



The Australian National University
Centre for Economic Policy Research
DISCUSSION PAPER

**Dynamics of health insurance ownership in Vietnam,
2004 – 06 ¹**

Trong-Ha Nguyen ²
Australian National University

Suiwah Leung
Australian National University

DISCUSSION PAPER NO. 643

August, 2010

ISSN: 1442-8636

ISBN: 978-1-921693-24-3

¹ The authors are grateful to Trevor Breusch, Alison Booth and Amy Liu for their suggestions. The usual disclaimers apply.

² All correspondence to Trong-Ha Nguyen, Research School of Economics, Crisp Building, Australian National University, Canberra, ACT, 0200 Australia. Email: ha.trong@anu.edu.au. Tel: +61 2 61258109

Abstract

Vietnam is undertaking health financing reform in an attempt to achieve universal health insurance coverage by 2014. Changes in health insurance policies have doubled the overall coverage between 2004 and 2006. However, close examination of Vietnam Living Standard Surveys during this period reveals that about one fifth of the insured in 2004 dropped out of the health insurance system by 2006. This paper uses longitudinal data from VHLSS 2004 and 2006 to investigate the characteristics of those who joined and those who left the health insurance system. We model the static and dynamic health insurance choices allowing for heterogeneity of choices. The results from both static and dynamic models highlight the importance of income and education in determining the movement in or out of a particular scheme. The results from the static models of health insurance determinants show significant adverse selection in the current health insurance system where individuals with bad health are more likely to be insured. The findings from the dynamic models of health insurance ownership also suggest that the current health insurance system entails significant adverse selection where people with worse health are more likely to join or stay in and less likely to move out of the system. Some policy implications to increase coverage and to maintain financial sustainability of the health insurance system are drawn.

JEL Codes: I11, D12, O12

Keywords: health insurance, adverse selection, Vietnam

1 Introduction

Vietnam is undertaking health financing reform in an attempt to achieve universal health insurance by 2014. Over the last five years, significant changes in health insurance policies have been implemented and have resulted in a rapid growth in coverage. In the two years from 2004 to 2006, the number of the insured doubled (World Bank 2007). This impressive figure, while highlighting the success of the government's measures to increase coverage during this period, disguises a striking fact that at the same time, about one fifth of those insured in 2004 dropped out of the health insurance system by 2006. The high dropout rate indicates that those policies, while successfully increasing the flow of the newly insured, fail to retain the stock of the insured in the system. In order to achieve universal health insurance coverage, Vietnam needs to increase the number of newly enrolled as well as keep those currently enrolled. An understanding of the factors influencing the demand for health insurance is clearly necessary and is thus the main purpose of this paper.

Understanding these determinants also has other important policy implications since currently Vietnam seems to be in a dilemma when it wants to increase the health insurance coverage and to sustain the financial sustainability of the health insurance fund at that same time. The rapid increase in the number of people who enrolled from 2004 to 2006 coinciding with a deficit³ for the first time in the health insurance fund in late 2006, suggest there might be a tradeoff between an increase in coverage and the financial sustainability of the system. This deficit in the health insurance fund also indicates that adverse selection, a situation where people with worse health are more likely to purchase

³ The health insurance fund switched from a surplus of 1989 billion VND in June 2006, which was accumulated over the last ten years, to a deficit of 1200 billion VND at the end of 2006. In 2007, the health insurance fund also experienced a deficit of 1,650 billion VND. In 2008, deficit was at 1700 billion VND. In 2009, the deficit was estimated at 2000 billion VND.

health insurance, may exist in the health insurance system. Ironically, at the beginning of 2008, in an attempt to increase coverage, the group-base requirements⁴ which had been set up to reduce adverse selection were removed. In this context, a study of the motivations behind the movement in and out of the health insurance system could give insights into what Vietnam should do to increase coverage on the one hand and maintain financial sustainability of the health insurance system on the other. The experience of Vietnam then can be shared with other developing countries⁵ which are pursuing universal health insurance coverage.

This paper uses data from two recent waves of the Vietnam Household Living Standard Survey (VHLSS) in 2004 and 2006 to explore factors influencing individual choices among various health insurance schemes. We first examine factors determining people's current choices of health insurance. Then we examine factors influencing their subsequent choices of health insurance.

Compared with other studies on health insurance determinants in Vietnam (for example, Trivedi 2004 or Wagstaff 2010), this paper is different in two respects. First, by using the multinomial logit model, this paper is the first to examine the health insurance determinants while allowing for heterogeneity of choices. Second, by investigating factors determining the movement in and out of the health insurance system, this paper makes another contribution to the literature as the first to study health insurance dynamics in Vietnam.

The paper is structured as follows. Section 2 reviews Vietnam's health insurance system. Section 3 describes the data set and discusses the transition of health insurance ownership

⁴ Group base requirements require individual to enroll in the voluntary health insurance scheme on a household or community basis. See section 2 for details.

⁵ For example, the Philippines and Indonesia aim to achieve universal coverage by 2010 and 2014, respectively.

in Vietnam during the 2004 – 06 period. The empirical model and econometric methodology used to investigate health insurance determinants and dynamics are introduced in Section 4. Empirical results on determinants and dynamics of health insurance ownership are discussed in Sections 5 and 6, respectively. Finally, Section 7 summarizes and discusses the policy implications.

2 The development of Vietnam’s health insurance system

Vietnam’s formal health insurance system began in 1993. In general, Vietnam’s health insurance can be classified into three main schemes: compulsory health insurance (CHI), health care for the poor (HCFP) and voluntary health insurance (VHI).⁶ Table 1 provides a summary of the Vietnamese health insurance system by scheme.

[Table 1 about here]

The compulsory part of the health insurance system consists of two separate schemes: social health insurance (SHI) and free health care for children below six years of age. The SHI scheme which was initiated in 1993 mainly covers public servants, employees in State Owned Enterprises (SOEs) and those in the private formal sector. Initially, only private enterprises with ten or more workers were required to participate, but this size limit was dropped in 2005. The contribution to the scheme is set at 3 per cent of salary, of which the employer contributes 2 per cent and 1 per cent is paid by the employee.⁷ The SHI covers also pensioners, the disabled and meritorious people (such as mothers, widows or orphans of veterans). The contribution of these groups is 3 per cent of pensions for pensioners or 3 per cent of the minimum wage for the disabled or meritorious people. In 2005, the

⁶ For other reviews of Vietnam health insurance, see Ekman et al. (2008) or World Bank (2007) (Lieberman and Wagstaff 2009).

⁷ The 2008 Health Insurance Law increases the contribution rate to 6 per cent of salary, in which employees will pay 2 per cent of their salaries and employers 4 per cent. This law also increases the waiting time for VHI to be in effect for new enrollees to 180 days. In addition, health insurance will be compulsory for students from 2010.

government decided that children under age six would be provided free health care at public health facilities. This program is financed by the central government budget.

The second component of the health insurance system is the HCFP program which was established in 2003 to provide free health care access to individuals in households classified as poor; households in especially disadvantaged communes; and ethnic minorities living in six mountainous northeast and five highland provinces. This HCFP program replaced another program, which provided a special health care card for the poor,⁸ a program that had little success mostly due to funding shortage and implementation difficulties (Ekman et al. 2008; Wagstaff 2007). Initially, provinces were free to decide whether to use the HCFP funding to purchase health insurance cards or to manage the risk themselves and provide direct reimbursement to providers. But in 2005, provinces were instructed to use HCFP resources to purchase health insurance cards directly for eligible people. This change thus allows HCFP beneficiaries to enjoy the same benefit package as those covered by CHI.

The voluntary part of the health insurance system was initiated in 1993 to cover the rest of the population not covered by the CHI and HCFP. The implementation of VHI, however, was not actually carried out until 1995 and has been mainly applied to school students. VHI could not be spread over the non-student population due to lack of guidance policies as well as unattractive benefits. The benefit package is brought compatible between the VHI and CHI in 2003 and this marks a key step in increasing the VHI coverage over

⁸ This program was set up via the circular 05/1999/TTLT-BYT-BLDTB&XH on health care policies for the poor. According to this program, local governments were reliant on their own budgets to finance the scheme. Due to the financial shortage of provincial governments, the coverage of the scheme was narrow and shallow. In addition, complicated application process and the restriction of one care provider per province are also reasons for the failure of this scheme (see Wagstaff (2007) for detail). In contrast to the previous program, the HCFP represents a substantial increase in financial resources allocated for the poor. The major part (75 per cent) of the costs for the HCFP program is funded by the central government.

school students.⁹ However, membership requirements for non-student VHI had not been clearly stated until 2005 and were largely group based.¹⁰ In particular, individuals who belong to households with all members participating in some form of health insurance and living in a commune with at least 10 per cent of households participating in VHI can join the scheme. In addition, students can join the VHI scheme as long as the institute they are studying in has at least 10 per cent of students participating. These group-based participation requirements were dropped in January 2008. The premium rates for VHI are set according to ability to pay, ranging between VND 40,000 (US\$ 2.5 per year) for students in rural areas to VND 160 (US\$ 10 per year) for household members in urban areas.

The benefit package is quite generous and includes outpatient and inpatient treatment at all levels of the health care system. Since 2003, the benefit package has been almost uniform across all schemes with some exceptions. For example, those insured under the pension or merit basis are entitled to 100 per cent of expensive high-tech treatment without limit while others have to pay the amount over a certain limit. In addition, the VHI card requires a waiting period to be put into effect. It can be used 30 days after the day the premium is paid for first time participants. In contrast, CHI scheme takes effect immediately.

Regulations on co-payment for all types of health insurance change from time to time. From 2003 to September 2005, 20 per cent co-payment rate for treatment was shared by the insured. The benefits for the insured were more generous from September 2005 to April 2007 as all expenditures under VND 7 million (US\$ 438) per treatment were covered by the insurer. For treatment above VND 7 million, 40 per cent co-payment is required for

⁹ This is done via the inter-ministry circular 77/2003/TTLT-BTC-BYT dated 07/08/2003.

¹⁰ These group base requirements are from the inter-ministry circular number 22/2005/TTLT-BYT-BTC dated 24/08/2005.

the insured. The co-payment requirement was reintroduced in 2007 where the insured under VHI scheme has to pay 20 per cent of costs incurred during treatment.

Figure 1 shows the resultant impact of health insurance policies on coverage from 1993 to 2006. From Figure 1, CHI appears to be the most utilized health insurance scheme in Vietnam and its coverage increased steadily over the period. The number of individuals insured under the student voluntary scheme, while increasing over the whole period, declined from 1998 to 2000. This decline in coverage was attributed to increases in the premiums of the student voluntary scheme during these years (World Bank 2001). The coverage under the non-student voluntary scheme also experienced a decade of sluggish growth before it picked up significantly in 2005. The number of insured under HCFP has been increasing since its establishment in 1999. In 2006, the number of insured under HCFP outweighed that under CHI, thus becoming the largest scheme. For the health insurance system as a whole, although the percentage of the population insured declined temporarily in 1999, it increased substantially (eightfold) in the entire 1993 – 2006 period. In response to the dramatic changes in health insurance policies in 2003 and 2005, the proportion of the population covered almost doubled (from 22 per cent in 2004 to 43 per cent in 2006, an increase equivalent to the accumulated growth in coverage over the previous decade).

