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The Impact of Health Insurance for Children: Evidence from Vietnam

Nguyen Viet Cuong¹

Abstract

Although there are numerous studies on impact evaluation of overall health insurance, little is known on the impact of health insurance on health care utilization and out-of-pocket health care spending of children, especially in developing countries. This paper measures the impact of child health insurance on health care utilization and spending of children from 6 to 14 years old in Vietnam using two recent nationally representative surveys. Unlike previous empirical studies which found a positive effect of health insurance on health care utilization in Vietnam, we did not find a statistically significant effect of school health insurance as well as free health insurance for children on outpatient health care contacts. However, the school health insurance and free health insurance help the insured children decrease out-of-pocket spending per outpatient contact by around 14 and 26 percent, respectively.

Keywords: Child health insurance, impact evaluation, health care utilization, out-of-pocket spending, Vietnam.

JEL classification: I10; G22; H43

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1. Introduction

Although Vietnam has been very successful in poverty reduction, the incidence of poverty remains rather high, especially in rural areas. According to Vietnam Household Living Standard Surveys, the poverty rate was reduced from 28 percent in 2002 to 14 percent in 2008. The incidence of rural poverty was around 18 percent in 2008. Poverty and poor health have a two-way relationship. One of important causes of poverty which is mentioned in all Participatory Poverty Assessment (PPA) studies is health shocks (World Bank 2001; 2004). Having low income, people are more likely to have low nutrition and health care.

Children can be more vulnerable to illness. Poor children tend to have limited access to preventive and sanitized facilities such as clean water and flush toilet and might be easier to get diseases and illness. According to World Bank (2004), children in low expenditure quintiles are more likely to be under weight and height compared to other children. The percentage of children who have low height and weight for age is 13 and 9 percent for the children in the richest quintile, respectively. However, these corresponding figures for the children in the lowest quintile is 34 and 33 percent, respectively. Without proper treatment, illness can have adverse impacts of children's health and schooling. These adverse impacts can be mitigated if children have health insurance. Thus, provision of health insurance is very necessary for children, especially the poor ones.

Yet, there are still a large number of children not having health insurance in Vietnam. Children under 6 years old are provided with free health insurance by the government. For children from 6 years old, there are two main schemes of health insurance, which are operated by Vietnam Health Insurance Organization (VHI) on non-profit and public basis. The first is school health insurance, which is provided for school children on a voluntary basis. The second scheme of health insurance is free health insurance for the poor children. According to the 2008 Vietnam Household Living Standard Survey, there were 18 percent of children aged between 6 and 14 not having health insurance.

To improve health and medical care of people, the government has set up a policy to achieve full coverage of health insurance by 2015. All the children will be covered by school health insurance and free health insurance. Although these schemes of health insurance are necessary, there exist questions on their effectiveness. They are sometimes to blame for poor health care services (e.g., Luong Nga 2004). Thus impact evaluation of current school health insurance and free health insurance for children can provide the government with helpful information on expansion and modification of child health insurances.

There are a large number of studies aiming to measure the effect of a health insurance policy or program in both developed and developing countries. Although health insurance is expected to increase health care utilization, empirical findings on the impact of health insurance are not always consistent. Positive impacts of health insurance on health care demand and utilization are found in several studies such as Harmon and Nolan (2001), Yip and Berman (2001), Wagstaff et al. (2009). However, other studies find limited effects of health insurance on health care utilization and expenditures (e.g, Sapelli and Vial 2003; Davidoff et al. 2005; Ekman 2007).

The impact of health insurance in Vietnam has been evaluated quantitatively in a number of studies. Positive impacts of health insurance on health care utilization are found in most studies such as Wagstaff and Pradhan (2005), Jowett et al. (2003). Sepehri et al. (2006) and Wagstaff (2009) find that health insurance helps the insured reduce out-of-pocket health expenditures.

Although there are numerous studies on impact evaluation of overall health insurance, little is known on the impact of health insurance on health care utilization and out-of-pocket health care spending of children, especially in developing countries. There have been no studies on the impact of child health insurance in Vietnam. Thus, the main objective of this paper is to measure to what extent health insurance affects health care utilization and health spending for children aged from 6 to 14 using data from the most two recent Vietnam Household Living Standard Surveys (VHLSS) in years 2006 and 2008. Children below 6 years old are not considered, since all of them are provided with

health insurance, therefore there is no control group for them. The study will measure the effect of two health insurance policies for children including school health insurance and free health insurance. By doing so, this study is expected to contribute an empirical finding on the effect of health insurance policy for policy to the literature of health insurance.

