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Determinants of Health Insurance Coverage in Cambodia: A Comparative Analysis of National and Private Insurance

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Abstract
This study examines the determinants of health insurance coverage in Cambodia, focusing on enrolment in the National Social Security Fund (NSSF) and private health insurance. It uses the Cambodia Demographic Health Survey (CDHS) 2021-22 data and utilises multinomial logistic regression analysis to identify predictors of insurance uptake in Cambodia. The result indicates that the working-age population is more likely to possess either national or private health insurance, with females being three times more likely to have NSSF, and rural populations are less likely to be insured. Socioeconomic status strongly predicted health insurance type, with education being a significant predictor of both NSSF and private health insurance coverage, while wealth shapes private insurance but has limited influence on NSSF. Occupation also mattered, where formal or semi-formal employment markedly increases the probability of health insurance enrolment, reflecting Cambodia's segmented labour market. These findings highlight persistent inequities in access to health protection and underscore the need for policies that expand outreach in rural areas, improve accessibility for informal sector workers, and leverage educational interventions to raise awareness of health protection programmes among underserved populations.

Keywords
Health insurance, National Social Security Fund, social protection, Cambodia

Introduction

Universal health coverage is to ensure access to essential health services without financial hardship (WHO and WB 2023). There is strong empirical evidence confirming the theoretical prediction that health insurance significantly reduces out-of-pocket health expenditures (Aistov, Aleksandrova, and Gerry 2021; Lee 2024; Amu et al. 2018).

Expanding the social protection system has become one of the main agendas in Cambodia that is striving toward sustainable growth (NSPC 2024a). The latest "National Social Protection Policy Framework 2024-2035" aims to ensure the continued strengthening and sustainability of a comprehensive social protection system that addresses all life-cycle risks and responds effectively to emergencies and crises (NSPC 2024b). This new framework transitions from a pillar-based to a life-cycle risk approach, focusing on maintaining income stability and mitigating citizens' economic vulnerabilities while being prepared to handle any emergencies or crises that may arise. Three tiers make up Cambodia's social protection governance structure: (1) policy level, (2) regulator level, and (3) operator level. The purpose of this system is to provide a check-and-balance between the three tiers.

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The development of the health system in Cambodia has witnessed remarkable strides, increasing the uptake of healthcare utilisation, which has resulted in a steady improvement in the people's healthcare status and longer life expectancy (NSPC 2024a). Some key health indicators provided a clear testament, which included: (1) an essential service coverage index at around 58 percent in 2021 wherein the reproductive, maternal, newborn, and child health sub-index was at around 74 percent, infectious disease at 65 percent, non-communicable disease at 64 percent, service capacity and access at 37 percent; (2) a reduction of out-of-pocket health expenditure to about 60 percent in 2020; (3) a gradual increase in life expectancy; and (4) declining maternal, infant, and child mortality rates (NSPC 2024a). The expansion of social protection coverage is mandatory and is implemented primarily through the National Social Security Fund (NSSF), established in 2007. The NSSF is the main and single operator for the social security system, or simply known as social insurance, because people must contribute to the institution to be insured (NSPC 2024b). Since its launch, NSSF has progressively expanded in coverage; however, it is still far from covering the whole Cambodian labour force.

In 2021, around 1.5 million workers were actively engaged in NSSF healthcare programmes, with 19 percent from the public sector and 81 percent from the private sector; however, the ratio between the total number of employees and active contributors is just 41 percent, pointing to the significant social security deficit in the country (ILO 2024). Notably, women made up two-thirds of contributors, which is linked to the large scale of the garment sector in Cambodia. As a result, the share of women in the labour force contributing to NSSF was more than double that of men, reflecting the predominance of female workers rather than gender equity in receiving social protection coverage. As an NSSF member, the insurer would be entitled to receive free treatment at public and contracted private health facilities.