[Figure 1 about here]

3 Review of literature on demand for health insurance in Vietnam

Some studies briefly discuss the determinants of health insurance status. For example, using data from the Vietnam Living Standard Survey in 1997/98, Trivedi (2004) cannot differentiate between voluntary and compulsory schemes and uses only one indicator for health insurance status in his study. Due to this aggregation of the two types of health

insurance, his results on the positive correlation between age, education and income and insurance ownership are less informative. Furthermore, the timeframe when this study was carried out is not relevant for current policy debate since Vietnam's health insurance system has undergone dramatic changes since 1997/98. More recently, Wagstaff (2007) uses data from Vietnam Household Living Standard Survey (VHLSS) 2004 to study the impact of HCFP on health care utilization. In his paper, a Probit model is used to assess the determinants of being covered by HCFP. His main finding is that individuals living in a household with an elderly or illiterate head are more likely to be covered by HCFP. In addition, as designed by the scheme, living in a household that is categorized as poor or headed by an ethnic minority individual or located in economically disadvantageous regions significantly increases the probability of being covered by HCFP. Again, since the focus of Wagstaff's (2007) study is on the impact of HCFP on health care utilization, no attention is given to other schemes. Similar to the study of Wagstaff's (2007), a recent study of Axelson et al. (2009) on the impact of HCFP on health care utilization does not focus on other schemes. Using Health Survey data for 2002, ADB (2008) finds that demand for student voluntary insurance is positively associated with household income, education levels of the household head and accessibility of provincial hospitals. However, it does not find evidence of adverse selection in student voluntary scheme. To our knowledge, there has been no study on the determinants of non-student voluntary health insurance and health insurance dynamics in Vietnam.

Our primary focus is on the determinants of movement in and out of the voluntary scheme. This is of interest since people join on a voluntary basis so their choices partially reflect their preferences and constraints. In addition, although several policies have been implemented to minimize adverse selection in voluntary schemes, such as making the participation unit the community or household rather than the individual and imposing a

waiting time before obtaining benefits from the insurance scheme after participation, the effects of these methods have not been assessed empirically.

Although it is argued that in a health insurance system where the majority of members are insured on a non-voluntary basis, it may not be particularly enlightening to study the determinants of participation in such schemes as SHI and HCFP (World Bank 2007). Determinants of the participation in these non-voluntary schemes are of interest in our study for two reasons.

First, the current health insurance system is facing non-compliance and targeting problems. Although by law, employers are required to pay compulsory health insurance for their employees, the compliance rate is not high. In a recent report, the World Bank (2007) shows that by 2005, while almost all public employers participated in the CHI program, only about 40 per cent of private enterprises did. It also claims that due to a lack of knowledge about insurance from both employees and employers, the issuance of health insurance cards depends on the awareness of employees about their rights, given their concerns about health care needs and their bargaining power in relation with their employers (World Bank 2007). In the case of HCFP, although the three official determinants of HCFP coverage are clearly laid down (see Section 2), the targeting of the program is in question (Wagstaff 2007). Furthermore, there is anecdotal evidence of adverse selection created by local authorities who misused the HCFP funds by providing health insurance cards to the poor only when they needed medical treatment (World Bank 2007). Thus by studying who, among the eligible, is more likely to receive health insurance, this study provides evidence of the possible coverage or leakage of the program.

Second and more importantly, in a health insurance system where individuals have several channels available to them to be covered, the probability of enrollment in one scheme

depends on that in other schemes. For example, a poor person who is eligible for HCFP benefit is less likely to join the voluntary scheme. Studies that examine participation in one scheme in isolation from the others (for example, ADB (2008) or Wagstaff (2010)) do not reflect the interrelation among alternatives. This paper uses the MNL model for this purpose since it supports the interdependence amongst all options.

4 Data

4.1 Data

We use data from the Vietnam Household Living Standard Survey (VHLSS) in 2004 and 2006.¹¹ These surveys are conducted by Vietnam's General Statistics Office, with technical support from the United Nations for Development Program (UNDP) and the World Bank. The 2004 and 2006 VHLSS are nationally representative surveys covering 9,300 and 9,189 households in 2004 and 2006, respectively. Both surveys contain information on demographics, education, health, employment (on an individual level), income, assets, expenditure (on the household level) and a range of community-level infrastructural and institutional variables. In particular, the VHLSSs contain valuable information on types of health insurance for each household member. The VHLSSs are particularly useful as they follow a panel of 4,200 households surveyed in both 2004 and 2006. This feature, together with information on health insurance status, allows us to track the health insurance ownership dynamics for each individual through a period of many changes in health insurance policies, thereby eliminating unobserved differences between individuals that remain unchanged over the period.

¹¹ Although another earlier version of VHLSS that was carried in 2002 can be used to create a panel for the period 2002 - 2006, this version does not have information on health insurance on an individual level. Therefore, we only use VHLSS 04 and 06 for this study.

4.2 Sample

We use different samples to investigate health insurance determinants and health insurance dynamics. In particular, all individuals aged seven or above, regardless of whether they were interviewed in both years, are included in the model of health insurance determinants. We exclude children aged under seven in 2006 from the 2006 sample because they should have had health insurance in 2006.¹² For comparability between the two surveys, we also exclude children aged six or under from the sample for VHLSS04. Finally, we have a sample consisting of 36,749 observations at the individual level for 2004 and 35,626 observations for 2006 to study the health insurance determinants.

For the model of health insurance dynamics, we use a balanced panel of individuals who appear in both surveys. We restrict the panel sample to individuals whose age in 2006 was seven or more. With these restrictions, we have a sample of 15,504 individuals for each year (in 4,166 repeated households).¹³

4.3 Descriptive analysis of health insurance dynamics, 2004 - 06

Table 2 describes the health insurance status of all individuals in the panel sample. Table 2 shows that more than half (50.4 per cent), an increase from 39 per cent in 2004, of Vietnamese were covered by at least one type of health insurance in 2006.¹⁴ In both years,

¹² However, our data show that 16 per cent of children aged under seven do not have any kind of health insurance in 2006. According to the Decree 36/2005/ND-CP, they can still receive health services for free at public facilities on the condition that they present “equivalent papers” such as birth certificates (World Bank 2007)

¹³ Among 4,200 household repeated, some households have all new members. These households are excluded from our sample. In addition, the original data provided by the GSO have some data entry errors for household and individual identification codes. These data entry errors make a large number of individual matches inconsistent (we use individual demographic data to identify possible inconsistency). We drop these households and individuals from our individual panel. Therefore, only 4,166 households are used for our analysis.

¹⁴ Our calculation using VHLSSs shows a higher proportion of the population covered than that reported by VSS (as shown in Figure 1). Note that the statistics reported in Table 1 are calculated for the individual panel sample. If we use the sample of all individuals surveyed in 2004 and 2006 instead, we have almost the same proportion of the population covered as reported in Table 2. This figure does not change much when we use sampling weights either. Therefore, the number of the insured may be over-represented in the VHLSS 2004 and 2006.

three main types of health insurance were HCFP, student voluntary and compulsory schemes. Over the 2004 - 06 period, the number of people participating in HCFP, compulsory and non-student voluntary health insurance schemes increased while that for the student voluntary scheme was stable. Among those schemes that experienced growth in coverage, the non-student voluntary scheme showed the highest rise and tripled (from a low base of 1.4 per cent of the population who were covered under this scheme in 2004 to 4.9 per cent in 2006).

[Table 2 about here]

Table 2 also shows the transition in Vietnamese health insurance status from 2004 to 2006. For Vietnam as a whole, about 42 per cent of the panel individuals were uninsured in 2004 and remained uninsured in 2006. 18.7 per cent of the panel individuals did not have any type of health insurance in 2004 but managed to have one by 2006. The health insurance enrollment rate was the highest for HCFP (7.3 per cent of the panel individuals or 12 per cent of the uninsured in 2004), following the student (4.7 per cent of the panel individuals or 8 per cent of the uninsured in 2004) and other voluntary (4 per cent of the panel individuals or 7 per cent of the uninsured in 2004) schemes. Despite Vietnam's efforts to increase health insurance coverage between 2004 and 2006, the proportion of individuals who moved in the other direction (insured in 2004 but uninsured in 2006) was fairly large; about 7.4 per cent of the panel individuals (or 19 per cent of the insured in 2004) dropped out of the health insurance system during the period. The drop out rate was highest for those insured under the student scheme (23 per cent of the insured under this scheme in 2004), then HCFP (21 per cent) and non-student voluntary (19 per cent). Finally, 31.7 per cent of the panel individuals were insured in 2004 and remained so in 2006. Among the individuals who were insured in both years most remained in their original schemes. Those

insured under the non-student voluntary scheme in 2004 was an exception where 37 per cent of them moved to CHI by 2006 and 17 per cent moved to HCFP scheme.

5 Econometric Model

We use the Multinomial Logit (MNL) model to analyze individual insurance choices and the dynamics of health insurance status. The MNL model states that the probability that an individual i is in state j is given by:

$$P_{ij} = \frac{\exp(\beta_j' x_i)}{\sum_{j=1}^J \exp(\beta_j' x_i)} \quad \text{for } j=1 \text{ to } J \quad (1)$$

where P_{ij} is the probability that individual i is in state j , J is the number of all states, β_j is the set of coefficients to be estimated and x_i includes factors affecting the outcomes.

The sum of probability of falling in all stages for each individual is unit ($\sum_{j=1}^J P_j = 1$). In principle, there is one set of β 's for each state j . However, to identify J sets of β 's, one of them must be set at an arbitrary value. For our purposes, we set the state $j=1$ as the base group. All other sets of β 's are estimated in comparison with this base group.

For ease of interpretation, we calculate and represent the results in terms of the impact of the variable on the relative risk ratio (RRR). The RRR is the probability of a given outcome divided by the probability of the base outcome ($\ln(P_{ij} / P_{i1})$). Therefore, RRR of a coefficient indicates how the probability of the outcome falling in the comparison group compared to the probability of the outcome falling in the base group would change with the variable in question. For example, Table 3 shows MNL results of determinants of health insurance ownership with being uninsured set as the base outcome. Suppose that an

individual has a 20 per cent chance of being uninsured in some year (the base group) and 40 per cent chance of being insured under HCFP. For that individual, the RRR of being insured under HCFP (relative to being uninsured) is 2 (0.4 divided by 0.2). The impact of each variable on the RRRs for 'being insured' under different schemes are also presented in Table 3. For instance, an individual with characteristic x ($x = 1$) has an RRR of being insured under HCFP of 40 per cent while an identical individual without that characteristic ($x = 0$) has an RRR of being insured under HCFP of 20 per cent. The impact of this variable on the RRR is 2 (0.4 divided by 0.2) which means that it increases the relative probability of being insured under HCFP (relative to the probability of being uninsured) by 100 per cent. A simple rule for the impact of a variable on the RRR is that an impact of greater than one ($RRR > 1$) indicates that the variable increases the relative probability of being in the comparison group while an impact of less than one ($RRR < 1$) indicates that the variable reduces the relative probability of being in the comparison group.

