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Testing for Asymmetric Information in the Public Health Insurance Market in Vietnam: Towards the Accomplishment of Universal Health Insurance Coverage

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1. Introduction

Universal health coverage (UHC) aims to ensure that all individuals obtain necessary health services without suffering financial hardship (World Health Organization [WHO], 2010). Achieving UHC has become a central objective of global health policy and constitutes a core component of the United Nations Sustainable Development Goals for 2030 (WHO, 2017). A principal policy instrument for advancing UHC is public or social health insurance. Historically, high-income countries, such as Japan and France, have utilized health insurance systems to provide broad medical access while protecting households from catastrophic expenditures. Recently, an increasing number of emerging and developing economies have expanded publicly funded health insurance as a key strategy to improve healthcare access and strengthen financial risk protection.

Vietnam represents a particularly salient case within this global movement. As an emerging Southeast Asian economy, Vietnam has made remarkable progress in expanding public health insurance over the past three decades. Following local pilot schemes, the Vietnamese government initiated a national health insurance program in 1992 as part of broader health sector reforms aimed at mobilizing resources and reducing reliance on out-of-pocket (OOP) payments (Ensor, 1995). Subsequent policy initiatives—including the 2002 introduction of the Healthcare Fund for the Poor (HCFP) and the 2008 Health Insurance Law (effective 2009)—accelerated coverage expansion. According to Vietnam Social Security, over 95 million individuals were enrolled by 2024, exceeding 94 percent of the population.[1] Consistent with administrative records, nationally

[1] https://vss.gov.vn/english/news/Pages/vietnam-social-security.aspx?CateID=198&ItemID=12689
(Accessed on December 26, 2025)

representative household survey data show that coverage increased from approximately 40 percent in 2004 to nearly 90 percent by 2020 across all age groups (Figure 1).

While Vietnam's progress is impressive, expanding coverage does not, by itself, resolve a fundamental challenge in health insurance markets: asymmetric information. This occurs when insured individuals possess private information about their health risks or behaviors that insurers cannot directly observe. This information gap manifests primarily through two mechanisms: adverse selection and moral hazard. Adverse selection arises when individuals with higher-than-average health risks are more likely to enroll (Rothschild & Stiglitz, 1978), while moral hazard occurs when insurance alters behavior—either by reducing ex-ante preventive effort or increasing ex-post utilization due to lower out-of-pocket prices (Pauly, 1968).

Although adverse selection and moral hazard are conceptually distinct, they are often empirically difficult to disentangle, particularly when detailed longitudinal data on diagnoses or health shocks are unavailable. In reduced-form empirical analyses, both mechanisms can generate a positive association between insurance coverage and subsequent healthcare utilization or reported illness. Nevertheless, their combined effect significantly shapes the efficiency, sustainability, and fiscal implications of insurance systems, especially during rapid expansion. A seminal study by Chiappori and Salanié (2000) proposed a general test: conditional on all observable characteristics used by insurers, insurance coverage should be positively correlated with the occurrence of the insured risk if asymmetric information is present. This insight has motivated a vast literature utilizing correlation-based methods and complementary approaches that estimate demand and cost functions to quantify welfare losses from selection. Applied studies have extended this logic to various healthcare contexts (e.g., Resende & Zeidan, 2010), often interpreting the absence of a positive correlation as evidence of effective

screening.

However, existing empirical literature often treats asymmetric information as a static phenomenon. This overlooks a critical policy dimension: how the empirical importance of asymmetric information evolves as coverage expands toward universality. In emerging economies, the path to UHC is typically gradual, involving successive expansions of eligibility, changes in subsidy regimes, and evolving enforcement. As coverage expands, the composition of the insured population changes, potentially altering the nature and magnitude of selection.

Vietnam exemplifies this dynamic. Early expansion concentrated on formal-sector workers and subsidized groups, while large segments—particularly working-age adults outside formal employment—faced voluntary or quasi-voluntary enrollment. Despite strengthened legal mandates, enrollment for certain adult groups remained de facto voluntary due to limited enforcement and reliance on household-based premiums. Consequently, even as aggregate coverage approached universal levels, individual enrollment decisions may have continued to reflect private information. This motivates our central research question: To what extent does asymmetric information remain an empirically relevant concern as health insurance coverage approaches universal levels? Does expansion mechanically eliminate selection, or can it persist under standardized benefits and nationwide mandates until the final stages of the UHC transition?

To address this, we examine the temporal evolution of asymmetric information during Vietnam's transition toward UHC. Rather than focusing solely on determinants of enrollment, the analysis centers on how evidence of selection under asymmetric information changes as coverage expands. Using five waves of the Vietnam Household Living Standards Survey (VHLSS) spanning 2004–2020, we trace the relationship between enrollment and realized health risk. Following Chiappori and Salanié (2000), we

test whether enrollment and risk remain correlated after conditioning on observables, implementing this framework in a dynamic setting that allows the correlation to vary over time. The analysis focuses on working-age adults (aged 19–59). While mandatory enrollment expanded between 2004 and 2020, full coverage remains unachieved. To examine the evolution of asymmetric information under these conditions, we restrict our sample to exclude fully subsidized groups—specifically, HCFP recipients, near-poor beneficiaries, and holders of free healthcare certificates—whose participation is automatic.

By adopting this dynamic perspective, the study contributes to the literature in three key ways. First, it extends empirical tests of asymmetric information beyond static settings and examines whether selection attenuates, persists, or changes in nature as public insurance systems mature. Second, it exploits a setting with a uniform benefit package, minimizing confounding from benefit heterogeneity that complicates interpretation in competitive insurance markets. Third, it provides evidence from an emerging economy that is directly relevant for other countries pursuing UHC through similar institutional arrangements, where high aggregate coverage does not necessarily imply the absence of individual-level selection.

From a policy perspective, understanding the persistence of asymmetric information near universal coverage is vital. If selection dissipates, policymakers can shift focus to service quality and provider payments. If it persists, informational frictions may continue to influence utilization and fiscal sustainability, suggesting a need for complementary policies such as automatic enrollment or stronger enforcement.

The remainder of the paper is organized as follows. Section 2 reviews the literature on asymmetric information. Section 3 describes the institutional evolution of Vietnam's system since 2000. Section 4 introduces the data. Section 5 outlines the

empirical methodology. Section 6 presents the results and discusses their implications for UHC debates. Section 7 concludes.

2. Literature Review: Asymmetric Information in Health Insurance

2.1 Asymmetric information in health insurance: concepts and mechanisms

Asymmetric information in health insurance markets broadly refers to situations in which insurers and insured individuals differ in information or incentives relevant to insurance coverage and health care utilization. Two canonical mechanisms are adverse selection and moral hazard. Adverse selection arises when individuals possess private information about their ex ante health risk, leading higher-risk individuals to be more likely to enroll in insurance or to select more generous coverage (Rothschild & Stiglitz, 1978). Moral hazard, in contrast, refers to changes in health care utilization or health-related behavior that occur ex post as a consequence of insurance coverage, holding underlying risk constant (Pauly, 1968).

