(3)	(4)
Post-intervention period	−0.753*** (0.091)	−0.757*** (0.098)		−0.753*** (0.091)
PTV beneficiary	0.856*** (0.201)	0.546** (0.234)		
PTV beneficiary × Post (DiD estimate)	0.541*** (0.145)	0.535*** (0.156)	0.541*** (0.145)	
Age of spouse		0.023*** (0.008)		
Household income		0.228** (0.098)		
General expenses		0.158 (0.109)		
House location		−0.452** (0.209)		
Television		0.571** (0.233)		
Jewellery		0.235** (0.096)		
Car		−0.310* (0.180)		
Asthma		0.850*** (0.250)		
Education of spouse		0.296*** (0.096)		
Hospital visit before intervention		0.499* (0.275)		
Hospital visit after intervention		0.535** (0.215)		
Heart disease		0.121 (0.338)		
Hypertension		0.261 (0.223)		
Kidney disease		0.193 (0.567)		
Constant	5.149*** (0.107)	0.005 (0.992)		5.272*** (0.040)
Observations	1,198	1,092	1,198	1,198
R-squared	0.040	0.163	—	—

Notes: The dependent variable is household health expenditure. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

4.3 Other Takaful and Insurance Cover

Table 3 repeats the analysis with households that hold a takaful or insurance policy other than a PTV plan as the treated group. The pattern is the reverse of Table 2. These households also spent more on health before the intervention (0.892). However, their spending then fell by far more than that of households without such cover: the difference-in-differences estimate is −1.110 and significant at the 1 per cent level, and it is −1.089 with covariates. If the outcome is in logarithms, this is a relative fall of about 67 per cent. The covariates behave as in Table 2, and asthma is again the condition most clearly associated with higher spending (0.892).

Taken together, Tables 2 and 3 show that the cover which households chose and paid for is associated with a large fall in out-of-pocket spending, whereas the subsidised PTV cover is not. Section 5 considers why.

Table 3

Difference-in-Differences Estimates: Other Takaful/Insurance and Health Expenditure

	(1)	(2)	(3)	(4)
Post-intervention period	−0.577*** (0.080)	−0.585*** (0.085)		−0.577*** (0.080)
Holds other takaful/insurance	0.892*** (0.261)	0.533* (0.320)		
Other takaful/insurance × Post (DiD estimate)	−1.110*** (0.366)	−1.089*** (0.393)	−1.110*** (0.366)	
Age of spouse		0.020** (0.009)		
Household income		0.231** (0.097)		
General expenses		0.157 (0.110)		
House location		−0.523** (0.203)		
Television		0.555** (0.234)		
Jewellery		0.212** (0.095)		
Car		−0.303* (0.181)		
Asthma		0.892*** (0.252)		
Education of spouse		0.276*** (0.095)		
Hospital visit before intervention		0.696** (0.274)		
Hospital visit after intervention		0.589*** (0.218)		
Heart disease		0.278 (0.335)		
Hypertension		0.259 (0.226)		
Kidney disease		0.407 (0.570)		
Constant	5.193*** (0.102)	0.304 (0.991)		5.272*** (0.040)
Observations	1,198	1,092	1,198	1,198
R-squared	0.021	0.155	–	–

Notes: As for Table 2. The treated group is households that hold a takaful or insurance policy other than a PTV plan.

4.4 Exposure to Hospital Visits

Figure 3 shows the Kaplan–Meier survivor curves for insured and uninsured respondents. Almost no respondent reports a hospital visit before the mid-twenties; after that, the probability of remaining without a visit declines steadily and reaches about one-half in the mid-fifties. The curve for insured respondents lies slightly above that for uninsured respondents between about ages 45 and 55, but the two curves cross several times and remain close throughout. The figure does not show a clear difference between the groups.