The paper is structured into five sections. The second section describes the health insurance for children in Vietnam in Vietnam. The estimation method is presented in the third section. The fourth section presents the empirical findings on impact evaluation. Finally, the fifth section concludes.

2. Health insurance for children in Vietnam

In this study, we will use data from the most two recent Vietnam Household Living Standard Surveys (VHLSS) in years 2006 and 2008. These surveys were conducted by General Statistical Office of Vietnam with technical support of the World Bank. Each survey covers 9,189 households, which are representative for the national, rural and urban, and regional levels. The 2006 and 2008 VHLSSs set up a panel of 4,090 households and 15,475 individuals.

The surveys collect very detailed information on household and individual characteristics. Information on households and individuals includes demography, employment and labor force participation, education, health, income, expenditure, housing, fixed assets and durable goods, participation of households in poverty alleviation programs,. The surveys contain information on enrolment in different health insurance types, out-of-pocket spending on inpatient and outpatient treatments, other expenses on health care, health care utilization, the number of health care contacts during the 12 months before the interview for all the sampled individuals.

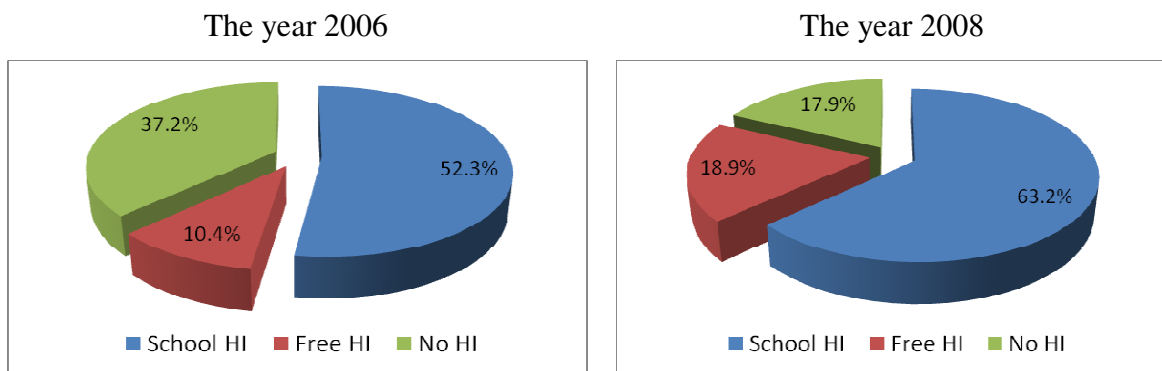
In Vietnam, health insurance has been implemented by the government since 1992. Nowadays, there are three main schemes of health insurance in Vietnam. The first is

compulsory health insurance which is applied for employees in formal sectors. The second is voluntary health insurance. The third is free health insurance for the poor which is provided by the government for the poor without fee. The compulsory and free health insurance are provided by the public sector, while the voluntary health insurance can be provided by both public and private sectors.

Health insurance types for children are all public and non-profit in Vietnam. Children under 6 years old are provided with free health insurance. The main type of health insurance for children above five years old is school health insurance. This is voluntary health insurance and users must pay for that. The average fee of school health insurance is around VND 80,000 (approximately USD 4 in June 2011). It should be noted that the schooling rate is very high in Vietnam, at around 95 percent for the primary and lower-secondary school.

The other type of health insurance that children, especially the poor ones can obtain is free health insurance for the poor. The provision of health insurance for the poor has been supported by “Health Care Fund for the Poor” (HCFP) since 2003. The annual amount that is used to subsidize a beneficiary is about VND 70000 (approximately USD 4.4). Members in households who are classified as the poor by commune authorities can be eligible for this health insurance. In addition, children in policy families can be also provided with free health insurance.