Importantly, asymmetric information need not be one-dimensional. Individuals may also hold private information about preferences for insurance, such as risk aversion or attitudes toward preventive care. In such environments, advantageous selection may arise, whereby individuals with lower expected medical expenditures are more likely to purchase insurance because they value coverage more highly (Finkelstein & McGarry, 2006). As a result, the presence of asymmetric information does not necessarily imply a positive correlation between insurance coverage and realized medical risk.

2.2 Empirical approaches to detecting asymmetric information

The empirical literature has developed multiple strategies to identify and quantify asymmetric information in insurance markets. One influential approach is the

positive correlation test proposed by Chiappori and Salanié (2000), which examines whether, conditional on observables used for pricing or eligibility, individuals with greater insurance coverage experience higher ex post risk. Under standard competitive models with one-dimensional private information about risk, a positive conditional correlation constitutes evidence of asymmetric information. Subsequent theoretical work clarified both the scope and limitations of correlation-based tests. Chiappori et al. (2006) show that the absence of a positive correlation does not imply the absence of asymmetric information when private information is multidimensional or when contract menus are constrained. Accordingly, correlation tests should be interpreted as diagnostic tools whose empirical content depends on the institutional environment.

Beyond correlation tests, a substantial body of research estimates insurance demand and cost curves using price or policy variation and evaluates the welfare consequences of selection. Studies based on employer-provided insurance demonstrate how adverse and advantageous selection can be distinguished and how selection affects efficiency and welfare (Einav et al., 2010; Einav & Finkelstein, 2011). These approaches underscore that the appropriate empirical method depends on the structure of the insurance market and the margin along which individuals make choices.

2.3 Selection in public and social health insurance in low- and middle-income countries

In contrast to competitive insurance markets, public and social health insurance schemes in low- and middle-income countries typically feature uniform benefit packages, and individual choice often operates on the enrollment (take-up) margin rather than through plan selection. Moreover, enrollment mandates are frequently imperfectly enforced, leaving scope for voluntary or quasi-voluntary participation.

Empirical studies document selection on the enrollment margin in such settings. Evidence from China's voluntary rural health insurance scheme shows that households with higher expected medical needs are more likely to enroll (Wang et al., 2006). Studies of community-based health insurance in Africa analyze how adverse selection evolves over time and how targeted subsidies affect enrollment (Parmar et al., 2012). Research on Ghana's national health insurance scheme suggests that household-based enrollment rules can mitigate, though not eliminate, selective enrollment (Rajkotia and Frick, 2012). Collectively, this literature highlights the importance of administrative design, enforcement capacity, and household decision-making in shaping selection under standardized benefits.

2.4 Vietnam and selection during the transition toward universal coverage

Vietnam's public health insurance system provides a particularly informative setting for studying asymmetric information. The system combines a uniform benefit package with a gradual expansion of legal mandates toward universal health coverage, while enrollment among adults outside formal employment remained de facto voluntary for extended periods. Experimental evidence shows that information provision and premium subsidies significantly affect voluntary enrollment among informal-sector households, underscoring the relevance of selection mechanisms in practice (Wagstaff et al., 2016).

At the same time, existing studies typically examine enrollment or utilization at a single point in time (Jowett et al., 2004; Nguyen, 2016). Much less is known about how selection under asymmetric information evolves dynamically as legal mandates expand and aggregate coverage increases. Interpreting time-varying evidence on selection therefore requires careful attention to the institutional environment governing enrollment incentives and enforcement, motivating the detailed institutional background presented

in the next section.

3. Institutional Background: Public Health Insurance in Vietnam since 2000

Public health insurance in Vietnam has evolved through a sequence of legal and policy reforms aimed at achieving universal health coverage (UHC). This evolution is characterized by a uniform benefit package, legally expanding mandates, and a persistent gap between de jure compulsory enrollment and de facto enforcement—particularly for adults outside formal employment. These features are central for understanding selection into public health insurance over time. In this section, we discuss the institutional background of public health insurance in Vietnam from 2000 until 2020 and which timing the datasets we use in the later section capture. The datasets we use are Vietnam Household Living Standards Surveys (VHLSS) in 2004, 2008, 2012, 2016, and 2020. Figure 2 illustrates the chronology of public health insurance reforms and the timing of the asymmetric information analysis.

3.1 Fragmented coverage and largely voluntary enrollment before the mid-2000s

In the early 2000s, health insurance coverage was limited to specific social groups rather than the population at large. Formal-sector workers—including civil servants and employees of state-owned enterprises—were mandatorily enrolled through employer-based arrangements, while most adults in agriculture, self-employment, and the informal sector faced no nationwide enrollment mandate and could participate only on a voluntary basis. As documented in policy reviews and household surveys, overall coverage remained low and highly segmented (Wagstaff and Doorslaer 2003; Le et al. 2020).

3.2 Policy Developments in the Mid-2000s: Early Reform and Limited Expansion

During the mid-2000s, public health insurance remained far from universal, but a series of early reforms began to reshape the institutional landscape. Coverage was still largely confined to formal-sector workers and selected social groups, while most working-age adults outside formal employment remained uninsured. Enrollment among these groups was predominantly voluntary, with no effective nationwide mandate or enforcement mechanism in place.

A comprehensive review by Ekman et al. (2008) documents that, during this period, Vietnam's health insurance system was characterized by fragmented coverage, limited risk pooling, and weak administrative capacity. Although social health insurance had been introduced earlier, enrollment outside formal employment was low, and participation among informal-sector adults depended largely on individual willingness and perceived need rather than institutional obligation.

At the same time, government policy began to signal a stronger commitment to expanding health insurance coverage, particularly for vulnerable populations. This period saw the gradual introduction of premium subsidies for poor households and selected social policy beneficiaries. These measures improved access for targeted groups but did not fundamentally alter the enrollment environment for most working-age adults outside formal employment, whose participation remained discretionary.

Taken together, the mid-2000s represent a pre-systematization phase of Vietnam's public health insurance, in which early reform efforts coexisted with predominantly voluntary enrollment for large segments of the adult population. This institutional environment is reflected in the 2004 VHLSS.

3.3 The 2008 Health Insurance Law: Systematization and Legal Expansion

A major institutional turning point occurred with the enactment of the Health Insurance Law in 2008, which came into effect in July 2009. This law established the first comprehensive legal framework governing public health insurance and consolidated previously fragmented schemes into a single national system. Beneficiaries were explicitly classified according to the source of premium financing—the state, employers, or households (National Assembly of Vietnam, 2008).

Under this framework, enrollment for formal-sector workers and state-subsidized groups—such as the poor and children under six—was compulsory or automatic. In contrast, adults in agriculture, self-employment, and the informal sector were expected to enroll by paying premiums at the household level, with no automatic enrollment mechanism and no effective penalties for non-compliance. Consequently, for these adults, enrollment remained behaviorally voluntary, despite the expansion of the legal framework. The 2008 VHLSS captures this transitional phase of systematization without full enforcement.

3.4 Gradual Expansion with Persistent De Facto Voluntary Enrollment (2009–2013)

Following the implementation of the 2008 law, Vietnam pursued a strategy of incremental coverage expansion. Compulsory enrollment was extended to additional groups, such as students, and partial premium subsidies were introduced for near-poor households. These reforms substantially increased aggregate coverage and reduced disparities across socioeconomic groups.