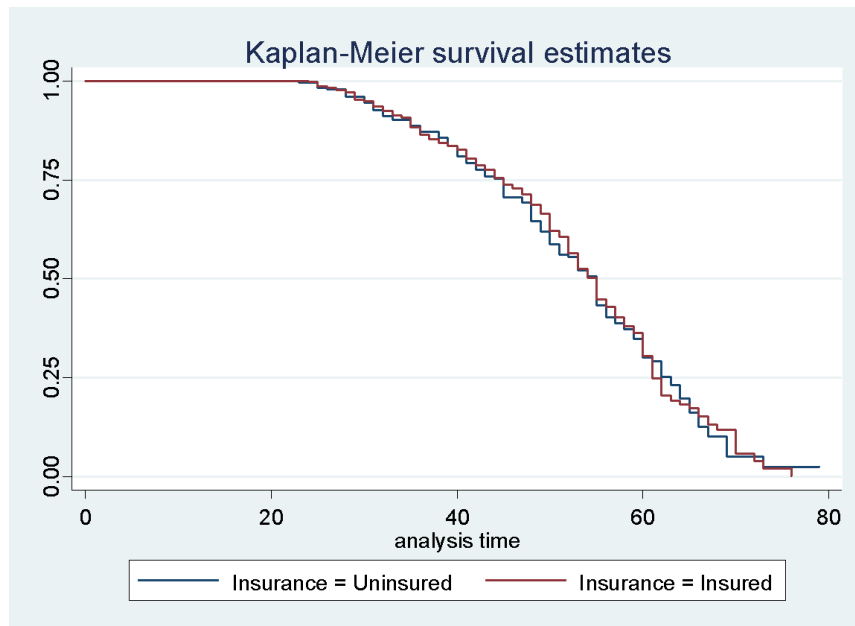


Figure 3. *Kaplan–Meier Survivor Curves: Insured and Uninsured Respondents*
 Note: The event is a hospital visit, and analysis time is the respondent's age in years.

Figure 4 divides respondents into those with health expenditure at or above the sample mean. The curves again lie close together up to about age 55. At older ages, the estimates rest on few respondents, and the curves cross so that no conclusion can be drawn from differences in the tails.

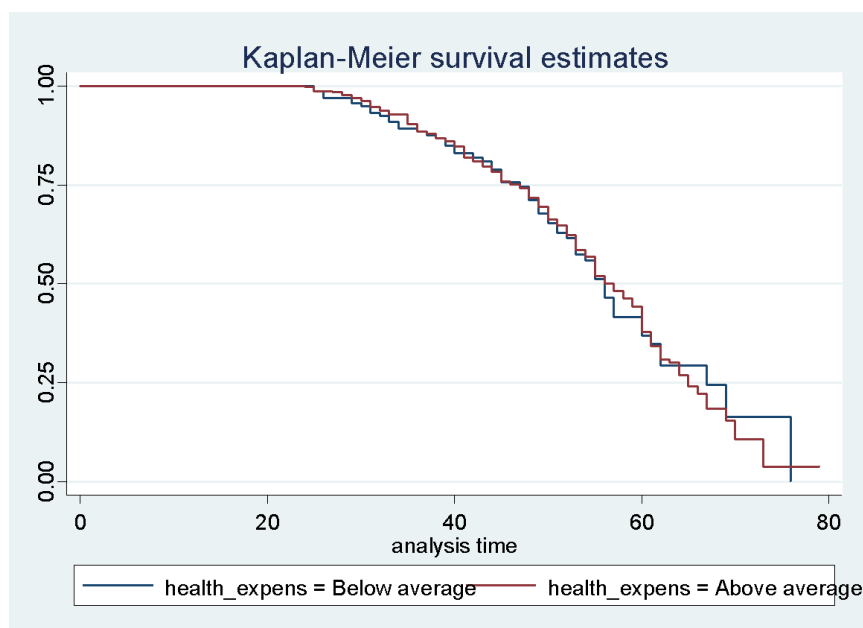


Figure 4. *Kaplan–Meier Survivor Curves: Health Expenditure Above and Below the Sample Mean*
 Note: The event is a hospital visit, and analysis time is the respondent's age in years.

The Cox model in Table 4 is more informative because it simultaneously relates the risk of a hospital visit to several characteristics. Two associations are significant at the 1 per cent level: a one-unit increase in general expenditure is associated with a 72 per cent higher hazard of a hospital visit, and a one-unit increase in health expenditure with a 46 per cent higher hazard. Heart disease (hazard ratio 2.26), poor health in the household (1.81), asthma (1.71) and mild illness in the family (1.71) are all associated with a higher hazard, but only at the 10 per cent level, so this evidence is weak. Hypertension and the number of children are not significant. Diabetes is associated with a lower hazard (0.37, significant at the 5 per cent level). This runs counter to expectations; it may reflect routine management of diabetes in outpatient clinics rather than hospitals, or the small number of respondents with diabetes, and it should

be checked. Because spending and hospital visits are jointly determined, the expenditure coefficients capture an association rather than the effect of spending on health risk.