Recent findings in Cambodia reveal that awareness of free services at public health facilities doubled the odds of visiting public health provider for outpatient care, while awareness of free services at public hospitals associated with higher odds of seeking inpatient care (Feldhaus, Nagpal, and Bauhoff 2022). However, despite acknowledging the financial risk due to health problems, according to a survey of 160 families in Northwest Cambodia on the decision to enrol in a community-based health insurance, known as Cambodian Association for Assistance to Families and Widows (CAAFW), charged at USD2 per family member per year and up to USD12 per family per year, the most important factors were hospital fees, travel expenses, and food prices (Ozawa, Grewal, and Bridges 2016). The determinants of enrolment in the social protection system through health insurance remain insufficiently examined in Cambodia, particularly regarding differences between national (public) and private health insurance schemes. This gap limits understanding of which population groups are covered by different types of insurance and how these enrolment patterns shape the equity and inclusiveness of health coverage expansion.

Prior studies indicated that demographic and socioeconomic factors, such as age, gender, wealth, education, and employment, strongly shape health insurance enrolment across various developing countries (Allcock, Young, and Sandhu 2019; Salari et al. 2019). In Ghana, for example, the National Health Insurance Scheme (NHIS) has increased the use of healthcare services but still struggles to achieve universal coverage, with more than 60 percent of adults remaining uninsured, and enrolment is seen only among wealthier, urban populations (Salari et al. 2019).

Higher education level and wealth quintile are also linked with the increased likelihood of owning health insurance (Allcock, Young, and Sandhu 2019; Salari et al. 2019), with women being particularly more likely to possess health insurance, especially those who are educated, currently working and living in urban areas (Amu and Dickson 2016; Amu et al. 2021). In Cambodia, although benefits from health spending at the primary care level in the public sector are distributed in favour of the poor, with about 32 percent of health facilities benefits going to the poorest population quintile (Asante et al. 2019), a qualitative study by Soeung et al. (2012) argued that households do not recognise the significance of health access and contextualise poor health and health access in terms of their everyday

living conditions, reinforcing a pattern of "living from moment to moment," which resulted in a cycle of a disadvantage and ill health. Additional factors that influence participation in health schemes include levels of trust in public institutions, administrative barriers, and cultural norms surrounding illness and care-seeking (Ozawa, Grewal, and Bridges 2016; Aistov, Aleksandrova, and Gerry 2021).

Although the socio-demographic factors correlating with health insurance ownership were explored (Amu and Dickson 2016; Allcock, Young, and Sandhu 2019; Salari et al. 2019), it tended to overlook the different specific forms of insurance, particularly social and private health insurance. This lack of focused research limits the understanding of the choices of health insurance possession. The variations in the possession of different types of health insurance, particularly national and private health insurance in Cambodia, have also not been explored.

It is essential to conduct a comparative study, investigating the determinants of health insurance coverage, particularly when comparing governmental insurance (NSSF) against other private options. This study explores the factors that influence health insurance possession in Cambodia, with a special focus on distinguishing the NSSF and other private health insurance holders.

Methodology

The study utilises the latest Cambodia Demographic Health Survey (CDHS) 2021-22. CDHS is a nationally representative survey conducted by the National Institute of Statistics (NIS) every five to seven years, in partnership with the Ministry of Health and other stakeholders. It is the most

Table 1: Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Type of insurance (Dependent)				
None	0.81	0.39	0	1
NSSF	0.14	0.35	0	1
Private	0.05	0.22	0	1
Determinants (Independent)				
Age	30.97	9.51	15	49
Age square	1049.49	596.02	225	2401
Female	0.68	0.47	0	1
Rural	0.57	0.49	0	1
Wealth (Ref. Middle)				
- Q1 (Poorest)	0.17	0.38	0	1
- Q2	0.18	0.38	0	1
- Q3 (Middle)	0.19	0.40	0	1
- Q4	0.22	0.41	0	1
- Q5 (Richest)	0.23	0.42	0	1
Education attainment (Ref. No education/Pre-primary)				
- No education/Pre-primary	0.10	0.31	0	1
- Primary	0.38	0.49	0	1
- Secondary	0.44	0.50	0	1
- Post-secondary	0.08	0.27	0	1
Employment group (Ref. Unskilled manual)				
- Unskilled manual	0.09	0.29	0	1
- Skilled manual	0.25	0.43	0	1
- Sales & admin	0.20	0.40	0	1
- Professional	0.06	0.24	0	1
- Agriculture or self-employed	0.19	0.39	0	1
- Not working	0.21	0.40	0	1
Total observations	27,608			