However, enforcement among household-paying adults outside formal employment remained weak. Enrollment decisions for informal-sector adults continued to depend on individual health risk, preferences, and household resources rather than

institutional obligation. Evidence from policy evaluations and field experiments indicates that voluntary participation and selective enrollment remained salient features of the system during this period (Wagstaff et al., 2016). The 2012 VHLSS reflects this coexistence of expanding legal mandates and persistent de facto voluntary enrollment.

3.5 The 2014 Amendment and Nationwide Mandate from 2015

A further institutional shift occurred with the 2014 amendment to the Health Insurance Law, which took effect in January 2015. The amendment formally redefined public health insurance as a nationwide compulsory scheme and introduced household-based enrollment for individuals outside formal employment (National Assembly of Vietnam, 2014). In legal terms, the distinction between mandatory and voluntary enrollment was eliminated.

In practice, however, enforcement mechanisms remained highly asymmetric. Employer-based enrollment and state-subsidized coverage continued to be effectively enforced, while household-paying adults faced neither automatic enrollment nor meaningful penalties for non-compliance. As a result, non-enrollment persisted among informal-sector adults even after 2015, indicating that enrollment for this group remained behaviorally voluntary (Le et al., 2020). The 2016 VHLSS thus represents a post-mandate environment in which health insurance was legally compulsory but not fully enforced.

3.6 High Coverage with Persistent De Facto Voluntary Enrollment (2016–2020)

By the late 2010s, Vietnam had achieved high aggregate health insurance coverage rates, reflecting strong political commitment to universal health coverage. Nonetheless, adults outside formal employment who were required to pay premiums fully at the household level continued to exhibit incomplete take-up. For this group, enrollment

decisions remained closely linked to health risk, medical needs, and household economic conditions rather than to effective enforcement. The 2020 VHLSS captures this mature institutional environment, characterized by a uniform benefit package, high aggregate coverage, and continued individual-level enrollment choice among certain adult populations.

Importantly, this pattern of high aggregate coverage coexisting with de facto voluntary enrollment among household-paying adults is consistent with Vietnam's post-2020 policy trajectory. Vietnam's authorities have set a policy target of achieving over 95% health insurance coverage by 2025, with universal health coverage as a longer-term goal by 2030. Recent official statements indicate that insurance enrollment is on track to meet these targets, reflecting sustained expansion under a uniform benefit package and nationwide legal mandates (VietnamPlus, 2024; Vietnam Social Security, 2024). Together, these developments underscore that Vietnam's transition toward near-universal coverage has proceeded primarily through incremental expansion and administrative consolidation, while leaving meaningful scope for individual enrollment decisions among certain adult populations.

3.7 Implications for Identification

This institutional trajectory—uniform benefits, legally expanding mandates, and persistent de facto voluntary enrollment among household-paying adults—creates a setting in which selection into public health insurance remains empirically relevant throughout the study period. By exploiting five rounds of the VHLSS (2004–2020), this study examines how voluntary enrollment decisions under asymmetric information evolved as Vietnam transitioned toward universal coverage, while holding benefit design constant and abstracting from confounding driven by plan choice or institutionally

mandated enrollment.

Crucially, the persistence of voluntary enrollment implies that observed correlations between insurance status and subsequent health care utilization or expenditures can be informative about selection under asymmetric information rather than reflecting mechanical effects of benefit heterogeneity or compulsory coverage. This feature distinguishes Vietnam's public health insurance system from typical competitive insurance markets and provides a rare opportunity to study selection dynamics during a transition toward universal coverage.

Building on this identification logic, the next section describes the data used in the analysis, followed by an outline of the empirical methodology employed to test for selection under asymmetric information and to trace how such selection evolved over time using repeated cross-sections of the VHLSS.

4. Data

4.1 Household survey

The data used in this study are drawn from the Vietnam Household Living Standards Survey (VHLSS), which has been conducted biennially by the General Statistical Office of Vietnam (GSO) with technical assistance from the World Bank since 2002. The surveyed households constitute a nationally representative sample, encompassing a broad range of regions with diverse demographic, socioeconomic, and environmental conditions across the country. While this study utilizes VHLSS waves starting from 2004, we specifically focus on the rounds conducted in 2004, 2008, 2012, 2016, and 2020 to perform a rigorous analysis of working-age adults.[2]

[2] Although the 2022 VHLSS is already available, we do not utilize it due to the effects of COVID-19.

The VHLSS collects data through both household and community-level questionnaires. The household questionnaire provides granular information on basic demographics, education, health, employment, labor force participation, income, consumption expenditure, housing, fixed assets, durable goods, and participation in poverty alleviation programs. Notably, per capita consumption expenditure and income are derived from a comprehensive set of detailed survey items.

Furthermore, the surveys record household members' health insurance status, the annual frequency of outpatient and inpatient visits to hospitals and clinics, and out-of-pocket (OOP) medical expenditures. However, as detailed breakdowns of OOP healthcare payments are unavailable in the dataset, the reported OOP figures include not only direct treatment fees but also all related medical costs. These encompass informal payments to healthcare providers, service charges for supplemental medical requirements, medical equipment, transportation, and other incidental expenses.

4.2 Health insurance enrollment

Using the VHLSS data, Figure 1 illustrates the trends in health insurance enrollment rates by age group since 2004. The average enrollment rate for the total population increased markedly, rising from 39.3% in 2004 to 90.8% in 2020. Enrollment among children under age six rose sharply from 25.8% in 2004 to 86.2% in 2006, following the introduction of a fully subsidized compulsory health insurance scheme for this cohort. This rate continued to climb, reaching nearly 100% by 2020. Similarly, for school-age children (aged 6–18), the enrollment rate increased from 59.9% in 2004 to 96.9% in 2020, reflecting the impact of partial subsidies for students. Among the elderly (aged 60 and above), enrollment grew from 34.8% in 2004 to 94.3% in 2020. This high coverage is attributable to several factors: the eligibility for free insurance among those

aged 80 and above, expanded pension and social welfare coverage, and a growing number of policy beneficiaries over time. In contrast, enrollment among working-age adults remained the lowest throughout the period, despite a substantial increase of approximately 56 percentage points—reaching 86.3% in 2020. The relatively lower enrollment in this group reflects the fact that most working-age adults are eligible only for voluntary health insurance schemes without subsidies.

Table 1 details the shifting composition of health insurance schemes over time. As of 2020, compulsory insurance for children aged six or younger accounts for 9.0% of the sample. Other compulsory schemes cover individuals from poor households (3.7%), pension or social welfare beneficiaries (10.7%), and other policy beneficiaries such as ethnic minorities (11.0%). Formal sector employees are divided equally between government staff (7.0%) and private-sector workers (7.0%), though imperfect enforcement results in some eligible workers remaining uninsured. Among voluntary enrollees, individuals from near-poor households account for 1.9%, students for 15.5%, and other voluntary insurance cardholders for 25.0% of the sample.

In the subsequent empirical analysis, we focus on the health insurance enrollment decisions of working-age adults aged 19–59. We exclude individuals residing in households eligible for the Healthcare Fund for thHCFPe Poor (HCFP), as well as those from near-poor households who are eligible for the health insurance specifically for near-poor households, as their premiums are fully or largely subsidized. For the same reason, holders of free healthcare certificates and other policy beneficiaries are also excluded from the analysis to ensure the focus remains on discretionary enrollment decisions.