Table 4

Cox Proportional Hazards Model of the Risk of a Hospital Visit

	Hazard ratio	Coefficient
Number of children	0.859 (0.110)	-0.152 (0.129)
General expenditure	1.722*** (0.290)	0.543*** (0.169)
Health expenditure	1.462*** (0.161)	0.380*** (0.110)
Asthma	1.714* (0.539)	0.539* (0.314)
Poor health in the household	1.807* (0.562)	0.591* (0.311)
Diabetes	0.373** (0.156)	-0.986** (0.419)
Heart disease	2.255* (0.939)	0.813* (0.417)
Hypertension	1.511 (0.505)	0.413 (0.334)
Mild illness in the family	1.706* (0.477)	0.534* (0.280)
Observations	588	588

Notes: The event is a hospital visit, and the analysis time is the respondent's age. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. A hazard ratio above one indicates a higher risk of a hospital visit.

4.5 Who Holds Cover Without a Subsidy?

Table 5 reports the logit model of holding takaful or insurance other than a PTV plan. Income and education matter most clearly. The odds of holding unsubsidised cover rise by about 22 per cent with each step in household income and by about 30 per cent with each step in the education of the spouse, and they are about 51 per cent higher for households that own a car and 19 per cent higher for each additional room in the house. General expenses also have a positive coefficient. Religion is significant (odds ratio 1.37): Muslim respondents are more likely to hold cover, which is consistent with the appeal of takaful as a Shariah-compliant form of protection.

Health conditions work in both directions. Households with a member who has heart disease have odds of holding cover about 2.4 times those of other households, whereas households with hypertension have odds about 29 per cent lower. One explanation is that a serious diagnosis raises the perceived value of protection, while common chronic conditions lead to exclusions or higher contributions that low-income households cannot afford; the data cannot separate these. Two further associations are significant only at the 10 per cent level: households with a hospital visit after taking out insurance and households that own their home are less likely to hold cover. The age of the spouse, the sex of the respondent, being head of the household, house location, television and jewellery are not significant.

The households most likely to maintain coverage without a subsidy are therefore those with higher incomes, more education, and more assets. These are not the households the voucher was designed for, which suggests that many PTV beneficiaries will let their plans lapse unless the contribution remains subsidised or the benefit becomes more visible to them.

Table 5*Logit Model of Holding Takaful or Insurance Other Than a PTV Plan*

	Coefficient	Odds ratio
Religion	0.314*** (0.107)	1.37
Head of household	-0.091 (0.227)	0.91
Household income	0.199*** (0.065)	1.22
General expenses	0.00016*** (0.00005)	1.0002
House location	-0.211 (0.139)	0.81
Television	0.182 (0.175)	1.20
Jewellery	0.078 (0.058)	1.08
Car	0.410*** (0.132)	1.51
Hospital visit after insurance	-0.258* (0.154)	0.77
Hypertension	-0.340** (0.166)	0.71
Heart disease	0.866*** (0.272)	2.38
Education of spouse	0.264*** (0.065)	1.30
Rooms in the house	0.176** (0.073)	1.19
House ownership	-0.295* (0.176)	0.74
Age of spouse	-0.001 (0.007)	1.00
Gender	0.187 (0.226)	1.21
Constant	-3.877*** (0.823)	—
Observations	599	

Notes: The dependent variable equals one if the household holds a takaful or insurance policy other than a PTV plan. Coefficients are log-odds; standard errors in parentheses. Odds ratios are the exponentials of the coefficients. *** p<0.01, ** p<0.05, * p<0.1.

5. DISCUSSION

The central finding is that the voucher brought low-income households into takaful and insurance but is not associated with lower out-of-pocket health spending. Three explanations are consistent with the evidence, and they are not mutually exclusive.

The first is that the cover was hardly used. With only 490 claims reported nationally by June 2023, almost all beneficiaries continued to pay their health care costs out of pocket. A plan that is not claimed on cannot reduce spending, whatever its terms. Low use may reflect limited awareness of what the plan covers, a claims process that is difficult for first-time participants, or benefits that pay on specified events and do not reimburse the routine outpatient costs that make up most household health spending. Meanwhile, PTV provide coverage services to reduce the health cost burden through subsidies.

The second is selection. Beneficiaries spent more on health care than non-beneficiaries before the intervention, suggesting that households with greater health needs were more likely to use the voucher. If their needs persisted while spending fell elsewhere, a positive difference-in-differences estimate would still be observed even if the voucher had no effect. The general fall in health spending between the two periods is likely to reflect the circumstances of the pandemic and its recovery and should not be attributed to the programme.

The third is that cover encourages the use of care. Insured households may seek treatment they previously went without, or move to more costly providers, so that spending rises even as access improves (Wagstaff & Lindelow, 2008). On this reading, higher spending among beneficiaries is not necessarily a loss of well-being, but it is not financial protection either.