Source: Created by the authors based on the CDHS 2021-22

Note: Std. Dev. stands for standard deviation, and Ref. stands for reference group

recent large-scale data with detailed information on health insurance coverage and types of insurance in Cambodia. After restricting the age group and omitting observations with missing values, the final sample for the analysis is 27,608. Table 1 presents the descriptive statistics of the dependent variable (insurance possession) and independent variables used in this study. Insurance possession is categorised as 1 for "no insurance," 2 for "NSSF holder," and 3 for "private insurance".

More than 80 percent of the sample did not enrol in any health insurance programme, while about 14 percent and 5 percent were in the NSSF and private insurance scheme respectively at the time of the survey. The sample's average age is 30.97 years, with a range of 15 to 49 years (working age group). The sample is predominantly female (68 percent), and the majority of the sample (57 percent) are rural residents. About 10 percent of the respondents have never attended school or have only received pre-primary education, while 38 percent have completed primary education, another 44 percent have completed secondary education, and just 8 percent have completed post-secondary education. The occupational distribution shows that about 9 percent work in unskilled manual labour (reference group), 25 percent is in skilled manual labour, 20 percent in sales or admin, 6 percent is in professional, 19 percent is in agriculture or is self-employed, and around 21 percent is not currently working.

Multinomial Logistic Regression model is utilised for the analysis, where the dependent variable Y_i represents the insurance coverage choice for individual *i*. This model can be expressed as

$$(1) \qquad P(Y_i = j) = \frac{e^{\beta_j X_i}}{\sum_{k=1}^{J} e^{\beta_k X_i}}$$

$Y_i = j$ indicates that individual *i* choose insurance type *j*, where *j*=1 corresponds to no insurance coverage, *j*=2 refers to NSSF insurance coverage, and *j*=3 corresponds to private insurance coverage. X_i is a vector of independent variables for individual *i*; β_j is a vector of coefficients corresponding to insurance type *j*. The denominator ensures that the probabilities for all categories sum to 1. This formulation provides for an analysis of the likelihood of an individual choosing a given type of insurance, depending on the independent factors X_i.

Under this formulation, the coefficients are interpreted through Relative Risk Ratios (RRRs), defined as:

$$(2) \qquad RRR_{jm} = \exp(\beta_{jm})$$

An RRR greater than 1 indicates that an increase in X_m raises the relative risk of choosing category *j* over the base category (no insurance), while an RRR less than 1 indicates the opposite. Because RRRs reflect relative risks rather than absolute probabilities, marginal effects at mean are computed to directly interpret how changes in the predictors influence the probability of choosing each insurance category. They are calculated using the mean values of the independent variables from all observations. These effects reveal how a unit change in an independent variable affects the likelihood of picking a certain insurance type while keeping other factors constant. This can be stated as

$$(3) \qquad ME_{jm} = \frac{\partial P(Y_i = j)}{\partial x_m} = P(Y_i = j)$$
$$(\beta_{jm} - \Sigma_{k=1}^{J} P(Y_i = k)\beta_{jm})$$

ME_{jm} is the marginal effect at means of variable x_m on the probability of choosing insurance type *j*; β_{jm} is the coefficient of variable x_m for category *j*; $P(Y_i = k)$ is the probability of choosing category *k*.

Results

Table 2 reports the RRR and Marginal Effects at the Mean (MEMs) for NSSF enrolment in comparison to the no insurance, and for the private insurance enrolment in comparison to the no insurance. While the RRR results describe the relative odds of enroling in NSSF or private insurance compared to the reference group (no insurance), the MEMs refer to the actual change in the absolute probability (percentage points) of enroling in NSSF or private insurance.