5. Empirical Methodology: Testing for asymmetric information

To implement a rigorous test for asymmetric information, we employ the

empirical framework proposed by Chiappori and Salanié (2000). In the context of Vietnam's public health insurance market, where enrollment depends largely on demand-side decisions and the benefit packages are uniform or exhibit minimal variation, we test the hypothesis that individuals with a higher probability of health risk (proxied by medical service utilization) are more likely to enroll in insurance programs.

Specifically, we examine the correlation between the following two probit regression models:

$$HI_{ijp} = 1\left(X_{ijp}^{IDV}\beta_{IDV}^{HI} + X_{jp}^{HH}\beta_{HH}^{HI} + \alpha_p + \varepsilon_{ijp}\right) \quad (1)$$

and

$$RI_{ijp} = 1\left(X_{ijp}^{IDV}\beta_{IDV}^{RI} + X_{jp}^{HH}\beta_{HH}^{RI} + \gamma_p + \eta_{ijp}\right) \quad (2)$$

In these equations, HI_{ijp} is a dummy variable that equals 1 if individual *i*, residing in household *j* within province *p*, is enrolled in health insurance, and 0 otherwise. RI_{ijp} is a dummy variable that equals 1 if individual *i* utilized medical services over the past 12 months, and 0 otherwise. X_{ijp}^{IDV} is a vector of socioeconomic characteristics for each individual. This includes a gender dummy (female) to investigate enrollment disparities and a set of age-cohort dummies to control for life-cycle effects. Marital status is categorized into three groups: single, married, and widowed/divorced/separated. We include the education level of individual *i* to capture the cognitive ability to assess the benefits of health insurance. Furthermore, occupation-type dummies are included to control for differences in eligibility across distinct health insurance schemes. X_{jp}^{HH} represents a vector of sociodemographic characteristics of household *j* in province *p*. This comprises the total number of co-resident family members and per capita consumption expenditure, the latter reflecting household resource constraints that may act as a barrier to enrollment. These variables effectively control for the household's economic conditions.

α_p and γ_p represent province-level fixed effects. The parameters to be estimated are denoted by β_{IDV}^{HI}, β_{HH}^{HI}, β_{IDV}^{RI}, and β_{HH}^{RI}. The error terms, ε_{ijp} and η_{ijp}, are assumed to be normally distributed..

If these error terms remain correlated after controlling for the observable covariates (X_{ijp}^{IDV} and X_{jp}^{HH}), this correlation must stem from unobservable factors. Such a result is interpreted as empirical evidence of asymmetric information.

The test statistic \$W\$ proposed by Chiappori and Salanié (2000) is defined as follows:

$$W = \frac{\left(\sum_{i=1}^{n} \widehat{\varepsilon_{ijp}}\widehat{\eta_{ijp}}\right)^2}{\sum_{i=1}^{n} \widehat{\varepsilon_{ijp}}^2 \widehat{\eta_{ijp}}^2} \quad . \qquad (3)$$

Under the null hypothesis of conditional independence, $Cov\left(\widehat{\varepsilon_{ijp}}, \widehat{\eta_{ijp}}\right) = 0$, W follows an asymptotic $\chi^2(1)$ distribution (Gouriéroux et al., 1987). Alternatively, we examine the correlation between the error terms by estimating the two equations simultaneously using a bivariate probit model, assuming the error terms are jointly normally distributed.

Table 2 presents the summary statistics for the two dependent variables and all explanatory variables utilized in the estimation of equations (1) and (2).

6. Empirical Results

6.1 Factors associated with health insurance enrollment and healthcare utilization

Table 3 reports the estimation results for equation (1), the probit model for health insurance enrollment. While the factors associated with enrollment show a consistent pattern overall, 2004 (and to a lesser extent, 2008) exhibits distinct trends. This divergence is likely attributable to the transitional nature of the system. Notably, the enforcement of the HCFP was likely suboptimal in 2004, and coverage schemes for near-poor households were absent in both 2004 and 2008. As a result, the 2004 and 2008

samples retain a significant number of individuals from near-poor households who would typically be excluded as policy beneficiaries in later waves. Accordingly, our discussion focuses mainly on the more stabilized periods of 2012, 2016, and 2020.

On average, females are significantly more likely to enroll in health insurance than males, with a marginal effect ranging from approximately 3 to 6 percentage points (statistically significant at the 1% level). However, this does not imply a uniform trend across all female subgroups. For instance, being a dependent—a status in which females are overrepresented—is negatively associated with enrollment (significant at the 1% level) when compared to government staff. Regarding marital status, being divorced or separated is negatively associated with enrollment (significant at the 1% or 5% level). Education shows a strong positive association (significant at the 1% level), suggesting that higher educational attainment enhances the ability to comprehend the benefits of insurance. In terms of occupation, self-employed workers, wage earners in domestic private companies (except in 2008), and dependents are significantly less likely to enroll compared to government staff. This is a predictable outcome of the institutional framework, as government staff are mandatorily enrolled through employer-based arrangements. Furthermore, consumption expenditure per capita, used here as a proxy for household wealth, is positively associated with enrollment in all years (significant at the 1% level). This indicates that individuals from wealthier households are better positioned to overcome the financial barriers to health insurance participation.

Table 4 presents the estimation results for equation (2), the probit model for healthcare utilization. Similar to the enrollment model, the determinants of healthcare utilization remain consistent across waves, except for 2004 (and, to a lesser extent, 2008). Being female is positively associated with higher healthcare utilization (significant at the 1% or 5% level). This association is plausible, particularly when considering healthcare

needs related to pregnancy and childbirth. Regarding marital status, being single or divorced/separated is generally associated with lower utilization compared to being married (significant at the 1% or 5% level, except for 2016). While occupation types do not show a perfectly consistent pattern across all categories, being a student is consistently and negatively associated with utilization compared to government staff. Regarding household characteristics, household size is negatively associated with utilization, whereas consumption expenditure per capita exhibits a strong positive association (both significant at the 1% level in all years). These results suggest that even among those with similar health risks, economic resources significantly facilitate access to medical services.

6.2 Testing for asymmetric information

Table 5 presents the results of the tests for asymmetric information among working-age adults. The findings strongly suggest that the null hypothesis—postulating no association between the error terms of health insurance enrollment decisions and medical service utilization—is rejected at the 1% significance level for all years. The test statistic W in equation (3), computed for each wave, yielded consistently large values, thereby rejecting the absence of asymmetric information. Furthermore, the correlation coefficients ($¥rho$) obtained from the bivariate probit estimation of equations (1) and (2) reinforce this conclusion, as the null hypothesis is again rejected at the 1% level across all periods. Collectively, these results confirm the persistent presence of asymmetric information in the Vietnamese public health insurance market, even as the aggregate enrollment rate among working-age adults (aged 19–59) exceeded 80% by 2020.

To further investigate the specific segments where asymmetric information is most prevalent, we estimated the models by occupation type using the 2020 VHLSS dataset. Table 6 summarizes these subgroup analyses. For government staff, the test

statistic W is 0.201, failing to reject the null hypothesis of no asymmetric information, although the correlation coefficient still suggests its presence. This result is expected given that the coverage rate for government staff is nearly universal at 98%, leaving virtually no room for selection bias. Similarly, for students, the correlation coefficient fails to reject the null hypothesis, although the W statistic rejects it at the 10% level. Given their high enrollment rate of 96.8%, the scope for asymmetric information is likewise minimal. In contrast, the null hypothesis is robustly rejected for self-employed workers, dependents, and private-sector employees. Notably, even among private employees, where the coverage rate is approximately 92%, asymmetric information remains clearly evident.