Fig. 1 Distribution of pupils aged from 6 to 14 by health insurance status

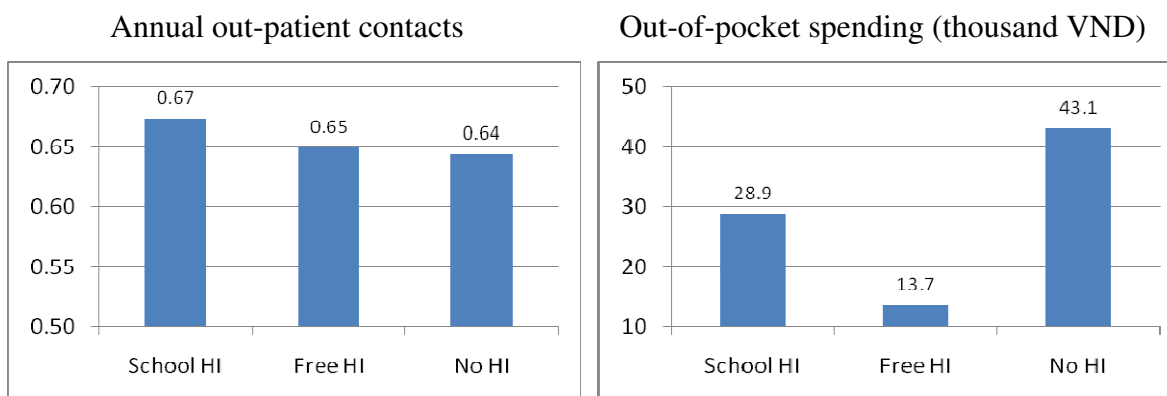


Source: Estimation from panel data of VHLSS 2006-2008.

Figure 1 shows that around 52.3 and 10.4 percent of children had school health insurance and free health insurance in 2006, respectively. The coverage of health insurance increased remarkably in 2008. 63.2 and 18.9 percent of children had school health insurance and free health insurance, respectively.

There might be at least two possible reasons why some schoolchildren do not have health insurance. Firstly, health insurance premium can be relatively costly for some poor households (this reason is reported in several studies, e.g., according to a survey on willingness to pay for voluntary health insurance which was conducted by Hanoi National Economics University and World Bank in 2005, 20 percent of people do not buy health insurance because of the cost). Secondly, health insurance is sometimes to blame for poor health care service, and people can find it unhelpful to have health insurance (Labor Newspaper 2010).

Fig. 2 Annual out-patient contacts and out-of-pocket spending per contact in 2008



Source: Estimation from panel data of VHLSS 2006-2008.

Figure 2 shows that there is a negligible difference in the average annual out-patient contacts between the insured and uninsured children. However, the out-of-pocket spending per contact is much lower for the insured than the uninsured.

3. Estimation method

To measure the effect of health insurance on health utilization outcomes, we assume the following functions:

$$Y_{it} = \beta_0 + H_{it}\beta_1 + X_{it}\beta_2 + T_{it}\beta_3 + \varepsilon_{it} \quad (1)$$

where Y_{it} is an indicator of health care utilization. Health care utilization indicators including children's annual health care contacts and out-of-pocket health expenditure. H is a vector of dummy variables of enrolment in school health insurance and free health insurance (it is equal one for the insured and zero for the uninsured). X is a vector of household and individual characteristics. The description and summary statistics of explanatory variables are presented in Table A.1 in Appendix. T is the time dummy which equals one for the 2008 year and zero for the 2006 year. ε_{it} denotes unobserved variables.

There are two problems in estimating equation (1). The first problem is that the dependent variable Y is not a standard continuous variable. When annual health care contacts are the dependent variable, Poisson regressions which are applied for count dependent variables should be used. There are also a large number of children who did not use the health care services and had zero expenditure on health care. Thus Tobit regressions of out-of-pocket spending should be used when the dependent variable is out-of-pocket spending. We do not present the Poisson and Tobit regressions in this paper, since they are standard and presented in most econometrics textbooks.

A second problem is endogeneity of health insurance. Parent who pay special attention to their children's health can be more likely to buy health insurance for children and bring their children to health care centers more often. In this study, we use panel data fixed-effects regressions to remove the endogeneity bias due to time-invariant unobserved. Fixed-effect regression will, however, fail to remove all endogeneity bias if the unobserved variables which affect health care outcome and health insurance are not time-invariant. It is expected that the estimation bias resulting from these factors is small relative to the bias eliminated by using fixed-effects regression.

While the fixed-effect Poisson estimator are well developed and the program code of this estimator is available in several statistical software such as Stata, the fixed-effects Tobit model cannot be estimated using a maximum likelihood method due to a so-called incidental parameter problem (Greene 2004). Instead, we will have to use a variant of

fixed-effect Poisson estimation which is developed by Wooldridge (2001). To illustrate this method, let's write a standard Tobit model:

$$Y_{it}^* = \beta_0 + D_{it}\beta_1 + H_{it}\beta_2 + T_{it}\beta_3 + u_i + v_{it} \quad (2)$$