Age was found to be a significant predictor on the likelihood of possessing either NSSF or private insurance. Each additional year increases the relative likelihood of being enroled in NSSF

Table 2: Multinomial regression results

Variables	RRR		MEMs	
	No insurance vs NSSF	No insurance vs Private insurance	No insurance vs NSSF	No insurance vs Private insurance
Age	1.201***	1.187***	0.012***	0.007***
	(0.021)	(0.028)	(0.001)	(0.001)
Age square	0.997***	0.998***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Female	3.997***	1.654***	0.095***	0.018***
	(0.188)	(0.109)	(0.004)	(0.003)
Rural	0.628***	0.806***	-0.032***	-0.008***
	(0.030)	(0.055)	(0.003)	(0.003)
Wealth (Ref. Middle)				
-Q1 (Poorest)	1.243***	1.082	0.017***	0.002
	(0.091)	(0.119)	(0.006)	(0.005)
- Q2	0.979	0.845	-0.001	-0.006
	(0.065)	(0.093)	(0.005)	(0.004)
- Q4	0.984	1.130	-0.002	0.005
	(0.060)	(0.106)	(0.004)	(0.004)
- Q5 (Richest)	0.655***	1.378***	-0.027***	0.017***
	(0.044)	(0.131)	(0.004)	(0.005)
Education attainment (Ref. No education/Pre-primary)				
- Primary	1.313***	1.151	0.015***	0.005
	(0.103)	(0.126)	(0.004)	(0.004)
- Secondary	1.455***	1.216*	0.022***	0.007
	(0.119)	(0.140)	(0.005)	(0.004)
- Post-secondary	3.434***	3.503***	0.098***	0.071***
	(0.381)	(0.483)	(0.011)	(0.009)
Employment group (Ref. Unskilled manual)				
- Skilled manual	4.399***	0.867	0.237***	-0.020***
	(0.309)	(0.094)	(0.009)	(0.005)
- Sales & admin	0.218***	0.905	-0.080***	0.000
	(0.021)	(0.091)	(0.006)	(0.005)
- Professional	4.172***	2.126***	0.208***	0.030***
	(0.398)	(0.263)	(0.016)	(0.008)
- Agriculture or self-employed	0.395***	0.568***	-0.059***	-0.021***
	(0.037)	(0.068)	(0.007)	(0.005)
- Not working	0.201***	0.571***	-0.081***	-0.020***
	(0.020)	(0.065)	(0.006)	(0.005)
Constant	0.003***	0.002***	-	-
	(0.001)	(0.001)	-	-
Observations	27,608	27,608	27,608	27,608

Source: Created by the authors based on the CDHS 2021-22
Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

and private insurance by 20.1 percent and 18.7 percent, respectively. In absolute terms, additional year in age increases in predicted probabilities by 1.2 and 0.7 percentage points to enroled in NSSF and private insurance. However, with RRR of *Age square* below one, it suggests an inverted U-shaped relationship between age and the likelihood of being insured. The probability of having insurance rises as individuals transition from youth to middle age or to working status, but the rate of increase slows and eventually declines.

Females are about three times more likely than males to be enroled in NSSF and 65.4 percent more likely to have private insurance. The large marginal effect for NSSF (9.5 percentage points) and smaller but still meaningful effect for private insurance (1.8

percentage points) suggest that females are more frequently to enrol in health insurance schemes.

A consistent rural disadvantage emerges across both insurance types. Rural residents are 37.2 percent less likely than urban counterparts to be enroled in NSSF (RRR=0.628) and 19.4 percent less likely to hold private insurance (RRR=0.806). These differences translate into reductions of 3.2 and 0.8 percentage points in predicted probability, respectively. Although the magnitude is larger for NSSF, the direction is consistent, indicating structural barriers affecting rural households' navigation of both public and private health systems.