Other econometric issues involve sampling weights and clustering. First, since both VHLSS04 and 06 were over-sampled in certain areas, we use sampling weights to calculate representative statistics (O'Donnell et al. 2008). We use the corresponding weights for the model of health insurance determinants for each year. For the individual panel data used in the model of health insurance dynamics, we use the weight in 2004 as the benchmark.¹⁵ Second, both VHLSS04 and 06 use a three stage stratified cluster sampling method with commune as the primary sampling unit. Clustering raises the possibility of intra-commune correlation and results in the smaller estimated variance of the coefficients. In this study, to deal with the effects of clustering, we calculate the robust standard errors of parameter estimates adjusted for clustering.

¹⁵ We also conducted analyses of health insurance dynamics without weight in 2004 and with weight in 2006. The results were consistent and robust, indicating the attrition does not affect the results. We only present the results with 2004 weight here.

6 Determinants of health insurance ownership

6.1 Model specification

Our empirical models are based on the basic model of demand for health insurance (detailed in, for example, Cameron et al. (1988), Deb et al. (1996) or (Zweifel and Manning 2000)). Generally, under uncertainty, the consumer seeks to maximize utility by choosing health insurance coverage (low or high) prior to the realization of health care services. The *ex ante* utility maximizing choice of health insurance coverage depends on income, health status, insurance premiums, prices of other goods, the state of the world and exogenous preferences.

We use the MNL model to examine individual choices over various health insurance schemes. From Section 2 we know that the benefits are almost the same between schemes; therefore, there is no incentive for individuals to have more than one type of health insurance policy.¹⁶ The nature of the Vietnam's health insurance satisfies the requirement of the MNL model that outcomes categorized in the dependent variable be mutually exclusive. We divide health insurance ownership status into five mutually exclusive states: (1) uninsured, (2) insured under the HCFP scheme, (3) insured under the compulsory scheme, (4) insured under the student voluntary scheme, and (5) insured under the non-student voluntary.¹⁷ As discussed in the previous section, the 'uninsured' group is set as the base group, with the consequence that all other groups are compared to this group.

¹⁶ The questionnaires for VHLSS04 and 06 also reflect the mutual exclusion among health insurance schemes as they allow the respondent to choose only one among listed schemes.

¹⁷ The VHLSSs use information on whether individuals had to buy health insurance themselves or had it bought by someone else (for example, provided by the government for free or by their employers) to classify which health insurance scheme they are in. Theoretically, this method can precisely classify type of health insurance. In practice, it should be noted that at the time of surveys the awareness of people about the existence and benefits of health insurance was limited so we may expect some of the insured to misreport their types of health insurance. For example, employees in the public sector are granted CHI, so it is odd to observe that some of them report having voluntary health insurance. Although the number of these people is negligible, the interpretation of any result in this study should take this data limitation into consideration.

Following the literature dealing with income in developing countries, where income data are relatively scarce, we use per capita household expenditure to proxy for income. Although the VHLSSs have some income information, it is difficult to construct reliable income estimates for households where the main income is from self employment or in-kind remuneration. In addition, expenditure data generally indicate household's permanent income more precisely. To capture the non-linear relationship between income and outcomes, we categorize income into five groups (5 quintiles). We also include type of dwelling in the regressions to measure the impact of household assets on insurance choices.

Since adverse selection plays an important role in modeling the demand for health insurance, we include a number of health status variables to measure whether there is adverse selection in the health insurance program. Adverse selection refers to the case where individuals differ according to their health risk and when faced with the same insurance options, persons with higher health risk are more likely to purchase insurance since the expected benefits are greater (Akerlof 1970; Arrow 1963; Rothschild and Stiglitz 1976). We expect individuals in worse health to be more likely to purchase insurance *ceteris paribus* since they have higher expected consumption of health services and higher health expenditure. To indirectly identify participants at high risk we use both long-term and short-term health status. Accordingly, long-term health status is measured by the existence of any chronic disease or limitation in functional ability¹⁸ and short-term health status is measured by a dummy variable indicating whether the individual had any illness in the 12 months before the survey period. In our empirical model, the impact of age on

¹⁸ The VHLSS06 provides a comprehensive description of an individual's overall functional health on the basis of vision, aural, remembering or concentrating, ambulation (ability to get around), dexterity (use of hands and fingers) and communication attributes. For each attribute, four possible responses are recorded: not difficult, a little difficult, very difficult and impossible. We classify an individual as one with any limitation in functional ability if having a little difficulty or more in any of above attributes.

health insurance demand also represents the health effect as individuals in old age have more demand for health care. Following the literature on health insurance, we also use information on smoking behavior as a proxy for attitude to risk (Barsky et al. 1997; Buchmueller et al. 2004; Doiron et al. 2008). The smoker is considered as more risk-loving and hence less likely to buy health insurance.¹⁹

Our approach of using the correlation between the individual observable health status and the probability of enrolling in the health insurance system to empirically test for adverse selection is similar to that in the literature (Ettner 1997; Finkelstein and Poterba 2004; Shmueli 2001; Wolfe and Goddeeris 1991). However, since premiums in Vietnam do not vary according to risk rating by insurers as in developed countries (Ellis 1998; Ellis and McGuire 1986; Newhouse 1996), we believe that the impact of health on the probability of purchasing insurance more precisely reflects the existence of adverse selection in our study.²⁰

Variables are included to reflect individual preferences. These include age (and its squared), gender, marital status, ethnicity and educational background. As suggested by the theoretical models, premiums should be included in the model of health insurance determinants. However, we do not include premiums in the regressions for two reasons. First, premiums are not applicable for insurance schemes other than social (SHI) and voluntary (VHI) schemes. Second, under the VHI scheme, premiums are uniform for everybody after controlling for regional and rural/urban differences. The inclusion of

¹⁹ Information on smoking, chronic disease or disability is only available in the VHLSS06. We make use of our individual panel to assume that individuals who report having ever smoked or having any chronic disease or being disabled in 2006 also did so in 2004.

²⁰ Risk-rating of health insurance premiums means insurers can differentiate premiums according to assessed true risk. Due to this premium risk-rating practice, the most common finding in empirical studies in health insurance in developed countries is that that healthy people are more likely to be covered by private health insurance (see Doiron et al. (2008) for a review).

regional and rural/urban variables in the regressions therefore controls for this heterogeneity in premiums.

Besides the inclusion of those variables suggested by the standard health insurance models, we include other variables that may be useful in explaining health insurance ownership in Vietnam. For example, in Vietnam, employment plays a significant role in health insurance participation since health insurance is compulsory for employees under labour contracts. Since employees with labour contracts are usually wage earners, we use wage employment status to measure the impact of employment on health insurance. In addition, we expect the impact of employment to be different between the public and private sector. Therefore, we include two dummy variables indicating the sector of wage employment. We also include a variable indicating whether the individual is at school to examine its impact on insurance options.

Current regulations state that membership of a voluntary health insurance scheme can be attained via a number of channels such as institution, community or household. As a result, we include a number of variables representing household characteristics such as the proportion of household members in various age cohorts or health status that may influence the likelihood of participation of each member on a household basis. Following Wagstaff (2007), we also include two variables describing ethnicity of individuals and their residential locations (135 Program commune) to capture their impact on the

probability of receiving HCFP.²¹ Detailed description and summary statistics of explanatory variables are presented in Appendix Tables 1 and 2, respectively.

[Appendix Table 1 and 2 about here]

6.2 Regression results

The estimation results for the models of health insurance determinants in 2004 and 2006 are presented in Table 3. The estimates are broadly similar for both samples, indicating that the impact of these contributing factors is robust and consistent during the period. Although we can quantitatively measure the magnitude of the impact of a variable using the RRR as discussed in the econometric model section, in order to facilitate the discussion currently, we refer to the direction of the impact on the propensity to have health insurance.

[Table 3 about here]

We first discuss the impact of health on insurance choices. Estimates of the health variables show that individuals with bad health are more likely to join the health insurance system. In particular, having any illness in the 12 months prior to the survey significantly increases the probability of being included in such schemes as HCFP (in 2004), compulsory (in 2004 and 2006) and student (in 2004 and 2006). In addition, in 2006 sample, individuals with any chronic disease or disability were more likely to have HCFP or CHI schemes than those without. Furthermore, those with a disability were also more likely to enroll in the non-student voluntary scheme than those without in 2006. In line

²¹ Information on whether a commune is classified as a beneficiary of the 135 Program is available in the commune information section. In both surveys, the commune questionnaire is asked for all communes in rural areas and some communes in urban areas. Although commune information is not available for all communes, the fact that all communes covered by the 135 Program are in rural or remote areas allows us to use commune questionnaire to identify Program 135 communes. We do not include a variable indicating whether the household is identified by the commune as poor in the regressions since this variable is highly correlated with our household expenditure quintile.

with the literature (Noterman et al. 1995; Shalev et al. 2005), we also find that females were more likely to join the voluntary scheme in both years because they have a higher risk (especially when they are at productive age) than males. The finding that poor health is associated with higher probability of having government subsidized schemes such as HCFP or CHI is expected, as these policies are designed to cover those people in difficult situations, including those with poor health. The finding that individuals with bad health had more chance to receive HCFP is in line with the study of World Bank (2007) which shows the evidence of adverse selection created by local authorities who misused the HCFP fund by providing health insurance cards to the poor only when they needed medical treatment. The finding that individuals with poor health managed to overcome the group-based enrollment barriers to enroll in VHI is an interesting one. This finding not only indicates the existence of adverse selection in the voluntary schemes but also casts doubt on the effectiveness of the group-based participation requirement which was set up to avoid adverse selection in this scheme.

Estimates of age variables were also significant and consistent with the effect of health status. The higher age was associated with higher probability of enrollment in all types of health insurance (except HCFP scheme in 2006). The impact of age, however, is not linear for the insured under the voluntary groups (both student and non-student) since the estimate of the age squared variable is significantly positive and smaller than one, indicating that when the insured get older, they may withdraw from their schemes. Take the student voluntary scheme for example. Students have a higher probability of joining their designed scheme as they advance in their study. Student participation, however, starts to fall at some point, such as when they finish study, when they switch to other schemes or leave the health insurance system.

Smoking appears to significantly affect health insurance choices. Smokers are less likely to have CHI and VHI than non-smokers. The negative impact of smoking on the probability of possessing CHI can be explained by occupation choice where non-smokers are more likely to choose the public sector that has a higher compliance rate in providing CHI for its employees (Ettner 1997; Savage and Wright 2003). In contrast, smoking does not affect the probability of having HCFP. This is to be expected as smoking behavior is not one of the criteria to be eligible for HCFP.