In summary, asymmetric information appears to be deeply entrenched in Vietnam's public health insurance market. This is demonstrated by the fact that the presence of informational frictions is consistently detected across most subgroups, even those approaching universal coverage.

6.3 Discussion: Implications for and controversies on the achievement of universal health insurance coverage

The results of the asymmetric information tests carry important implications for ongoing debates about the meaning and achievement of universal health insurance coverage. A common presumption in policy discussions is that as enrollment rates rise, problems of selection driven by private information will naturally fade. Our findings challenge this view. Even when coverage among working-age adults exceeds 80 percent, we consistently reject the null hypothesis of no asymmetric information using tests in the spirit of Chiappori and Salanié (2000). The persistent correlation between insurance enrollment and medical utilization suggests that private information continues to

influence participation decisions well into the later stages of insurance expansion.

This persistence is notable given Vietnam's institutional design. The public health insurance system offers a largely uniform benefit package and operates under nationwide legal mandates, features that in theory should limit scope for adverse selection by restricting contract heterogeneity (Rothschild & Stiglitz, 1978). Yet our evidence indicates that institutional uniformity alone does not eliminate informational frictions when enrollment remains de facto voluntary for certain population groups. High aggregate coverage, therefore, does not necessarily imply that enrollment is independent of individual health risk or preferences, a point consistent with broader evidence that asymmetric information can persist even in regulated insurance environments (Einav & Finkelstein, 2011).

The occupation-specific results further illuminate this pattern. Among government staff and students—groups with enrollment rates close to universal—the tests provide weaker or mixed evidence of asymmetric information, consistent with limited room for selective participation. In contrast, significant asymmetric information persists among self-employed workers, dependents, and private-sector employees, despite coverage rates above 90 percent among private-sector employees. This finding echoes evidence from other settings that voluntary or weakly enforced enrollment can sustain selection even under public insurance schemes (Wang et al., 2006).

Taken together, the results suggest that achieving high enrollment rates is not equivalent to resolving the informational challenges inherent in health insurance markets. For countries pursuing UHC, the Vietnamese case underscores that the final stages of coverage expansion may remain shaped by asymmetric information, with implications for risk pooling, financial sustainability, and enrollment policy design.

7. Conclusions

This study examined whether asymmetric information in health insurance enrollment remains empirically relevant as coverage approaches universal levels. Using five rounds of nationally representative data from Vietnam spanning 2004–2020, we applied tests in the spirit of Chiappori and Salanié (2000) to assess the relationship between insurance enrollment and realized health risk among working-age adults. The results consistently indicate the presence of asymmetric information throughout the period. Additional analysis by occupation shows that asymmetric information weakens where enrollment is effectively automatic, such as among government employees and students, but persists among groups with greater discretion in enrollment decisions. These findings suggest that high aggregate coverage does not necessarily eliminate selection driven by private information.

The results have important policy implications for countries pursuing universal health coverage. Expanding enrollment through legal mandates and standardized benefit packages can substantially improve risk pooling, but may not be sufficient to neutralize informational frictions when enforcement remains incomplete. Even in advanced stages of coverage expansion, voluntary margins of enrollment can sustain selection patterns that affect risk distribution and financial sustainability. Policies such as automatic enrollment, stronger enforcement mechanisms, or default-based enrollment strategies may therefore be necessary complements to formal mandates. Moreover, monitoring enrollment patterns among specific population groups may be critical for maintaining balanced risk pools as systems mature.

This study has several limitations. First, the empirical tests rely on reduced-form correlations and cannot fully disentangle adverse selection from moral hazard or preference heterogeneity. Second, health risk is measured using self-reported indicators,

which may be subject to reporting bias. Future research could incorporate administrative claims data, longitudinal designs, or structural modeling approaches to better isolate mechanisms and quantify welfare implications. Extending similar dynamic analyses to other countries would also help assess the generalizability of the Vietnamese experience.

References

Chiappori, P. A., & Salanié, B. (2000). Testing for asymmetric information in insurance markets. *Journal of Political Economy*, *108*(1), 56-78.

Chiappori, P. A., Jullien, B., Salanié, B., & Salanie, F. (2006). Asymmetric information in insurance: General testable implications. *The RAND Journal of Economics*, *37*(4), 783-798.

Einav, L., & Finkelstein, A. (2011). Selection in insurance markets: Theory and empirics in pictures. *Journal of Economic perspectives*, *25*(1), 115-138.

Einav, L., Finkelstein, A., & Cullen, M. R. (2010). Estimating welfare in insurance markets using variation in prices. *The Quarterly Journal of Economics*, *125*(3), 877-921.

Ekman, B., Liem, N. T., Duc, H. A., & Axelson, H. (2008). Health insurance reform in Vietnam: a review of recent developments and future challenges. *Health Policy and Planning*, *23*(4), 252-263.

Ensor, T. (1995). Introducing health insurance in Vietnam. *Health Policy and Planning*, *10*(2), 154-163.

Finkelstein, A., & McGarry, K. (2006). Multiple dimensions of private information: evidence from the long-term care insurance market. *American Economic Review*, *96*(4), 938-958.

Gouriéroux, C., Monfort, A., Renault, E., & Trognon, A. (1987). Generalised residuals. *Journal of Econometrics*, *34*(1-2), 5-32.

Jowett, M., Deolalikar, A., & Martinsson, P. (2004). Health insurance and treatment seeking behaviour: evidence from a low-income country. *Health economics*, *13*(9), 845-857.

Le, Q. N., Blizzard, L., Si, L., Giang, L. T., & Neil, A. L. (2020). The evolution of social health insurance in Vietnam and its role towards achieving universal health coverage. *Health Policy OPEN*, *1*, 100011.

National Assembly of Vietnam. (2008). *Law on Health Insurance (Law No. 25/2008/QH12)*.

National Assembly of Vietnam. (2014). *Law Amending and Supplementing a Number of Articles of the Law on Health Insurance (Law No. 46/2014/QH13)*.

Nguyen, M. T. (2014). Moral hazard and adverse selection in health insurances, evidence from a transitional economy. *The Singapore Economic Review*, *59*(02), 1450011.

Parmar, D., Souares, A., De Allegri, M., Savadogo, G., & Sauerborn, R. (2012). Adverse selection in a community-based health insurance scheme in rural Africa:

implications for introducing targeted subsidies. *BMC health services research*, *12*(1), 181.

Pauly M. V. (1968). "The Economics of Moral Hazard: Comment." *American Economic Review*, *58*(3), 531–537.

Rajkotia, Y., & Frick, K. (2012). Does household enrolment reduce adverse selection in a voluntary health insurance system? Evidence from the Ghanaian National Health Insurance System. *Health Policy and Planning*, *27*(5), 429-437.

Resende, M., & Zeidan, R. (2010). Adverse selection in the health insurance market: some empirical evidence. *European Journal of Health Economics*, *11*(4), 413-418.