In terms of wealth quintile, for NSSF, wealth effects are modest and somewhat counterintuitive: the poorest households show higher relative likelihood of enrolment at about 24.3 percent (RRR=1.243), while the richest households show significantly lower likelihood (RRR=0.655). The marginal effects confirm the small magnitude of these differences (between –2.7 percentage point and 1.7 percentage point). This pattern supports the policy objective of NSSF as a social protection scheme that primarily covers vulnerable populations rather than higher-income groups. In contrast, private insurance displays a strong wealth gradient. The richest households are 37.8 percent more likely to have private insurance, corresponding to a +1.7 percentage-point increase in probability. The lack of significant associations for lower wealth levels further suggests that private insurance remains accessible only to upper-income groups.

Education emerges as one of the most powerful predictors across both insurance types. For NSSF, primary and secondary education significantly increase enrolment likelihood, while post-secondary education yields the strongest effect (RRR=3.434; MEMs=9.8). Similarly, for private insurance, post-secondary education increases the odds around threefold and raises predicted probability by 7.1 percentage points. These patterns emphasise the role of education in shaping awareness of insurance benefits, either social or private insurance.

Employment type is a critical determinant of insurance coverage. For NSSF, skilled-manual labourers (RRR = 4.399; MEMs=23.7) and professional individuals (RRR = 4.172; MEMs=20.8) show exceptionally high enrolment, reflecting NSSF's linkage to mandatory contribution from both employers and employees. Conversely, those in agriculture, self-employed, or non-working exhibit much lower likelihood of NSSF coverage, with reductions in predicted probability ranging from –5.9 to –8.1 percentage points. These findings highlight structural exclusion among informal workers, a great challenge in extending social protection coverage. Regarding private insurance, it displays related but more muted employment effects. Only those works in the professional field benefit from significantly higher coverage (RRR = 2.126; MEMs=3.0), while those in agricultural and non-working households are substantially less likely to be covered. These patterns suggest that private insurance is tied to both income stability and employment types.

Discussion

This study analyses factors contributing to health insurance possession in Cambodia, comparing the individuals with no insurance (reference group) to those insured with the NSSF or private insurances.

Age has an inverted U-shaped association with the two forms of health insurance; the likelihood of holding insurance increases from youth into middle or working age but slows and eventually declines in later adulthood. This pattern likely reflects greater labour market participation, increased access to employer-linked insurance, and evolving perceptions of health risk. At the same time, older adults were found to be actively seeking insurance due to heightened awareness of health vulnerabilities and the desire to reduce out-of-pocket medical spending (Ozawa, Grewal, and Bridges 2016).

Unsurprisingly, women were much more likely to possess insurance, mostly through NSSF, but somewhat less likely to have private insurance. According to International Labour Organization (2024), between 60 and 75 percent of contributors are women, largely due to the demographics of the manufacturing sector (particularly the manufacture of garments, footwear, and luggage). Employees in the formal sector, including those in the garment industry, must be enroled in the NSSF.

In many previous studies, place of residence was a contextual factor significantly associated with health insurance coverage (Amu and Dickson 2016;

Amu et al. 2021). It is no difference in Cambodia, mainly the disparity between urban and rural areas, given the widespread lack of understanding of the potential benefits of insurance. Public awareness efforts about the NSSF have tended to focus on urban and industrial areas, leaving many rural communities with little access to accurate information or assistance with NSSF registration (Oxfam 2022).

Wealthier individuals were much more likely to have private insurance. The previous studies supported this finding, showing that wealthier individuals have greater financial capacity to afford them because of their perception that private insurance provides them a financial safety net to mitigate higher risks of financial loss from unexpected events like illness, accidents or property damage (Amu et al. 2021; Allcock, Young, and Sandhu 2019; Salari et al. 2019), while the poor has little thought on that (Soeung et al. 2012).

Higher education attainment marginally increased the likelihood of having either NSSF or other private insurances, with the strongest impact seen among those with post-secondary education level. When people have higher education, they can get higher-paying jobs, providing them with greater financial resources to afford insurance (Lee 2024). Less-educated people may have less insurance coverage due to lower income, job instability, and limited financial literacy (Chauluka, Uzochukwu, and Chinkhumba 2022).