Income (as measured by per capita household expenditure) also exerts a statistically significant influence, but in the opposite direction, on the probability of being insured under different schemes. On the one hand, individuals in better off households are less likely to be included in HCFP. Individuals in upper expenditure quintile households, on the other hand, have a higher probability of having compulsory and voluntary (both student and non-student) insurance. One interpretation of the income effects in the demand for compulsory and voluntary schemes is that these effects result from the HCFP programs that serve as social protection for the poor. Poor persons know that they can qualify for HCFP so they do not bother purchasing voluntary health insurance. Alternatively, the positive relationship between income and the probability of having voluntary health insurance indicates that this kind of health insurance is a normal good. On the positive impact of wealth on the probability of having VHI, our results are consistent with those studies in developed countries where wealthier individuals are more likely to purchase private health insurance (Cameron and Trivedi 1991; Hurd and McGarry 1997; Propper 1989; Savage and Wright 2003).

In line with the impact of income on the probability of having alternative schemes, education also significantly affects the chance of being covered. In particular, individuals

with higher education are more likely to join the compulsory, student and non-student voluntary schemes. In contrast, higher education is associated with lower probability of having HCFP.

By law, compulsory health insurance must be provided for wage earners. Therefore, it is not surprising to observe that workers in the formal sector are found to have a much higher probability (from nine to 59 times higher) of receiving this kind of insurance than their counterparts who are self-employed or unemployed. It is, however, interesting to find that wage earners in the public sector have significantly higher probability (more than four times higher) of receiving CHI than their counterparts in the private sector. This can be explained by the much higher compliance rate in the public sector than in the private sector (World Bank 2007). The gap in the compliance rate between the two sectors appears to have narrowed over the period since the ratio of the impact between the public and private sector decreased from about 5.7 times in 2004 to 4.2 times in 2006.

Current schooling status significantly affects the probability of purchasing student health insurance. Students had 17 (in 2004) to 20 times (in 2006) higher probability than people currently not at school. Also, as designed by the HCFP program, an individual living in a commune indentified as a beneficiary of Decision 135 and being an ethnic minority individual has a significantly higher probability of receiving the HCFP. Being an ethnic minority individual however reduces the chance of purchasing student (in both years) and non-student (in 2006) voluntary insurance.

Residents in urban areas have a higher chance of being covered by the HCFP, compulsory and student schemes than their counterparts in rural areas. On the contrary, no significant difference is found between rural and urban residents' behavior in purchasing non-student voluntary insurance. Urban residents tend to work for formal sectors more often than rural

ones and these sectors provide CHI so the former have more chance of receiving this kind of insurance. Why urban residents are more likely to participate HCFP seems surprising as rural areas are poorer and mainly targeted by the HCFP program. This finding casts doubt over the targeting of the HCFP program.

7 Dynamics of health insurance ownership

7.1 Model specification

We start investigating the dynamics of health insurance ownership by specifying a baseline model that contains only variables measuring initial conditions. By so doing, we remove all possible problems of endogeneity and also test the robustness of the model when variables that capture ‘changes’ are introduced.²² The initial variables are similar to those in the health insurance determinant models. Variables describing changes are suggested from the health insurance determinant models and change over time. These are changes in employment status, changes in schooling status and changes in income. These ‘change’ variables are expected to be exogenous in our empirical models since there is little evidence that the Vietnamese people choose whether to leave school or change their work for health insurance reasons (Jowett et al. 2003; Trivedi 2004). Accordingly, we add these ‘change’ variables in the model of health insurance dynamics and classify them as follows:

Changes in school status: the change of an individual’s schooling between 2004 and 2006 is classified into four mutually exclusive states: individuals who were not at school in both 2004 and 2006 (never at school, the base group), individuals who were not at school in 2004 but at school in 2006 (enrolling at school), individuals who were at school in 2004 but not at school in 2006 (leaving school), individuals who were at school in both 2004 and 2006 (remaining at school).

²² Our approach is similar to Wolfe and Goddeeris (1991) where we both study the impact of past characteristics on the current insurance decision. This paper, however, makes a significant improvement in this approach by looking at the impact of past characteristics on the dynamics of health insurance status.

Changes in wage work: the change of an individual's employment status between 2004 and 2006 is classified into four mutually exclusive states: individuals who were not wage earners in both 2004 and 2006 (never be a wage earner, the base group), individuals who were not wage earners in 2004 but were in 2006 (becoming a wage earner), individuals who were wage earners in 2004 but not in 2006 (becoming a non-wage earner), individuals who were wage earners in both 2004 and 2006 (remaining a wage earner). These variables are constructed separately for private and public sectors.

Changes in income: changes in income are measured by the change in the per capita household real expenditure adjusted by price indexes of regions and survey months.

7.2 Health insurance dynamics of the uninsured in 2004, by scheme

We now turn to analyze the dynamics of health insurance ownership in Vietnam over the 2004-06 period. To allow for the possibility of choice among various schemes, we divide the individuals by their initial health insurance status: uninsured or insured in 2004. We use the first sub-sample of the uninsured in 2004 to investigate which factors drove an uninsured individual in 2004 to (1) remain uninsured in 2006, or become insured in 2006 under such schemes as (2) HCFP, (3) CHI, (4) student voluntary and (5) non-student voluntary. To analyze all possible choices of individuals who started the 2004 – 06 period as uninsured we also use the MNL model for this sub-sample. In running this model, the status of remaining uninsured in 2006 is set as the benchmark group, resulting in all other groups being compared with this group.

We report the estimates for the health insurance dynamic models for the sample of individuals who were uninsured in 2004 in Table 4. This table shows factors contributing to the movement of the uninsured to become insured under a particular scheme. We discuss their movement to one of four insurance schemes in turn.

[Table 4 about here]

From uninsured in 2004 to insured under HCFP in 2006: Estimation results for the baseline and extended models are shown in the first and fifth columns of Table 4, respectively. These results, in general, mirror the growth of the HCFP program during a period where uninsured individuals belonging to an ethnic minority group or living in poorer households or in 135-Program communes had a higher probability of receiving HCFP by 2006. In addition, less educated individuals were more likely to be covered by HCFP. The uninsured with a chronic disease or disability were also more likely to receive HCFP during the period. This finding supports the evidence of adverse selection in ‘becoming insured’ under the HCFP group. Regarding the impact of income dynamics, we see that individuals living in households that experienced an improvement in income had a lower probability of receiving HCFP. In particular, an increase of one million VND in income during the period was expected to decrease the probability of receiving HCFP by 17 per cent.

From uninsured in 2004 to insured under CHI in 2006: The results (columns 2 and 6 in Table 4) show that the movement into CHI is significantly associated with changes in employment status. In particular, uninsured people were more likely to become insured under CHI when they had been or had started working in the formal wage sector (public and private). Again the impact of public sector employment on the probability of becoming insured under CHI was much higher than that of the private sector. This confirms one of our earlier findings of the lower compliance rate in the private sector. Using those who remain uninsured in 2006 as a benchmark point of comparison, then those becoming covered by CHI in 2006 tend to be better educated and those becoming insured under HCFP are less educated than the benchmark case. In contrast, variables representing initial

wealth and increase in wealth are insignificant in explaining the movements into CHI. Also we do not find significant evidence of adverse selection in this group since all observable health variables are insignificant.

From uninsured in 2004 to insured under the student voluntary scheme in 2006:

Insignificant estimates of health variables suggest no evidence of health based selection in the choice of moving into the student voluntary insurance (see columns 3 and 7 in Table 4). As designed by the scheme, becoming insured under the student scheme is significantly associated with schooling status where individuals who started or have been at school during the period had a much higher probability of being covered than never-at-school individuals. Kinh or Chinese students were more likely to join this scheme than other ethnic minority students. Higher initial wealth or an improvement in wealth over the period also increased the probability of becoming insured under this voluntary scheme.

From uninsured in 2004 to insured under the non-student voluntary scheme in 2006:

The results (columns 4 and 8 in Table 4) also provide evidence of adverse selection in the market for non-student voluntary health insurance. In comparison with the ‘remaining uninsured’ individuals, those who purchased non-student voluntary health insurance were significantly more likely (100 per cent higher) to have a chronic disease. Furthermore, it is interesting to observe the impact of group-based requirements on the choice of other household members, since individuals living in households with a higher share of ill members were more likely to move into the voluntary scheme by 2006. The latter finding not only provides evidence of adverse selection but also indicates the significant impact of group-base requirement in reducing adverse selection in VHI where healthy members in the household have to become insured for ill members to be eligible to enroll as specified by the household-group base. In contrast to the individuals becoming insured under the

HCFP, those becoming insured under the non-student voluntary scheme were wealthier and sometimes more educated (for example, the uninsured in 2004 with a secondary school degree). The uninsured who started working for the public sector during the period were more likely to have non-student voluntary health insurance before 2006 than those who never worked in the public sector.

7.3 Health insurance dynamics of the insured in 2004, by scheme

We use the sub-sample of the insured in 2004 to examine the possible link between their initial conditions in 2004 with their subsequent insurance choices during the 2004-06 period. In order to examine factors determining the insured's choice of (1) staying in their current scheme, or (2) moving to another scheme (i.e. still being insured but under another scheme)²³ or (3) becoming uninsured, we separately estimate MNL models for sub-samples of the insured in 2004 under different schemes. Accordingly, the sub-sample of the insured in 2004 is then divided further by type of health insurance scheme into four sub-samples of the insured under: HCFP, CHI, student and non-student voluntary scheme. For each scheme, the first group (remained insured under the same scheme) is set as the benchmark group, resulting in other groups being compared with this group.

The estimation results in Tables 4 to 7 for movements of individuals who started the period as the insured are consistent with the results explaining the behavior of individuals who started as the uninsured. In general, those factors that influenced the uninsured to be covered by the health insurance system are also the main determinants explaining why they left the system.

The insured under HCFP in 2004 (results are reported in Table 5): the probability of moving out of the HCFP scheme (either to another scheme or becoming uninsured) was

²³ We do not separate this state further by defining the destination scheme because in some cases, the number of individuals moving into any specific scheme is so small that the MNL loses its precision.

higher for individuals who belonged to the Kinh or Chinese ethnic group, or lived in wealthier households or in communes that were not a beneficiary of the 135 Program. In addition, we find evidence of adverse selection in the HCFP where individuals with a chronic condition, while having the same probability of transferring to another scheme, had a significantly lower probability of becoming uninsured in the subsequent period than those in the benchmark group (remaining insured under the HCFP). Regarding the impact of change variables on health insurance dynamics, changes in schooling status or employment were found to increase the probability of moving to another scheme (probably, the student or CHI) but not moving out of the health insurance system. In particular, individuals who became or remained as students during the period were more likely to move (probably to the student scheme) than those who did not. Similarly, those who became or remained as state employees had a higher chance of transfer to another scheme (most likely to CHI). Interestingly, individuals living in better-off households were more likely to switch to another scheme. All change variables, however, were not significant determinants of becoming uninsured.