Rothschild, M., & Stiglitz, J. (1978). Equilibrium in competitive insurance markets: An essay on the economics of imperfect information. In *Uncertainty in economics* (pp. 257-280). Academic Press.

VietnamPlus. (2024). *Vietnam targets universal health insurance coverage by 2030*. https://en.vietnamplus.vn/vietnam-targets-universal-health-insurance-coverage-by-2030-post326467.vnp (accessed on January 15, 2026)

Vietnam Social Security. (2024). *Health insurance coverage reaches over 93% of population*. https://vss.gov.vn/english/news/Pages/vietnam-social-security.aspx (accessed on January 15, 2026)

Wagstaff, A., Nguyen, H. T. H., Dao, H., & Bales, S. (2016). Encouraging health insurance for the informal sector: a cluster randomized experiment in Vietnam. *Health Economics*, *25*(6), 663-674.

Wagstaff, A., & Doorslaer, E. V. (2003). Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998. *Health economics*, *12*(11), 921-933.

Wang, H., Zhang, L., Yip, W., & Hsiao, W. (2006). Adverse selection in a voluntary Rural Mutual Health Care health insurance scheme in China. *Social science & medicine*, *63*(5), 1236-1245.

World Health Organization. (2010). *World Health Report 2010*. Retrieved on October 25th, 2018 from: https://www.who.int/whr/2010/en/

World Health Organization. (2017). *Universal Health Coverage.* Retrieved on October 25th, 2018 from: https://www.who.int/healthsystems/universal_health_coverage/en/

Table 1: Health insurance status of sampled individuals

Health insurance status	2004		2008		2012		2016		2020	
	Obs.	%	Obs.	%	Obs.	%	Obs.	%	Obs.	%
Health Insurance Enrollment	**15,873**	**(39.3)**	**150,707**	**(54.5)**	**24,071**	**(65.7)**	**136,637**	**(78.0)**	**155,856**	**(90.8)**
Booklet/card for children aged 6 or less	2,038	(5.0)	19,095	(6.9)	2,943	(8.0)	14,539	(8.3)	15,431	(9.0)
Health insurance card for the poor	1,377	(3.4)	26,062	(9.4)	3,836	(10.5)	14,095	(8.0)	6,296	(3.7)
Voluntary health insurance card for the near poor					568	(1.5)	4,285	(2.4)	3,334	(1.9)
Free healthcare booklet/card/certificate	3,841	(9.5)	22,223	(8.0)	2,327	(6.3)	12,394	(7.1)	18,915	(11)
Health insurance card for policy beneficiaries	2,220	(5.5)	16,253	(5.9)	2,472	(6.7)	18,694	(10.7)	18,329	(10.7)
Compulsory health insurance card (government)	5,846	(15.5)	20,648	(7.5)	2,639	(7.2)	12,665	(7.2)	11,934	(7.0)
Compulsory health insurance card (private)	380	(0.9)	4,222	(1.5)	1,083	(3.0)	7,464	(4.3)	11,996	(7.0)
Voluntary health insurance card for students	59	(0.2)	40,819	(14.8)	5,131	(14.0)	24,589	(14.0)	26,645	(15.5)
Other voluntary health insurance card	112	(0.3)	1,385	(0.5)	3,072	(8.4)	27,912	(15.9)	42,972	(25.0)
No Health Insurance	**24,565**	**(60.7)**	**125,714**	**(45.5)**	**12,584**	**(34.3)**	**38,604**	**(22.0)**	**15,745**	**(9.2)**
Total	40,438	(100.0)	276,421	(100.0)	36,655	(100.0)	175,241	(100.0)	171,597	**(**100.0**)**

Table 2: Summary statistics of explanatory variables (Working-age Adults (19-59))

Variable	2004				2008				2012				2016				2020			
	Mean	**S.D.**	**Min.**	**Max.**	**Mean**	**S.D.**	**Min.**	**Max.**	**Mean**	**S.D.**	**Min.**	**Max.**	**Mean**	**S.D.**	**Min.**	**Max**	**Mean**	**S.D.**	**Min.**	**Max.**
Number of Observations	17,792				84,102				16,149				14,416				14,123			
Individual characteristics																				
Health insurance	0.20	(0.40)	0	1	0.29	(0.46)	0	1	0.39	(0.49)	0	1	0.57	(0.50)	0	1	0.81	(0.39)	0	1
Utilization of medical services [(a)]	0.33	(0.47)	0	1	0.31	(0.46)	0	1	0.36	(0.48)	0	1	0.34	(0.47)	0	1	0.31	(0. 46)	0	1
Female	0.51	(0.50)	0	1	0.51	(0.50)	0	1	0.51	(0.50)	0	1	0.51	(0.50)	0	1	0. 50	(0.50)	0	1
Age	35.8	(11.0)	19	59	37.1	(11.6)	19	59	37.4	(11.6)	19	59	38.5	(11.6)	19	59	38.9	(11.07)	19	59
Single	0.23	(0.42)	0	1	0.23	(0.42)	0	1	0.21	(0.41)	0	1	0.19	(0.39)	0	1	0. 16	(0. 37)	0	1
Married	0.72	(0.45)	0	1	0.73	(0.45)	0	1	0.75	(0.43)	0	1	0.76	(0.43)	0	1	0.78	(0.41)	0	1
Widowed	0.03	(0.16)	0	1	0.02	(0.15)	0	1	0.02	(0.14)	0	1	0.02	(0.15)	0	1	0. 02	(0. 14)	0	1
Divorced/Separated	0.02	(0.12)	0	1	0.02	(0.13)	0	1	0.02	(0.14)	0	1	0.03	(0.16)	0	1	0. 03	(0. 18)	0	1
Education (years of schooling)	7.22	(3.55)	0	16	8.71	(3.64)	0	16	9.08	(3.80)	0	16	9.45	(3.86)	0	16	9.79	(3.80)	0	16
Self-employed worker	0.005	(0.07)	0	1	0.68	(0.47)	0	1	0.63	(0.48)	0	1	0.59	(0.49)	0	1	0. 53	(0. 50)	0	1
Wage earner (private, domestic)	0.03	(0.17)	0	1	0.04	(0.21)	0	1	0.10	(0.30)	0	1	0.12	(0.33)	0	1	0.17	(0.38)	0	1
Wage earner (private, foreign)	0.03	(0.17)	0	1	0.02	(0.15)	0	1	0.03	(0.17)	0	1	0.05	(0.22)	0	1	0.08	(0.27)	0	1
Government staff	0.005	(0.07)	0	1	0.06	(0.23)	0	1	0.06	(0.24)	0	1	0.12	(0.33)	0	1	0.11	(0.26)	0	1
Students	0.07	(0.25)	0	1	0.08	(0.27)	0	1	0.07	(0.25)	0	1	0.04	(0.20)	0	1	0.03	(0.17)	0	1
Dependent	0.05	(0.21)	0	1	0.12	(0.32)	0	1	0.12	(0.32)	0	1	0.07	(0.25)	0	1	0.07	(0.25)	0	1
Household characteristics																				
Household size	5.04	(1.83)	2.9	10	4.66	(1.60)	1	15	4.39	(1.51)	1	12	4.32	(1.49)	1	13	4.22	(1.52)	1	12
Log of (total consumption per capita)	5.65	(0.71)	2.93	10.07	6.72	(0.70)	4.00	11.87	7.51	(0.51)	5. 34	9.75	6.56	(0.61)	4.03	9.54	7.98	(0.50)	6.20	13.06

Note: Ethnic minorities and family members who live in households that are eligible for the healthcare fund for the poor (HCFP) are excluded.