Employment plays a critical role in shaping health insurance coverage. Individuals in skilled manual and professional occupations exhibit substantially higher enrolment, which is expected given Cambodia's regulatory framework: employees, particularly those in skilled and professional roles, are mandated to enrol in the NSSF, with employers contributing a share of the contribution (ILO 2024). Formal employment strongly shapes access to social protection in Cambodia, as NSSF coverage is tied to formal contracts and employer contributions, leaving self-employed and informal workers largely excluded (UNDP 2023). However, in some cases, irregular incomes and limited employer incentives further reduce participation in NSSF (Oxfam 2022).

While non-working and informal-sector individuals are less likely to be enroled in the NSSF, many of these groups may still access essential health services through the Health Equity Fund (HEF), which provides targeted financial protection to poor and vulnerable households. However, due to data constraints, this study does not account for HEF coverage in the analysis. In addition, although insurance pricing and contribution levels are widely recognised as important determinants of participation in voluntary health insurance schemes, the available data do not allow us to directly assess their impact.

These findings reveal how demographic, geographic, and socioeconomic factors intersect to shape health insurance coverage in Cambodia, aligning with prior studies (Laksono et al. 2024; Chauluka, Uzochukwu, and Chinkhumba 2022; Amu et al. 2018; Allcock, Young, and Sandhu 2019; Salari et al. 2019). Insurance enrolment remains unevenly distributed, favouring individuals who are urban, female, educated, and formally employed. Those living in rural areas or engaged in informal or unstable employment face significant coverage gaps. The higher likelihood of private insurance ownership among professionals highlights the close link of income, and beyond financial capacity, education improves health literacy and risk awareness, increasing people's willingness to view insurance as a valuable financial safety net (Lee 2024; Allcock, Young, and Sandhu 2019). The patterns observed across both NSSF and private insurance highlight the continuing challenges of extending health protection in a segmented labour market in Cambodia.

Limitation of the study

Although the study utilises the latest CDHS available, the survey was conducted before the introduction of the NSSF voluntary scheme for individually employed persons and their dependents. As a result, the findings could not capture recent NSSF expansions. Another limitation is the exclusion of the Health Equity Fund (HEF) from the analysis, despite its main role as a national health protection mechanism that provides access to health services for vulnerable populations in Cambodia. Due to data limitations, it utilises only the NSSF as the main proxy for national health insurance.

Conclusion

This study highlights the uneven distribution of health insurance coverage in Cambodia as well as the demographic and socioeconomic characteristics that influence health insurance enrolment in both the National Social Security Fund (NSSF) and private insurance schemes. Age, gender, education, and employment type emerged as strong and consistent predictors, with coverage peaking in middle adulthood or working age, being considerably greater among women, and rising significantly with higher educational attainment. Formal employment, particularly among skilled and professional occupations, has an important role in promoting access to NSSF, whereas private insurance remains predominantly accessible to wealthier and highly educated individuals. Rural disadvantage persists across both insurance types, reflecting structural barriers in awareness and accessibility. While NSSF appears to align with its social protection mandate by covering more vulnerable groups, private insurance continues to concentrate among higher-income households. Overall, the findings indicate that there are ongoing gaps in health protection, particularly for rural communities and informal labourers.

To address these gaps, the government has undertaken several important interventions in recent years. These include the introduction of the NSSF voluntary scheme and the development of a digital social registry to improve identification and targeting of beneficiaries, enabling more than 500,000 self-employed people and 150,000 dependents to register for NSSF in 2024. These efforts represent important steps toward expanding social protection coverage in Cambodia. In addition, the National Social Assistance Fund provides health insurance and pensions to civil servants, military personnel, and their families. It proposes that governments continue expanding NSSF coverage to reach underserved groups, as well as strengthening outreach and extending coverage pathways for informal and low-income populations, as critical measures toward attaining more equitable health insurance access in Cambodia.

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