[Table 5 about here]

The insured under CHI in 2004 (results are reported in Table 6): As before, wealth appears to be one of the driving forces in the insurance decision: higher income and better educated individuals are less likely to divert to another scheme or become uncovered. Insured individuals living in a 135-Program commune have a much higher probability (400 per cent higher) to make the shift (mostly likely to HCFP) than their counterparts in a more advantageous commune. The sector of employment, as shown in the determinant models of participation in CHI, is also found to have a significant impact on the movement out of CHI. In particular, the insured that work in the public or private formal sector for the whole

period or start working for the formal private sector during the period have a much lower probability of transferring to another scheme or becoming uninsured. One concern is that the insured who left the state sector during the period were more likely to become uninsured than those who never worked for the state. Regarding the negative impact of leaving the state sector and dropping out of the health insurance system, it can be inferred that leaving the sector is equivalent to losing health insurance status. An increase in wealth as measured by a change in per capita expenditure during the period, however, is not statistically significantly associated with the movement of the insured under CHI. In addition, there is no evidence of health based selection in the choice of moving out of this scheme since the health variables are not significant in all cases.

[Table 6 about here]

The insured under the student voluntary scheme in 2004 (results are reported in Table 7): We find evidence of adverse selection in the student scheme where the insured with bad health (as measured by having any illness in 2004) were less likely to become uninsured than healthier members. In addition, the insured with a disability were more likely to switch to another scheme (probably HCFP or CHI). Smoking behavior has a significantly impact on enrollment (as found in the health insurance determinant models) and also on the movement out of the student scheme since the insured who have smoked were more likely to become uninsured at the end of the study period. Other variables in the regressions have their expected signs. For example, the insured under the student scheme who are better educated or wealthier are less likely to shift to another scheme or leave the health insurance system. Additionally, belonging to an ethnic minority group or living in a 135-Program commune significantly increases the probability of shifting (mostly likely to HCFP). In contrast, the insured in urban areas are less likely to become uninsured than

their rural counterparts. As expected, insured individuals who have been or become students during the period have a lower probability of transferring to another scheme or becoming uninsured. Unlike the negative impact of leaving the state sector on the probability of becoming uninsured, for those who start as the insured under the CHI, school termination does not necessarily mean the end of student insurance coverage since students who left school during the period still had a lower probability of transferring to another scheme or becoming uninsured, than individuals who never attended school during the period.

[Table 7 about here]

The insured under the non-student voluntary scheme in 2004 (results are reported in Table 8): The insignificant impact of health variables on the movement out of the voluntary scheme indicates that there is no significant evidence of adverse selection in this group. The sector of employment or schooling status again plays an important role in transferring from VHI to the student or compulsory scheme. As in the case of the student scheme, an increase in income does not seem to impact on the decision to transfer to another scheme or quit the health insurance system.

[Table 8 about here]

8 Conclusion

This study uses longitudinal data from VHLSS 2004 and 2006 to investigate the static and dynamic determinants of health insurance ownership in Vietnam during this period. The results from the static models of health insurance determinants show that wealth and education have a significant impact on the probability of having health insurance. Higher wealth or education is negatively associated with the probability of having HCFP but

positively associated with CHI and VHI. The results from the dynamic models of health insurance ownership also suggest the importance of income and education in determining the movement in or out of a particular scheme. Higher initial income or an improvement in wealth during the period reduces the probability of remaining or becoming insured under HCFP. Higher initial income, however, raises the probability of becoming covered under CHI or VHI.

The results from the static models of health insurance determinants show significant adverse selection in the current health insurance system where individuals with worse health are more likely to be insured. In addition, adverse selection exists in all schemes. The results from the dynamic models of health insurance ownership also suggest that the current health insurance system entails significant adverse selection since people with worse health are more likely to join and stay in the system. Taken together, our results suggest that the current health insurance system contains significant adverse selection. The finding of adverse selection in the voluntary schemes indicates that those policies implemented to address adverse selection have not been successful. The problem of adverse selection is expected to worsen after the beginning of 2008 when the group-based requirements for enrollment in voluntary schemes are removed. The health insurance system will not be sustainable unless the problem of adverse selection is resolved (Cutler and Zeckhauser 2000).

From the findings of this paper, some policy implications to increase coverage and to maintain financial sustainability of the health insurance system are drawn. First, to increase coverage, partial subsidization of participation in VHI should be given for individuals in financially disadvantageous groups. This suggestion is supported by the finding of a significant impact of wealth on the probability of moving in, moving out or staying at VHI.

Therefore, results of this study give support for the government's recent approach to provide partial subsidies for those in financially disadvantageous groups such as individuals in near poor households, farmers and students.²⁴ Second, another way of increasing coverage is to make health insurance compulsory. This policy has been applied to employees in the formal sector, the poor and children aged under seven. It can be extended to other groups such as students or individuals in households that have any member currently holding CHI. The legalized inclusion of those individuals into CHI should be used in conjunction with the first policy suggestion to subsidize the participation of disadvantageous groups. Third, since there is under-compliance in health insurance issuance in the private formal sector, stricter measures to improve law enforcement should be implemented to motivate the healthy population from this sector to participate in the health insurance system.

One may argue that once universal coverage has been achieved, adverse selection could be eliminated. However, experience from the implementation of the HCFP program in Vietnam shows that, without substantial financial resources from the central government and concrete implementation policies, universal coverage will be a long time coming. On the way towards universal coverage, the financial sustainability of the health insurance system needs to be maintained. One of the measures to strengthen the financial sustainability of the health insurance system is to introduce and maintain a co-payment rate. The introduction of co-payment rate is important because it helps prevent patients from choosing more care than clinically required (moral hazard) and health care providers from supplying more care (supplier-induced demand). Another measure to maintain financial sustainability is to reduce adverse selection in the health insurance system. In

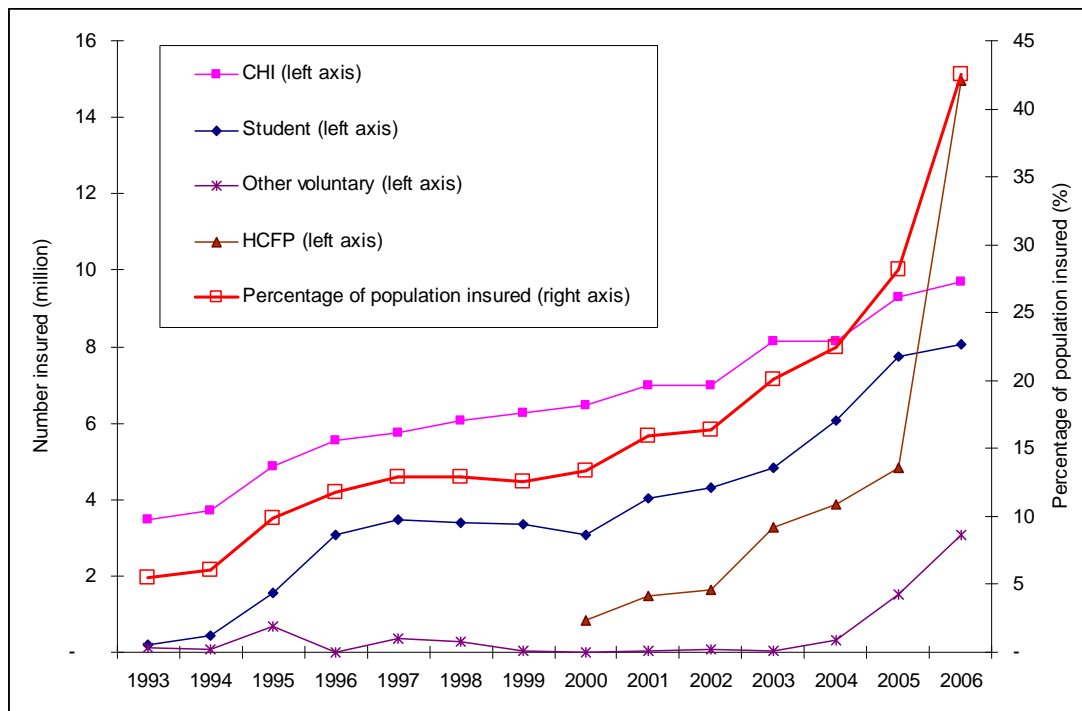
²⁴ According to the joint circular number 10/2008/TTLT-BYT-BTC dated 24/09/2008, households with per capita income above the poverty line but not over 130 per cent of the poverty line are defined as near poor. These households are subsidized at least 50 per cent of health insurance premium, which is set at 3 per cent of minimum wage.

order to reduce adverse selection, there are several policy implications based on the findings of this analysis. One of the measures is to maintain group-base requirements. Although the empirical results show that group base requirements could not totally eliminate adverse selection, there is some evidence indicating the importance of the household-base requirement in reducing adverse selection in VHI. Those policies to strengthen law enforcement to increase health insurance coverage in the private formal sector could also help reduce adverse selection.

Table 1: Components of Vietnam health insurance system, 2009

Scheme	Targeted population	Financing	Variations of benefit package
Compulsory health insurance (CHI)	Civil servants and employees in the formal sector	3 % salary (2 % paid by employer and 1 % by employee)	Cover 100 % for all treatment under VND 20 million No limit on the value of treatment
	Pensioners	3 % of monthly allowances, paid by VSS with subsidies from state budget	
	Meritorious people	3 % of minimum wage, paid from state budget	
	Children aged below six	Central government budget	
Health care for the poor (HCFP)	The poor	Central government budget (75 %) and provincial budget (25 %)	
Voluntary health insurance (VHI)	Students	VND 40,000 – 70,000 (urban). VND 30,000 – 50,000 (rural). Paid by parents.	
	Others (non-students)	VND 100,000 – 160,000 (urban). VND 70,000 – 120,000 (rural). Paid by enrollee.	

Figure 1: Vietnam's health insurance coverage, 1993 – 2006



Source: Data for 1993 to 2005 are combined from World Bank (2001 and 2007). Data for 2006 are from Vietnam Social Security.

Table 2 **Matrix of health insurance ownership dynamics in Vietnam, 2004 –2006**
(percentage of 15504 individuals in the panel sample)

			2006					Total		
			<i>Uninsured</i>	<i>Insured</i>						
			<i>Total</i>	By scheme						
				<i>Total</i>	HCFP	CHI	Student	Other voluntary		
2004	<i>Uninsured</i>	<i>Total</i>	42.1	18.7	7.3	2.7	4.7	4.0	60.8	
	<i>Insured</i>	<i>Total</i>	7.4	31.7	10.6	8.8	11.4	0.9	39.1	
		By scheme	HCFP	2.7	10.1	8.6	0.9	0.4	0.2	12.8
			CHI	0.7	8.3	0.9	7.0	0.1	0.3	9.0
			Student	3.7	12.2	0.9	0.4	10.8	0.1	15.9
			Other voluntary	0.3	1.1	0.2	0.5	0.1	0.3	1.4
Total			49.5	50.4	17.9	11.5	16.1	4.9	100.0	

Note: - Population means weighted to reflect sampling weights.