The contrast with other *takaful* and insurance policies is instructive. Households that pay for their own cover recorded a large relative fall in health spending. These households chose their plans, are more likely to understand them, and, as Table 5 shows, have higher incomes and more education. Their plans are also likely to offer broader medical benefits than a micro-product priced to fit a RM50-RM75 voucher. Part of the difference, therefore, reflects who buys such cover, but it also indicates that cover that is understood and used reduces out-of-pocket costs.

The survival results add that the risk of needing hospital care is concentrated in households with higher spending and with chronic or recurrent illness. However, the evidence for individual conditions is weak. Asthma appears in both parts of the analysis, as the condition most clearly associated with higher health spending and as one associated with a higher risk of a hospital visit. Households in this position stand to gain the most from protection and are also the most costly to cover, creating the tension that micro-*takaful* products must manage (Haron & Taylor, 2009; Alokla et al., 2023).

6. CONCLUSION

This paper examined the Perlindungan Tenang Voucher with a survey of 599 heads of household. Health expenditure fell for all households after the intervention. However, it fell by less among PTV beneficiaries than among non-beneficiaries, so the voucher is not associated with reduced out-of-pocket health spending. Households with other *takaful* or insurance policies recorded a large relative fall. Survivor curves for hospital visits differ little between insured and uninsured respondents, and the risk of a visit rises with household spending and, less clearly, with chronic illness. Households with coverage without a subsidy have higher incomes, more education, and more assets than those without.

6.1 Policy Implications

For policymakers, the results suggest that a premium subsidy is necessary but not sufficient. If the programme is renewed, the voucher should be accompanied by measures that turn enrolment into protection: a simple claims procedure, active communication to beneficiaries about what they are covered for and how to claim, and regular publication of claims data to detect under-use early. Because the households most likely to continue without help are the better-off, a continuing or tapered subsidy for the poorest beneficiaries would be better targeted than a single voucher for all. Raising awareness is a shared responsibility between the government and industry, not the government alone.

For *takaful* operators and insurers, low uptake poses commercial and social risks, as participants who see no benefit do not renew their policies. Operators can respond with plans whose benefits match the costs that low-income households meet most often, including outpatient care for conditions such as asthma, and with digital channels that connect the participant, the hospital and the operator so that claims are settled quickly. Products for households with chronic conditions need pricing and reserves that protect the solvency of the *takaful* fund, and regulators should take these risks into account in prudential requirements for micro-*takaful*.

6.2 Limitations and Future Research

The study has limitations. Pre-intervention values were reported by recall. With two periods, the assumption that beneficiaries and non-beneficiaries would have followed parallel trends cannot be tested, and households selected themselves into the programme, so the estimates should not be read as causal effects. The period also overlaps with the pandemic, which altered health care use for reasons unrelated to the voucher. Continuation is inferred from the holding of other cover. It is not observed directly, and several associations in the survival and logit models are significant only at the 10 per cent level.

Future research could use administrative records of takaful operators to study lapse, renewal, and time to first claim among PTV participants directly. It could compare households just above and just below the eligibility thresholds for BPR and BKM to obtain a cleaner estimate of the voucher's effect. Research on service quality and on the claims experience from the participant's point of view would help explain retention, and research on plans structured by health condition, age, and income would inform the design of products that include households most at risk.

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REFERENCES

- Aliyu, S., & Yusof, R. M. (2017). A panel survival analysis for Islamic banks. *International Journal of Economics, Management and Accounting*, 25(2), 381–410.
- Alokla, J., Daynes, A., Pagas, P., & Tzouvanas, P. (2023). Solvency determinants: Evidence from the Takaful insurance industry. *The Geneva Papers on Risk and Insurance – Issues and Practice*, 48, pages 847–871.
- Arifin, J., Bakar, N. A., Ghazali, P. L., Remli, N., & Muhammad, H. (2020). The role of satisfaction in mediating trust, commitment and loyalty in family Takaful. *The Journal of Management Theory and Practice (JMTP)*, 28–34.
- Aziz, N., & Razak, S. A. (2019). Survival analysis in insurance attrition. *AIP Conference Proceedings*, 2184(1). AIP Publishing.
- Cleves, M., Gould, W., Gutierrez, R. G., & Marchenko, Y. V. (2010). *An introduction to survival analysis using Stata* (3rd ed.). Stata Press.
- Cox, D. R. (1972). Regression models and life-tables. *Journal of the Royal Statistical Society: Series B (Methodological)*, 34(2), 187–220.
- Fauzi, M. P. N. F. N., & Laldin, M. A. (2022). Micro-takāful scheme for protecting low-income households' homes in Malaysia. *ISRA International Journal of Islamic Finance*, 14(3), 303–314.
- Fredriksson, A., & Oliveira, G. M. D. (2019). Impact evaluation using difference-in-differences. *RAUSP Management Journal*, 54(4), 519–532.
- FWD Takaful. (n.d.-a). *FWD Kasih*. <https://www.fwd.com.my/direct/kasih/>