$$Y_{it} = \max(y_L, Y_{it}^*) \quad (3)$$

where Y_{it}^* and Y_{it} are values of latent and observed out-of-pocket spending on health care, y_L is the non-zero lowest observed spending. ε_{it} in equation (1) is decomposed into u_i and v_{it} which are time-invariant and time-variant unobserved variables, respectively. u_i is allowed to be correlated with health insurance, but v_{it} is assumed to be uncorrelated with health insurance. Wooldridge (2001) assumes that $u_i = \beta_4 + \bar{H}_i\beta_5 + \bar{X}_i\beta_6 + \bar{T}_i\beta_7 + a_i$. We can substitute this equation to equation (2):

$$Y_{it}^* = \beta_0 + \beta_4 + H_{it}\beta_1 + X_{it}\beta_2 + T_{it}\beta_3 + \bar{H}_i\beta_5 + \bar{X}_i\beta_6 + \bar{T}_i\beta_7 + a_i + \varepsilon_{it}, \quad (4)$$

where \bar{H}_i , \bar{X}_i , \bar{T}_i are the mean value over two years of child i . a_i denotes the unobserved effect with zero mean and uncorrelated with health insurance. Thus u_i is eliminated in equation (4), and this equation can be estimated by a standard random-effects Tobit model (See Wooldridge 2001) for more detailed discussion on assumptions on distribution of the error terms in the model).

4. Results and discussion

Table 1 presents Poisson regressions of the number of annual out-patient contacts. Both school and free health insurance are not statistically significant in the fixed-effect regressions. In addition to the regression coefficients, marginal effects are presented. Since Poisson and Tobit models are not linear and regression coefficients do not have clear economic meaning. Table 1 shows that the point estimates have very small magnitudes. It should be noted that we do not examine the effect of health insurance on inpatient health care since only a few children in the data set reported the use of inpatient

health care services. There are only 73 children (around 3 percent) reporting the inpatient health contact in 2008.

Table 1 Poisson regressions of the number of annual out-patient contacts

Explanatory variables	Panel data random effects model			Panel data fixed-effects model		
	Coef.	Std. Err.	Marginal Effect	Coef.	Std. Err.	Marginal Effect
School health insurance	0.1088	0.0740	0.0277	0.0990	0.0986	0.0139
Free health insurance	0.2112**	0.1006	0.0585**	0.1446	0.1492	0.0217
Age	-0.0704***	0.0170	-0.0181***			
Sex (male = 1, female=0)	0.0457	0.0753	0.0117			
Ethnic minorities (yes = 1)	-0.3094**	0.1369	-0.0727**			
Sick during the past 4 weeks	3.1845***	0.1153	3.8501***	3.0216***	0.1642	1.4126***
Sick during the past 12 months	2.8119***	0.1094	1.4917***	2.7128***	0.1559	0.4973***
Log of per capita income	-0.0858	0.0572	-0.0220	-0.2927***	0.0849	-0.0417***
Household size	-0.1453***	0.0278	-0.0373***	-0.3125***	0.0681	-0.0445***
Age of head	0.0001	0.0037	0.0000			
Head without edu. degree	Omitted					
Head with primary education	-0.0021	0.1037	-0.0005			
Head with lower-secondary	0.0388	0.1221	0.0101			
Head with upper-secondary	0.1908	0.1376	0.0524			
Head with post-secondary	-0.2256	0.2649	-0.0522			
Head without spouse	0.2139	0.1367	0.0596			
Spouse without edu. degree	Omitted					
Spouse with primary education	-0.0645	0.1025	-0.0164			
Spouse with lower-secondary	-0.2902**	0.1296	-0.0689**			
Spouse with upper-secondary	0.1048	0.1513	0.0281			
Spouse with post-secondary	0.1658	0.2847	0.0462			
Urban (urban = 1; rural = 0)	-0.0657	0.1022	-0.0165			
Red River Delta	Omitted					
North East	-0.3417**	0.1624	-0.0780**			
North West	0.1059	0.2473	0.0285			
North Central Coast	0.0054	0.1525	0.0014			
South Central Coast	0.3032**	0.1522	0.0881**			
Central Highlands	0.3285**	0.1547	0.0965**			
South East	0.4356	0.1412	0.1326			
Mekong River Delta	0.5808***	0.1345	0.1849***			
Constant	-0.7614	0.5230				
Number of observations			3485			1426
Number of individuals			1846			713

Note: The marginal effect of the number of health care contacts with respect to the explanatory variables.

* significant at 10%; ** significant at 5%; *** significant.

Source: Estimation from panel data of VHLSS 2006-2008.