Source: own-calculation from the VHLSS 04 and 06.

Table 3 Determinants of health insurance ownership, 2004 - 2006

Variables	2004				2006			
	HCFP	CHI	Student	Other Voluntary	HCFP	CHI	Student	Other Voluntary
<i>Individual characteristics</i>								
Age	1.01*	1.06***	1.15*	1.04***	1.00	1.07***	1.13*	1.07***
Age squared	1.00	1.00	0.99***	1.00	1.00	1.00	0.99***	0.99***
Male	1.06	1.02	1.02	0.75**	0.99	1.09	1.12*	0.81***
Married	0.72***	0.82	0.21***	0.66*	0.73***	0.86	0.40***	1.42***
Kinh	0.41***	0.72	1.98***	1.33	0.30***	0.86	1.41*	1.75*
<i>No education(the base)</i>								
Primary education	0.85*	1.15	1.27**	1.48*	0.80***	1.51***	1.34**	1.14
Lower secondary	0.75**	1.78***	2.23***	1.86***	0.76**	2.76***	2.75***	1.46***
Upper secondary	0.78	2.10***	3.51***	2.39***	0.65***	2.85***	6.03***	1.74***
University and higher	1.23	7.61***	12.48***	4.58***	1.00	15.41***	14.00***	1.68
Training	1.80	2.88***	2.77***	2.09***	1.14	3.38***	1.55	1.04
Ill	1.14**	1.43***	1.23*	1.15	1.06	1.26**	1.48***	1.05
Chronic					1.66***	1.53***	1.24	1.78***
Disable					1.41***	1.32***	1.27	1.14
Smoking					0.96	0.80**	0.56**	0.71***
At school	1.24*	1.95***	17.33***	2.10***	1.76***	2.38***	20.08***	0.82
Private wage	1.06	9.10***	0.16***	3.08***	1.03	13.59***	0.35***	1.25
Public wage	1.84***	51.35***	1.22	9.35***	1.89***	58.65***	0.57	2.72***
<i>Household characteristics</i>								
Household size	0.99	0.97	1.00	0.91	0.93**	0.99	1.01	1.03
Proportion of children age under 7	0.94	1.29	0.86	2.93*	1.00	2.29*	0.82	1.63
Proportion of children aged 7 to 17	2.12***	0.77	1.26	1.62	1.54*	0.55*	0.86	1.08
Proportion of elderly	1.93***	1.20	1.56	0.48*	1.03	1.19	1.38	1.40
Proportion of people ill	0.88	0.77*	0.85	1.01	1.15	0.81*	0.71**	1.03
<i>Poor (the base)</i>								
Near poor	0.54***	0.93	1.81***	0.75	0.47***	0.89	1.64***	1.68**
Average	0.39***	1.17	2.52***	1.46	0.26***	0.95	2.10***	2.10***
Better-off	0.35***	1.64***	3.71***	1.81*	0.23***	1.47*	3.49***	3.06***
Rich	0.29***	2.17***	4.53***	2.15**	0.13***	1.88**	4.10***	4.18***
<i>Temporary house (the base)</i>								
Semi-permanent house	0.64***	0.83	0.92	1.10	0.56***	0.97	1.27*	1.03
Permanent house	0.47***	0.70**	1.03	1.18	0.36***	0.77	1.23	0.93
<i>Commune characteristics</i>								
Urban	1.51***	1.35**	1.35**	1.11	1.18*	1.24***	1.46***	1.04
Commune 135	2.68***	2.96***	0.75*	2.90**	3.97***	1.41	0.77*	0.95
No of observations	36749				35626			
Log pseudo likelihood	-24993				-26642			
Pseudo R-Square	0.40				0.44			

Note: - Uninsured is set as the base group; Regional variables are included.
- Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.
- ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Table 4 Health insurance ownership dynamics: the uninsured in 2004

Variables	Baseline model				Extended model			
	HCFP	CHI	Student	Voluntary	HCFP	CHI	Student	Voluntary
<i>Individual characteristics</i>								
Age	0.97**	0.97	0.79**	1.07***	0.97**	0.99	0.91	1.07***
Age squared	1.00*	1.00***	1.00	1.00**	1.00*	1.00*	1.00	1.00**
Male	0.83	0.68**	0.98	0.90	0.83	0.68**	1.05	0.90
Married	0.99	0.50**	0.15*	1.35	1.01	0.70	0.18	1.42
Kinh	0.49*	1.04	1.82	1.93	0.52*	0.99	2.05*	1.92
Primary education ^(a)	0.78	1.29	1.64*	1.15	0.79	1.38	1.00	1.14
Lower secondary ^(a)	0.63***	2.46***	3.57***	1.08	0.65**	2.18**	1.51	1.06
Upper secondary ^(a)	0.58*	4.63***	12.19***	1.80**	0.60*	2.40*	1.70	1.66*
University and higher ^(a)	0.00	17.50***	26.84***	1.05	0.00***	11.67***	1.37	0.95
Training	1.50	1.97*	0.00***	0.96	1.58*	1.69	0.00***	0.92
Ill	1.00	0.95	0.94	1.24	0.99	0.83	1.06	1.23
Chronic	1.53***	1.18	1.23	2.04***	1.58***	1.20	1.62	2.01***
Disable	1.44**	1.03	0.70	1.01	1.46**	1.17	0.84	1.02
Smoking	0.98	1.12	0.29**	0.74	0.97	0.99	0.53	0.73
<i>Household characteristics</i>								
HH head	1.25*	1.50*	0.00***	0.91	1.26*	1.64*	0.00***	0.91
HH size	0.94	1.05	1.00	1.04	0.94	1.05	1.03	1.04
Proportion of children age under 7	1.31	0.82	0.78	1.04	0.99	1.09	0.92	1.09
Proportion of children aged 7 to 17	1.57	0.42*	0.90	1.34	1.40	0.43*	0.91	1.30
Proportion of elderly	1.36	0.97	2.61	1.39	1.19	1.18	1.48	1.41
Proportion of people ill	1.01*	0.94	1.20	1.17**	1.03**	1.03	1.23	1.17**
Near poor ^(b)	0.58***	0.67	1.92*	1.88	0.56***	0.61	1.81*	1.86
Average ^(b)	0.36***	0.97	2.26**	2.32**	0.33***	0.86	1.93*	2.30**
Better-off ^(b)	0.30***	1.13	2.68**	2.70**	0.25***	1.00	2.64**	2.70**
Rich ^(b)	0.22***	1.13	1.79	4.22***	0.11***	0.92	1.84	4.27***
Semi-permanent house ^(c)	0.47***	0.85	0.89	0.97	0.49***	0.88	0.82	0.96
Permanent house ^(c)	0.21***	0.65*	0.91	0.93	0.22***	0.71	0.68	0.91
<i>Commune characteristics</i>								
Urban	1.57	1.43**	1.33	1.25	1.80*	1.48*	1.25	1.24
Commune 135	4.71***	1.40	1.44	1.49	4.85***	1.35	1.35	1.48
<i>“Change” variables</i>								
At school	1.43*	1.81*	2.91***	0.54				
Private wage	0.97	4.72***	0.53	0.57				
Public wage	1.11	15.79***	0.66	1.89				
Enrolling school ^(d)					1.07	1.36	238.25***	0.83
Leaving school ^(d)					1.45	1.71	10.42***	0.32*
Remaining at school ^(d)					1.38	2.93***	169.48***	0.74
Becoming a wage earner (public) ^(e)					1.65	80.56***	0.80	6.05***
Becoming a non-wage earner (public) ^(e)					0.84	3.30*	0.32	1.46
Remaining a wage earner (public) ^(e)					1.72	80.18***	0.00	2.80
Becoming a wage earner (private) ^(f)					1.10	27.24***	1.04	1.52
Becoming a non-wage earner (private) ^(f)					0.77	1.02	0.81	0.49
Remaining a wage earner (private) ^(f)					1.20	24.66***	0.00***	0.57
Income increase					0.83***	0.99	1.12*	1.02
No of observations	9129				9129			
Log pseudo likelihood	-6603				-6117			
Pseudo R-Square	0.29				0.35			

Note: - Remaining uninsured is set as the base group; Regional variables are included.
 - ^(a): No education; ^(b): Poor; ^(c): Temporary house; ^(d): never at school; ^(e): never be a wage-earner in the public sector; ^(f): never be a wage-earner in the private sector are set as the base group, respectively.
 - Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.
 - ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Table 5 Health insurance ownership dynamics: the insured under HCFP in 2004

Variables	Baseline model		Extended model	
	Another scheme	Uninsured	Another scheme	Uninsured
<i>Individual characteristics</i>				
Age	0.92*	0.98	0.97	0.98
Age squared	1.00**	1.00	1.00	1.00
Male	0.82	0.78	0.76	0.77
Married	1.82	1.43	1.73	1.52
Kinh	4.09**	3.74**	3.96**	3.72**
Primary education ^(a)	1.28	1.09	1.28	1.04
Lower secondary ^(a)	1.65*	1.08	1.97**	0.98
Upper secondary ^(a)	1.66	1.10	1.23	0.96
University and higher ^(a)	2.54	0.00***	4.37	0.00***
Training	6.00**	1.29	6.02**	1.30
Ill	0.81	0.90	0.79	0.90
Chronic	0.74	0.37***	0.67	0.38***
Disable	1.28	0.84	1.30	0.81
Smoking	1.08	1.33	1.18	1.33
<i>Household characteristics</i>				
HH head	1.55*	0.93	1.57	0.97
HH size	0.96	1.00	0.97	1.00
Proportion of children age under 7	1.24	0.69	2.24	0.79
Proportion of children aged 7 to 17	1.83	0.94	1.81	1.06
Proportion of elderly	0.60	0.49	0.61	0.52
Proportion of people ill	1.12	0.48*	1.06	0.49*
Near poor ^(b)	1.41	1.60	1.48	1.63
Average ^(b)	2.36*	2.12*	2.31*	2.23*
Better-off ^(b)	5.58***	2.36*	6.53***	2.56*
Rich ^(b)	9.51**	4.21	14.00**	4.90
Semi-permanent house ^(c)	2.04	2.18**	2.02	2.14**
Permanent house ^(c)	2.05	2.79	1.29	2.66
<i>Commune characteristics</i>				
Urban	1.51	1.08	1.38	1.07
Commune 135	0.37**	0.32***	0.36**	0.32***
<i>“Change” variables</i>				
At school	1.88	0.51		
Private wage	0.48	0.70		
Public wage	4.45*	3.00*		
Enrolling school ^(d)			8.79**	1.02
Leaving school ^(d)			0.45	0.89
Remaining at school ^(d)			7.13***	0.39*
Becoming a wage earner (public) ^(e)			12.07**	1.45
Becoming a non-wage earner (public) ^(e)			3.53	4.24
Remaining a wage earner (public) ^(e)			5.54*	2.27
Becoming a wage earner (private) ^(f)			3.11	1.64
Becoming a non-wage earner (private) ^(f)			0.21	0.94
Remaining a wage earner (private) ^(f)			0.61	0.51
Income increase			1.18***	1.04
No of observations	2306		2306	
Log pseudo likelihood	-1455		-1409	
Pseudo R-Square	0.26		0.28	