- FWD Takaful. (n.d.-b). *FWD Takaful offers micro-takaful plan with FWD Kasih* [News release]. <https://www.fwd.com.my/news-release/fwd-takaful-offers-micro-takaful-plan-with-fwd-kasih/>
- Gertler, P. J., Martinez, S., Premand, P., Rawlings, L. B., & Vermeersch, C. M. (2016). *Impact evaluation in practice* (2nd ed.). World Bank Publications.
- Haron, A., & Taylor, D. (2009). Risk management in takaful. In S. Archer, R. A. A. Karim, & V. Nienhaus (Eds.), *Takaful Islamic insurance: Concepts and regulatory issues* (pp. 169–191). Wiley.
- Kalbfleisch, J. D., & Prentice, R. L. (2002). *The statistical analysis of failure time data* (2nd ed.). Wiley.
- Kaplan, E. L., & Meier, P. (1958). Nonparametric estimation from incomplete observations. *Journal of the American Statistical Association*, 53(282), 457–481.
- Lane, W. R., Looney, S. W., & Wansley, J. W. (1986). An application of the Cox proportional hazards model to bank failure. *Journal of Banking & Finance*, 10(4), 511–531.
- Miao, Y., Gu, J., Zhang, L., He, R., Sandeep, S., & Wu, J. (2018). Improving the performance of social health insurance system through increasing outpatient expenditure reimbursement ratio: A quasi-experimental evaluation study from rural China. *International Journal for Equity in Health*, 17, 1–13.
- Mohd Hassan, N. Z. A., Mohd Nor Sham Kunusagaran, M. S. J., Zaimi, N. A., Aminuddin, F., Ab Rahim, F. I., Jawahir, S., & Abdul Karim, Z. (2022). The inequalities and determinants of households' distress financing on out-of-pocket health expenditure in Malaysia. *BMC Public Health*, 22(1), 449.
- MyPTV. (n.d.-a). *Perlindungan Tenang Voucher programme*. <https://www.myptv.my/>
- MyPTV. (n.d.-b). *Frequently asked questions*. <https://www.myptv.my/faq>
- Pappas, V., Ongena, S., Izzeldin, M., & Fuertes, A.-M. (2017). A survival analysis of Islamic and conventional banks. *Journal of Financial Services Research*, 51(2), 221–256.
- Said, R., Ismail, N., & Ismail, N. W. (2020). Determinants of out-of-pocket health expenditure among the low-income group in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 10(10), 292–311.
- Salami, M. A., Tanrivermis, H., & Tanrivermis, Y. (2024). Evaluation of the management soundness of the Takaful industry in selected countries. *Journal of Islamic Marketing*, 15(4), 945–962.
- Shah, S., Jha, N., Khanal, V. K., Nepal Gurung, G., Sharma, B., & Shrestha, M. (2022). Utilisation of social health security scheme among the households of Illam district, Nepal. *PLoS ONE*, 17(5), e0265993.
- Thomas, A., Gangopadhyay, K., Balooni, K., Balasubramanian, S., & Padmanabhan, M. (2024). Is government health subsidy targeted enough in India? Evidence from a tertiary hospital. *International Journal of Public Administration*, 47(9), 579–599.
- Van Doorslaer, E., O'Donnell, O., Rannan-Eliya, R. P., Somanathan, A., Adhikari, S. R., Garg, C. C., ... Zhao, Y. (2007). Catastrophic payments for health care in Asia. *Health Economics*, 16(11), 1159–1184.

- Wagstaff, A., & Lindelow, M. (2008). Can insurance increase financial risk? The curious case of health insurance in China. *Journal of Health Economics*, 27(4), 990–1005.
- Whalen, G. (1991). A proportional hazards model of bank failure: An examination of its usefulness as an early warning tool. *Economic Review, Federal Reserve Bank of Cleveland*, 27(1), 21–31.
- Wheelock, D. C., & Wilson, P. W. (2000). Why do banks disappear? The determinants of U.S. bank failures and acquisitions. *Review of Economics and Statistics*, 82(1), 127–138.
- World Bank. (n.d.). *World Development Indicators: Out-of-pocket expenditure (% of current health expenditure)*. <https://data.worldbank.org/indicator/SH.XPD.OOPC.CH.ZS>