(a) Utilization of medical services, measured by a dummy variable equal to 1 if an individual used any medical services in the past 12 months, and 0 otherwise.

(b) The highest level of education (years of school) attained by family members aged 18 above.

Table 3: Associated factors with health insurance enrollment

Dependent variable: Enrollment in health insurance (=1)	Working Age Adults (19-59)				
	2004	2008	2012	2016	2020
Individual characteristics					
Female (=1)	-0.006	0.036***	0.061***	0.055***	0.032***
	(0.004)	(0.003)	(0.005)	(0.006)	(0.005)
Age cohort dummy variables[(a)]	Included	Included	Included	Included	Included
Single (=1)	0.029**	-0.002	-0.013	0.006	-0.009
	(0.01)	(0.005)	(0.013)	(0.013)	(0.012)
Married (=1)	(Reference)	(Reference)	(Reference)	(Reference)	(Reference)
Widowed (=1)	0.034*	-0.003	-0.005	-0.037	-0.014
	(0.020)	(0.009)	(0.020)	(0.024)	(0.021)
Divorced/Separated (=1)	0.027	-0.019**	-0.063**	-0.065***	-0.081***
	(0.020)	(0.010)	(0.026)	(0.023)	(0.018)
Education (years of schooling)	-0.006***	0.018***	0.019***	0.019***	0.012***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
Self-employed worker (=1)	-0.026	-0.228***	-0.509***	-0.486***	-0.278***
	(0.050)	(0.015)	(0.016)	(0.016)	(0.027)
Wage earner (private, domestic) (=1)	0.144*	0.218***	-0.276***	-0.262***	-0.142***
	(0.050)	(0.016)	(0.018)	(0.022)	(0.027)
Wage earner (private, foreign) (=1)	-0.022	-0.033**	-0.026	-0.019	0.030
	(0.056)	(0.016)	(0.029)	(0.030)	(0.037)
Government staff (=1)	(Reference)	(Reference)	(Reference)	(Reference)	(Reference)
Student (=1)	0.007	0.116***	-0.087***	-0.019	0.062
	(0.051)	(0.019)	(0.023)	(0.028)	(0.040)
Dependent (=1)	0.252***	-0.084***	-0.425***	-0.382***	-0.255***
	(0.050)	(0.018)	(0.020)	(0.020)	(0.029)
Household characteristics					
Household size	0.002	-0.001	0.003	0.006	0.010***
	(0.003)	(0.001)	(0.003)	(0.004)	(0.004)
Log of (total consumption per capita)	-0.064***	0.043***	0.073***	0.093***	0.052***
	(0.010)	(0.005)	(0.008)	(0.009)	(0.012)
Province fixed effects	Included	Included	Included	Included	Included
Pseudo R squared	0.191	0.365	0.335	0.238	0.168
Observations	17,792	84,102	16,149	14,416	14,123

Note: Marginal changes are shown and province-level cluster-adjusted standard errors are in parentheses; * Significant at 1%; ** Significant at 5%; *** Significant at 1%. Ethnic minorities and family members who live in households that are eligible for the healthcare fund for the poor (HCFP) and for the near-poor are excluded. In addition, free care certificate owners and policy beneficiaries are also excluded. For working age adults, fixed effects for 6 age cohorts: 19-29, 30-39, 40-49, 50-59, 60-69, and 70-80 are controlled for.

Table 4: Associated factors with healthcare utilization

Dependent variable: Health care utilization (=1)	Working Age Adults (19-59)				
	2004	2008	2012	2016	2020
Individual characteristics					
Female (=1)	0.094***	0.096***	0.131***	0.111***	0.094***
	(0.007)	(0.004)	(0.007)	(0.008)	(0.008)
Age cohort dummy variables[(a)]	Included	Included	Included	Included	Included
Single (=1)	-0.088***	-0.110***	-0.150***	-0.130***	-0.126***
	(0.012)	(0.008)	(0.012)	(0.016)	(0.023)
Married (=1)	(Reference)	(Reference)	(Reference)	(Reference)	(Reference)
Widowed (=1)	0.074***	0.015	-0.015	0.023	-0.010
	(0.024)	(0.010)	(0.027)	(0.025)	(0.030)
Divorced/Separated (=1)	-0.042	-0.039***	-0.074***	-0.044	-0.085***
	(0.026)	(0.013)	(0.026)	(0.030)	(0.023)
Education (years of schooling)	-0.002*	-0.004***	-0.002	0.001	-0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Self-employed worker (=1)	0.114**	-0.003	-0.047***	-0.036***	-0.020
	(0.058)	(0.016)	(0.015)	(0.013)	(0.016)
Wage earner (private, domestic) (=1)	0.141**	0.034**	-0.047**	-0.037**	-0.034*
	(0.062)	(0.017)	(0.019)	(0.016)	(0.018)
Wage earner (private, foreign) (=1)	0.136**	-0.004	0.016	-0.002	-0.000
	(0.068)	(0.017)	(0.030)	(0.027)	(0.021)
Government staff (=1)	(Reference)	(Reference)	(Reference)	(Reference)	(Reference)
Student (=1)	0.216***	-0.048**	-0.100***	-0.122***	-0.104***
	(0.056)	(0.019)	(0.022)	(0.024)	(0.029)
Dependent (=1)	0.071	0.061***	0.016	0.084***	0.074***
	(0.061)	(0.017)	(0.021)	(0.018)	(0.017)
Household characteristics					
Household size	-0.017***	-0.021***	-0.018***	-0.026***	-0.023***
	(0.003)	(0.001)	(0.003)	(0.004)	(0.003)
Log of (total consumption per capita)	0.005	0.023***	0.041***	0.044***	0.057***
	(0.008)	(0.005)	(0.013)	(0.011)	(0.014)
Province fixed effects	Included	Included	Included	Included	Included
Pseudo R squared	0.071	0.086	0.097	0.101	0.099
Observations	17,792	84,102	16,149	14,416	14,123

Note: Marginal changes are shown and province-level cluster-adjusted standard errors are in parentheses; * Significant at 1%; ** Significant at 5%; *** Significant at 1%. Ethnic minorities and family members who live in households that are eligible for the healthcare fund for the poor (HCFP) and for the near-poor are excluded. In addition, free care certificate owners and policy beneficiaries are also excluded. For working age adults, fixed effects for 6 age cohorts: 19-29, 30-39, 40-49, 50-59, 60-69, and 70-80 are controlled for.