Note: - Remaining insured under HCFPI is set as the base group; Regional variables are included.
- ^(a): No education; ^(b): Poor; ^(c): Temporary house; ^(d): never at school; ^(e): never be a wage-earner in the public sector; ^(f): never be a wage-earner in the private sector are set as the base group, respectively.
- Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.
- ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Table 6 Health insurance ownership dynamics: the insured under CHI in 2004

Variables	Baseline model		Extended model	
	Another scheme	Uninsured	Another scheme	Uninsured
<i>Individual characteristics</i>				
Age	0.93*	0.98	0.90*	0.93
Age squared	1.00	1.00	1.00	1.00
Male	1.38	1.56	1.37	1.62
Married	0.93	0.68	1.00	0.85
Kinh	0.53	0.53	0.50	0.57
Primary education ^(a)	0.42*	0.45	0.45	0.56
Lower secondary ^(a)	0.99	0.45	1.08	0.47
Upper secondary ^(a)	0.60	0.31**	0.90	0.57
University and higher ^(a)	0.40	0.04***	0.65	0.08***
Training	0.58	0.46*	0.58	0.44
Ill	1.09	1.72	1.07	1.66
Chronic	0.72	1.02	0.78	1.20
Disable	1.35	0.95	1.21	0.89
Smoking	0.71	0.80	0.67	0.72
<i>Household characteristics</i>				
HH head	0.86	0.51*	0.84	0.45**
HH size	0.92	1.04	0.91	1.07
Proportion of children age under 7	3.18	0.12	5.63	0.10
Proportion of children aged 7 to 17	1.83	0.75	2.95	1.15
Proportion of elderly	1.70	1.06	2.12	1.47
Proportion of people ill	1.55	0.37*	1.65	0.38*
Near poor ^(b)	0.47	0.18**	0.46	0.17**
Average ^(b)	0.32**	0.28*	0.28**	0.23**
Better-off ^(b)	0.30*	0.29*	0.30*	0.29*
Rich ^(b)	0.37	0.18*	0.35	0.14*
Semi-permanent house ^(c)	0.59	1.25	0.54	1.08
Permanent house ^(c)	0.59	0.60	0.60	0.52
<i>Commune characteristics</i>				
Urban	1.18	1.43	1.06	1.33
Commune 135	4.73***	1.44	4.97***	1.35
<i>“Change” variables</i>				
At school	1.14	0.50		
Private wage	0.38	1.10		
Public wage	0.09***	0.61		
Enrolling school ^(d)			0.26***	0.29
Leaving school ^(d)			0.60	0.64
Remaining at school ^(d)			0.61	0.15
Becoming a wage earner (public) ^(e)			0.32	0.23
Becoming a non-wage earner (public) ^(e)			0.84	3.57***
Remaining a wage earner (public) ^(e)			0.03***	0.10***
Becoming a wage earner (private) ^(f)			0.08**	0.20*
Becoming a non-wage earner (private) ^(f)			0.60	3.96
Remaining a wage earner (private) ^(f)			0.21*	0.30*
Income increase			0.99	0.98
No of observations	1436		1436	
Log pseudo likelihood	-662		-606	
Pseudo R-Square	0.32		0.38	

Note: - Remaining insured under CHI is set as the base group; Regional variables are included.
- (a): No education; (b): Poor; (c): Temporary house; (d): never at school; (e): never be a wage-earner in the public sector; (f): never be a wage-earner in the private sector are set as the base group, respectively.
- Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.
- ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Table 7 Health insurance ownership dynamics: the insured under the student scheme in 2004

Variables	Baseline model		Extended model	
	Another scheme	Uninsured	Another scheme	Uninsured
<i>Individual characteristics</i>				
Age	0.78	0.76**	0.85	0.80*
Age squared	1.02***	1.02***	1.01**	1.01***
Male	0.95	1.00	0.96	1.02
Kinh	0.36**	1.34	0.30**	1.08
Primary education ^(a)	0.50*	0.61*	0.52*	0.64
Lower secondary ^(a)	0.25**	0.34**	0.23**	0.27***
Upper secondary ^(a)	0.32*	0.14***	0.51	0.23**
University and higher ^(a)	0.60	0.00***	0.24	0.00***
Ill	0.82	0.56**	0.77	0.54**
Chronic	0.42	0.59	0.42	0.54
Disable	1.97	0.86	1.79	0.82
Smoking	2.70*	3.17***	2.62*	3.06*
<i>Household characteristics</i>				
HH size	0.91	1.02	0.91	1.01
Proportion of children age under 7	3.17	0.54	1.86	0.37
Proportion of children aged 7 to 17	1.55	1.26	0.93	0.91
Proportion of elderly	0.82	0.73	1.00	0.89
Proportion of people ill	0.97	0.92	1.05	0.95
Near poor ^(b)	0.28***	0.46*	0.28***	0.44*
Average ^(b)	0.22***	0.51	0.21***	0.48*
Better-off ^(b)	0.07***	0.28***	0.06***	0.26***
Rich ^(b)	0.16***	0.30***	0.13***	0.25***
Semi-permanent house ^(c)	0.82	0.72*	0.86	0.79
Permanent house ^(c)	0.41*	0.74	0.53	1.07
<i>Commune characteristics</i>				
Urban	0.97	0.66**	1.06	0.68**
Commune 135	4.10***	1.29	4.81***	1.55
<i>“Change” variables</i>				
At school	0.51	0.32**		
Enrolling school ^(d)			0.00***	0.01***
Leaving school ^(d)			0.10*	0.09*
Remaining at school ^(d)			0.01***	0.01***
Income increase			0.93	0.97
No of observations	2404		2404	
Log pseudo likelihood	-1668		-1487	
Pseudo R-Square	0.15		0.25	

Note: - Remaining insured under student scheme is set as the base group; Regional variables are included. Training, married, head and wage sector variables are dropped because there is not much variation in these variables
- ^(a): No education; ^(b): Poor; ^(c): Temporary house; ^(d): never at school are set as the base group, respectively.
- Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.
- ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Table 8 Health insurance ownership dynamics: the insured under the non-student voluntary scheme in 2004

Variables	Baseline model		Extended model	
	Another scheme	Uninsured	Another scheme	Uninsured
<i>Individual characteristics</i>				
Age	0.95	0.85	0.95	0.84
Age squared	1.00	1.00	1.00	1.00
Male	1.24	0.70	1.49	0.59
Married	0.06	0.10	0.08	0.12
Kinh	0.00***	0.00***	0.00***	0.00***
Primary education ^(a)	2.31	2.99	2.11	3.08
Lower secondary ^(a)	0.55	1.65	0.48	1.36
Upper secondary ^(a)	0.43	2.26	0.41	1.64
University and higher ^(a)	2.88	0.89	2.71	0.68
Training	7.27*	1.10	7.17*	1.36
Ill	1.48	2.66	1.44	2.18
Chronic	2.94	1.08	2.75	1.09
Disable	2.38	1.39	2.56	1.58
Smoking	1.55	5.05	1.40	5.77
<i>Household characteristics</i>				
HH head	0.86	0.50	0.79	0.51
HH size	0.99	0.68	0.96	0.72
Proportion of children age under 7	0.95	70.37	1.17	13.47
Proportion of children aged 7 to 17	0.41	38.65	0.50	33.94
Proportion of elderly	0.13	0.12	0.13	0.14
Proportion of people ill	1.47	0.78	1.49	0.98
Near poor ^(b)	0.19	0.57	0.18	0.47
Average ^(b)	0.45	4.81	0.50	3.10
Better-off ^(b)	0.78	1.02	0.78	0.60
Rich ^(b)	1.16	4.75	1.28	2.24
Semi-permanent house ^(c)	0.07***	0.63	0.07***	0.45
Permanent house ^(c)	0.07**	0.60	0.07**	0.59
<i>Commune characteristics</i>				
Urban	0.27*	0.71	0.27*	0.93
<i>“Change” variables</i>				
At school	11.09*	0.24	9.68	0.31
Private wage	0.50	0.07*	0.43	0.10*
Public wage	27.55**	2.77	22.78**	2.91
Income increase			1.09	0.86
No of observations	229		229	
Log pseudo likelihood	-142		-140	
Pseudo R-Square	0.36		0.37	

Note: - Remaining insured under non-student voluntary is set as the base group; Regional variables are included. Commune 135, change in sector of employment and schooling status variables are dropped because there is not much variation in these variables

- ^(a): No education; ^(b): Poor; ^(c): Temporary house are set as the base group, respectively.

- Population means weighted to reflect sampling weights; - Relative Risk Ratio is reported.

- ***, ** and * denote significance at 1, 5 and 10 per cent, respectively.

Source: own-calculation from the VHLSS 04 and 06.

Appendix Table 1 **Variable definitions**

Variable name	Variable definitions
Age	Current age (in years)
Age squared	Age squared (in years squared)
Male	Dummy = 1 if male, = 0 if female (the base group)
Married	Dummy = 1 if married, widowed, divorced or separated; =0 if otherwise (the base group)
Kinh	Ethnicity Dummy = 1 if Kinh or Chinese; = 0 if otherwise (the base group)
Education	Achieved levels of education: no education (the base group), primary, lower secondary, upper secondary, university or higher
Training	Dummy = 1 if obtained long-term vocational training or professional high school, = 0 if otherwise (the base group)
Ill	Dummy = 1 if have any illness in the last 12 months; = 0 if have no illness (the base group)
Chronic	Dummy = 1 if has any chronic disease, e.g. diabetes, hepatitis, = 0 if have no chronic disease (the base group)
Disable	Dummy = 1 if have any difficulty in one of the seven functional ability; = 0 if have no difficulty (the base group)
Smoking	Dummy = 1 if have ever smoked; = 0 if otherwise (the base group)
Private wage	Dummy = 1 if working for wage in the private sector; = 0 if not working for wage in this sector (the base group)
Public wage	Dummy = 1 if working for wage in the public sector (including SOEs); = 0 if not working for wage in this sector (the base group)
At school	Dummy = 1 if currently at school or on vacation, = 0 if currently not at school (the base group)
Household head	Dummy = 1 if is the head of the household, = 0 if otherwise (the base group)
Household size	Number of household members
Proportion of members at various age cohorts	Proportion of children age under 7, between 7 and 17, and 60 and over in the household
Proportion of people ill	Proportion of people ill in the household
Income group	Five household expenditure quintiles: poor (the base group), near poor, average, better-off and rich
Semi-permanent house	Dummy = 1 if is the dwelling is classified as semi-permanent, = 0 if otherwise (the base group)
Permanent house	Dummy = 1 if is the dwelling is classified as permanent, = 0 if otherwise (the base group)
Region	Eight residential regions: Northeast (the base group), Red River Delta, Northwest, North Central Coast, South Central Coast, Central Highlands, Southeast and Mekong River Delta
Urban	Dummy = 1 if residential area is urban, = 0 if rural (the base group)
Commune 135	Dummy = 1 if the commune is the beneficiary of the 135 Program, = 0 if otherwise (the base group)
Change in schooling status	Not at school in 2004 and 2006 (as the base group), Not at school in 2004 but at in 2006, At school in 2004 but not in 2006, At school in both 2004 and 2006
Change in public wage earner status	Non wage-earner in the public sector in both 2004 and 2006 (the base group), Non wage-earner 2004 and wage-earner 2006, Wage-earner 2004 and non wage-earner 2006, Wage-earner in the public sector in both 2004 and 2006
Change in private wage earner status	Non wage-earner in the private sector in both 2004 and 2006 (the base group), Non wage-earner 2004 and wage-earner 2006, Wage-earner 2004 and non wage-earner 2006, Wage-earner in the private sector in both 2004 and 2006
Income increase	Change in real per capital expenditure between 2004 – 06

Appendix Table 2 Summary statistics for variables used in the regressions

Variables	Uninsured 2004 and uninsured 2006	Uninsured 2004 and insured 2006	Insured 2004 and uninsured 2006	Insured 2004 and insured 2006	All
Age	37.514	31.276	25.577	28.362	32.548
Age squared	1703.861	1413.984	984.439	1211.567	1439.534
Male	0.484	0.458	0.519	0.525	0.495
Married	0.719	0.512	0.339	0.424	0.558
Kinh	0.940	0.821	0.911	0.786	0.867
Primary education	0.314	0.276	0.311	0.260	0.290
Lower secondary	0.297	0.210	0.257	0.210	0.250
Upper secondary	0.103	0.118	0.136	0.128	0.116
University and higher	0.006	0.015	0.004	0.070	0.028
Training	0.021	0.028	0.024	0.076	0.040
Ill	0.304	0.288	0.227	0.283	0.289
Chronic	0.090	0.108	0.053	0.087	0.089
Disable	0.166	0.168	0.121	0.162	0.162
Smoking	0.320	0.206	0.184	0.198	0.250
Wage work – private sector	0.033	0.032	0.034	0.026	0.031
Wage work – public sector	0.011	0.028	0.046	0.148	0.060
At school	0.104	0.222	0.537	0.489	0.302
Household head	0.327	0.242	0.145	0.225	0.265
Household size	4.800	4.925	5.005	4.932	4.880
Proportion of children age under 7 in the household	0.075	0.090	0.061	0.073	0.076
Proportion of children aged 7 to 17 in the household	0.241	0.268	0.306	0.295	0.268
Proportion of elderly (age>=60) in the household	0.104	0.107	0.080	0.091	0.099
Proportion of people ill in the household	0.303	0.284	0.242	0.271	0.285
Near poor	0.236	0.229	0.212	0.170	0.212
Average	0.241	0.195	0.231	0.152	0.203
Better-off	0.224	0.178	0.216	0.207	0.209
Rich	0.164	0.158	0.155	0.230	0.183
Semi-permanent house	0.617	0.583	0.608	0.559	0.592
Permanent house	0.205	0.172	0.182	0.225	0.204
Red River Delta	0.239	0.192	0.236	0.195	0.216
Northwest	0.009	0.036	0.020	0.054	0.029
North central coast	0.119	0.141	0.111	0.168	0.138
South central coast	0.080	0.093	0.071	0.111	0.092
Central highlands	0.042	0.064	0.060	0.076	0.058
Southeast	0.157	0.140	0.187	0.123	0.145
Mekong River Delta	0.271	0.178	0.197	0.136	0.205
Urban	0.217	0.222	0.238	0.295	0.244
Commune 135	0.063	0.179	0.106	0.208	0.134
Not at school in 2004 but at in 2006	0.009	0.048	0.019	0.023	0.022
At school in 2004 but not in 2006	0.031	0.037	0.225	0.058	0.055
At school in both 2004 and 2006	0.072	0.297	0.312	0.431	0.246
Non wage-earner 2004 and wage-earner 2006 (public)	0.006	0.031	0.013	0.015	0.014
Wage-earner 2004 and non wage-earner 2006 (public)	0.007	0.008	0.031	0.020	0.013
Wage-earner 2004 and wage-earner 2006 (public)	0.004	0.020	0.015	0.128	0.048
Non wage-earner 2004 and wage-earner 2006 (private sector)	0.022	0.036	0.048	0.017	0.025
Wage-earner 2004 and non wage-earner 2006 (private sector)	0.021	0.013	0.017	0.008	0.015
Wage-earner 2004 and wage-earner 2006 (private sector)	0.013	0.019	0.017	0.019	0.016
Change in real per capital expenditure between 2004 - 06	1.342	1.297	1.267	1.648	1.426
Number of observations	6161	2968	1136	5239	15504

Note: - Sample of 15504 individuals in the panel
- Population means weighted to reflect sampling weights.

Source: own-calculation from the VHLSS 04 and 06.

REFERENCES

- Akerlof, G.A., 1970, 'The Market for "Lemons": Quality Uncertainty and the Market Mechanism', *The Quarterly Journal of Economics*, 84(3): 488-500.
- Arrow, K.J., 1963, 'Uncertainty and the Welfare Economics of Medical Care', *The American Economic Review*, 53(5): 941-973.
- Barsky, R.B., Juster, F.T., Kimball, M.S. and Shapiro, M.D., 1997, 'Preference Parameters and Behavioral Heterogeneity: An Experimental Approach in the Health and Retirement Study', *Quarterly Journal of Economics*, 112(2): 537-579.
- Buchmueller, T.C., Couffinhal, A., Grignon, M. and Perronnin, M., 2004, 'Access to physician services: does supplemental insurance matter? Evidence from France', *Health Economics*, 13(7): 669-687.
- Cameron, A.C. and Trivedi, P.K., 1991, 'The role of income and health risk in the choice of health insurance: Evidence from Australia', *Journal of Public Economics*, 45(1): 1-28.
- Cutler, D.M. and Zeckhauser, R.J., 2000, 'Chapter 11 The anatomy of health insurance', in A.J. Culyer and J.P. Newhouse (eds), *Handbook of Health Economics*, vol. 1, Part 1, Elsevier, pp. 563-643.
- Doiron, D., Jones, G. and Savage, E., 2008, 'Healthy, wealthy and insured? The role of self-assessed health in the demand for private health insurance', *Health Economics*, 17(3): 317-334.
- Ekman, B., Liem, N.T., Duc, H.A. and Axelson, H., 2008, 'Health insurance reform in Vietnam: a review of recent developments and future challenges', *Health Policy and Planning*, 23(4): 252-263.
- Ellis, R.P., 1998, 'Creaming, skimping and dumping: provider competition on the intensive and extensive margins', *Journal of Health Economics*, 17(5): 537-555.
- Ellis, R.P. and McGuire, T.G., 1986, 'Provider behavior under prospective reimbursement : Cost sharing and supply', *Journal of Health Economics*, 5(2): 129-151.
- Ettner, S.L., 1997, 'Adverse selection and the purchase of Medigap insurance by the elderly', *Journal of Health Economics*, 16(5): 543-562.
- Finkelstein, A. and Poterba, J., 2004, 'Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market', *Journal of Political Economy*, 112(1): 183-208.
- Hurd, M.D. and McGarry, K., 1997, 'Medical insurance and the use of health care services by the elderly', *Journal of Health Economics*, 16(2): 129-154.
- Jowett, M., Contoyannis, P. and Vinh, N.D., 2003, 'The impact of public voluntary health insurance on private health expenditures in Vietnam', *Social Science & Medicine*, 56(2): 333-342.
- Lieberman, S.S. and Wagstaff, A., 2009, *Health Financing and Delivery in Vietnam: Looking Forward*, The World Bank, Washington, DC.
- Lofgren, C., Thanh, N., Chuc, N., Emmelin, A. and Lindholm, L., 2008, 'People's willingness to pay for health insurance in rural Vietnam', *Cost Effectiveness and Resource Allocation*, 6(1): 6-16.
- Newhouse, J.P., 1996, 'Reimbursing Health Plans and Health Providers: Efficiency in Production Versus Selection', *Journal of Economic Literature*, 34(3): 1236-1263.
- Noterman, J.P., Criel, B., Kegels, G. and Isu, K., 1995, 'A prepayment scheme for hospital care in the Masisi district in Zaire: a critical evaluation', *Social Science and Medicine*, 40(9): 919-930.
- O'Donnell, O., Doorslaer, E.v., Wagstaff, A. and Lindelow, M., 2008, *Analyzing Health Equity Using Household Survey Data: a Guide to Techniques and their*

- Implementation, WBI Learning Resources Series, The World Bank, Washington, D.C.*
- Propper, C., 1989, 'An econometric analysis of the demand for private health insurance in England and Wales', *Applied Economics*, 21(6): 777-792.
- Rothschild, M. and Stiglitz, J., 1976, 'Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information', *The Quarterly Journal of Economics*, 90(4): 629-649.
- Savage, E. and Wright, D.J., 2003, 'Moral hazard and adverse selection in Australian private hospitals: 1989-1990', *Journal of Health Economics*, 22(3): 331-359.
- Shalev, V., Chodick, G., Heymann, A.D. and Kokia, E., 2005, 'Gender differences in healthcare utilization and medical indicators among patients with diabetes', *Public Health*, 119(1): 45-49.
- Shmueli, A., 2001, 'The effect of health on acute care supplemental insurance ownership: an empirical analysis', *Health Economics*, 10(4): 341-350.
- Trivedi, P.K., 2004, 'Patterns of Health Care Use in Vietnam: Analysis of 1998 Vietnam Living Standards Survey Data', in P. Glewwe, N. Agrawal and D. Dollar (eds), *Economic Growth, Poverty, and Household Welfare in Vietnam*, World Bank, Washington, D.C., pp. 391-423.
- UNDP (United Nations Development Program), 2003, *Health Care Financing for Viet Nam*, number 2, UNDP, Hanoi.
- Wagstaff, A., 2007, *Health Insurance for the Poor: Initial Impacts of Vietnam's Health Care Fund for the Poor*, World Bank Policy Research Working Paper number 4134, World Bank, Washington DC.
- Wolfe, J.R. and Goddeeris, J.H., 1991, 'Adverse selection, moral hazard, and wealth effects in the medigap insurance market', *Journal of Health Economics*, 10(4): 433-459.
- World Bank, 2001, *Vietnam Growing Healthy: A Review of Vietnam's Health Sector*, The World Bank, Washington, D.C.
- World Bank, 2007, *Vietnam Development Report 2008: Social Protection, Joint Donor Report to the Vietnam Consultative Group Meeting, Hanoi, December 6-7, 2007*, The World Bank, Hanoi.
- Zweifel, P. and Manning, W.G., 2000, 'Chapter 8 Moral hazard and consumer incentives in health care', in A.J. Culyer and J.P. Newhouse (eds), *Handbook of Health Economics*, vol. 1, Part 1, Elsevier, pp. 409-459.