Table 5: Testing for asymmetric information

	2004		2008		2012		2016		2020	
HI: Health insurance RI: Reporting illness	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**
(%)	*20.15*	*33.13*	*28.79*	*30.65*	*38.70*	*35.70*	*57.00*	*34.60*	*81.50*	*31.50*
W	56.26		732.911		349.29		277.65		247.39	
P-value	0.000		0.000		0.000		0.000		0.000	
Correlation coefficient	0.025		0.057		0.115		0.125		0.120	
P-value	0.000		0.000		0.000		0.000		0.000	
No. of observations	17,792		84,081		16,149		14,416		14,123	

Note: W is a test statistic proposed by Chiappori and Salanié (2000)

Table 6: Testing for asymmetric information using VHLSS2020, by occupation type

	Self-employed		Dependent		Government staff		Private employee		Student	
HI: Health insurance RI: Reporting illness	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**	**HI (=1)**	**RI (=1)**
(%)	*73.44*	*31.28*	*77.22*	*44.59*	*98.00*	*32.26*	*91.81*	*27.03*	*96.80*	*29.19*
W	180.17		40.55		0.201		18.70		2.650	
P-value	0.000		0.000		0.654		0.000		0.085	
Correlation coefficient	0.171		0.196		0.037		0.074		0.050	
P-value	0.000		0.000		0.147		0.000		0.298	
No. of observations	7,597		1,023		1,514		3.545		444	

Note: W is a test statistic proposed by Chiappori and Salanié (2000)

Figure 1. Health insurance coverage rates (2004-2020)

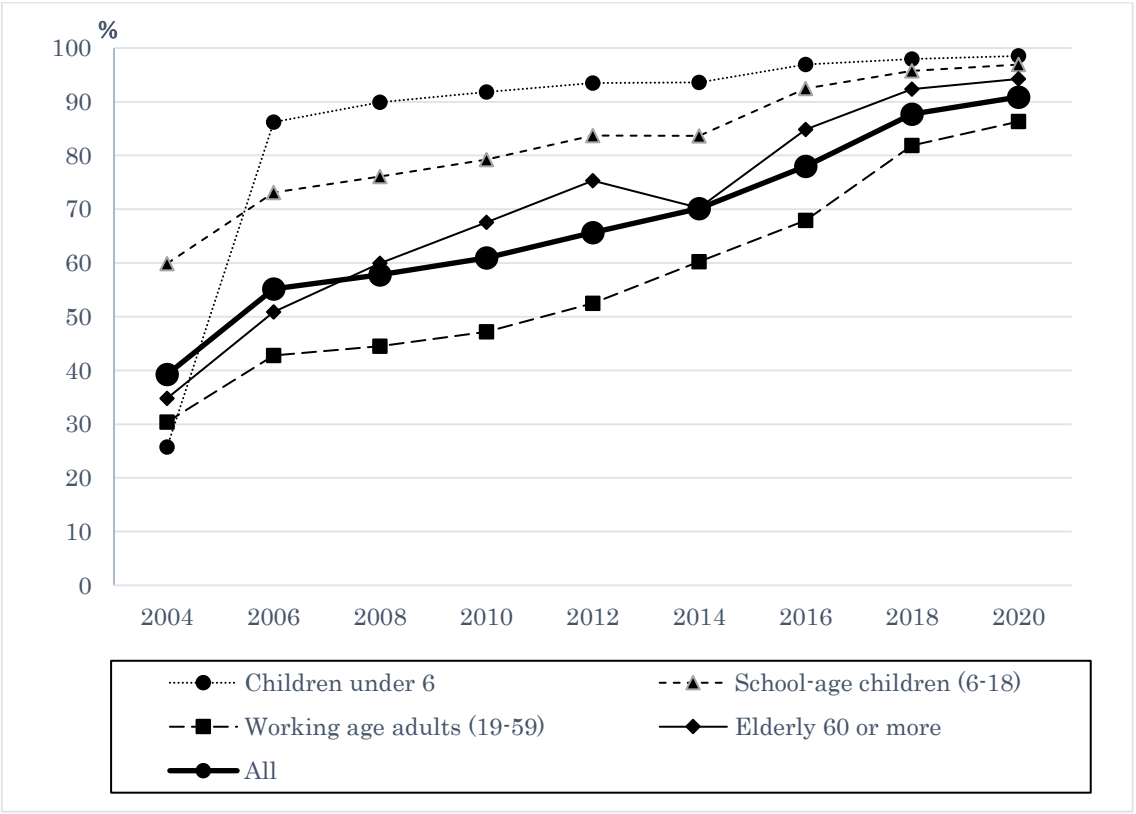
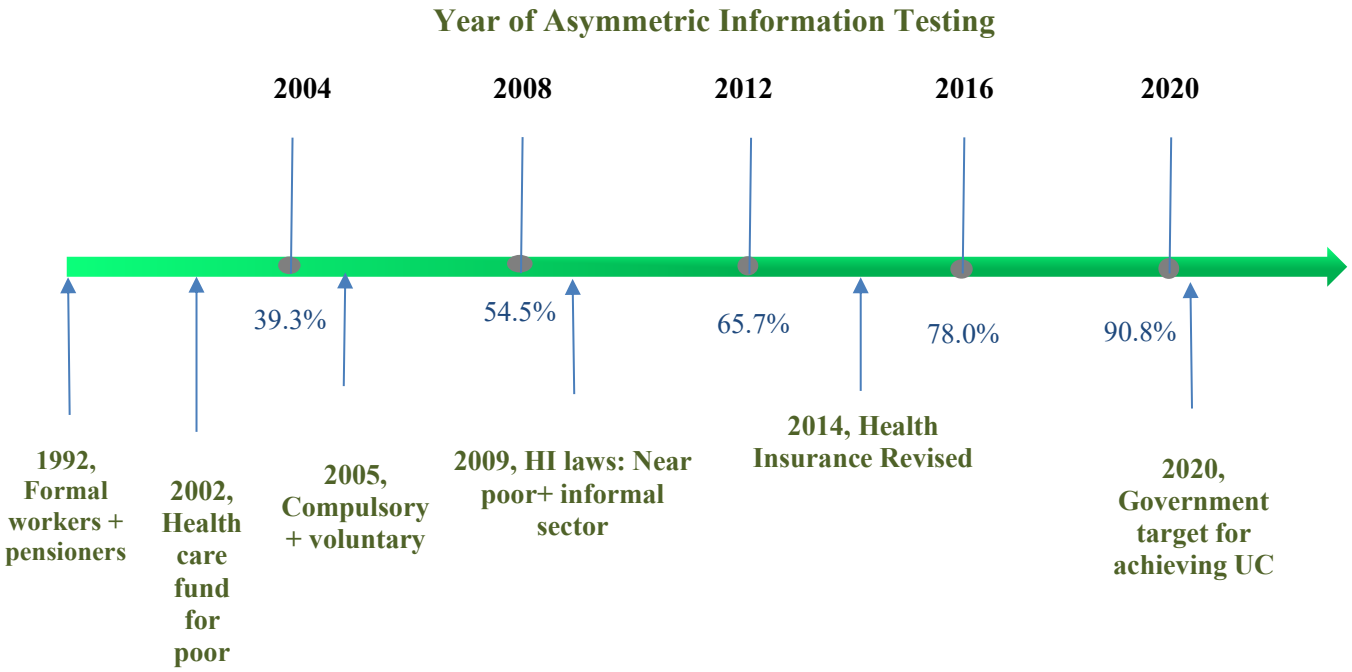


Figure 2: Chronology of Public Health Insurance Reforms and Asymmetric Information Analysis in Vietnam



Chronology of Public Health Insurance Reforms

Note: The chronology of public health insurance reforms highlights only newly introduced schemes.