Table 2 Tobit regressions of out-of-pocket spending per out-patient contact

Explanatory variables	Panel data random effects model			Panel data random effects model with group mean variables		
	Coef.	Std. Err.	Marginal Effect	Coef.	Std. Err.	Marginal Effect
School health insurance	-7.048***	2.686	-3.054***	-9.144**	3.947	-3.971**
Free health insurance	-10.424***	3.583	-4.339***	-8.551*	5.085	-3.581*
Age	2.131***	0.570	0.918***	2.105***	0.586	0.907***
Sex (male = 1, female=0)	2.364	2.162	1.018	2.093	2.163	0.901
Ethnic minorities (yes = 1)	-6.080	3.827	-2.574	-4.771	4.015	-2.028
Sick during the past 4 weeks	41.066***	3.346	20.306***	34.197***	4.907	16.530***
Sick during the past 12 months	28.181***	2.412	12.633***	28.859***	3.674	12.952***
Log of per capita income	3.997**	1.993	1.721**	4.600	3.973	1.981
Household size	0.337	0.804	0.145	-0.066	2.878	-0.028
Age of head	-0.042	0.115	-0.018	-0.048	0.115	-0.021
Head without edu. degree	Omitted					
Head with primary education	-4.303	3.324	-1.838	-4.773	3.333	-2.037
Head with lower-secondary	-1.963	3.826	-0.842	-2.302	3.837	-0.986
Head with upper-secondary	-3.419	4.368	-1.456	-3.883	4.390	-1.652
Head with post-secondary	-9.818	9.387	-4.049	-9.464	9.418	-3.910
Head without spouse	2.657	4.335	1.155	2.750	4.335	1.196
Spouse without edu. degree	Omitted					
Spouse with primary education	1.023	3.399	0.442	1.043	3.400	0.450
Spouse with lower-secondary	-2.467	4.030	-1.056	-2.442	4.032	-1.045
Spouse with upper-secondary	6.872	5.006	3.034	6.950	5.022	3.070
Spouse with post-secondary	41.525***	9.990	21.428***	41.714***	9.996	21.549***
Urban (urban = 1; rural = 0)	-0.046	3.107	-0.020	-0.121	3.122	-0.052
Red River Delta	Omitted					
North East	-8.903**	4.240	-3.722**	-8.935**	4.245	-3.736**
North West	-5.011	6.147	-2.114	-4.285	6.227	-1.813
North Central Coast	-6.755*	3.964	-2.843*	-6.693*	3.969	-2.818*
South Central Coast	-4.736	4.327	-2.004	-5.002	4.325	-2.115
Central Highlands	2.615	4.525	1.137	2.564	4.564	1.115
South East	-6.351	4.297	-2.676	-6.933	4.345	-2.915
Mekong River Delta	-13.409***	4.108	-5.533***	-14.014***	4.148	-5.772***
<i>Mean group variables</i>						
Sick during the past 4 weeks				13.136**	6.714	5.657**
Sick during the past 12 months				-1.512	4.855	-0.651
Log of per capita income				-1.326	4.586	-0.571
School health insurance				3.161	5.287	1.361
Free health insurance				-4.062	6.902	-1.749
Household size				0.477	2.983	0.205
Constant	-42.700**	18.398		-36.481*	21.892	
Number of observations			3485			3485
Number of individuals			1846			1846

Note: The marginal effect for the expected value of outcome conditional on being uncensored.

* significant at 10%; ** significant at 5%; *** significant.

Source: Estimation from panel data of VHLSS 2006-2008.

Table 2 presents Tobit regressions of out-of-pocket spending per outpatient contact. As known, the fixed-effects Tobit model cannot be estimated without bias using a maximum likelihood method due to a so-called incidental parameter problem (Greene 2004). To remove time-invariant unobserved effects, we use a random effects model with available explanatory variables and group means of these explanatory variables (Wooldridge 2001; Sepehri et al. 2006). According to this model, school health insurance and free health insurance help the insured decrease the out-of-pocket spending per outpatient contact by 4 and 3.6 thousand VND (around 14 and 26 percent, respectively).

We also include interactions between health insurance and gender and age of children to see whether the effect of health insurance on out-of-pocket spending differs by gender and age (Table 3). In this table, we report only the coefficients of health insurance and interactions. Coefficients of control variables are not reported. The interactions are not statistically significant, indicating the effect is not different for children of different ages and between girls and boys.

Table 3 Tobit regressions of out-of-pocket spending per out-patient contact with interactions

Explanatory variables	Panel data random effects model			Panel data random effects model with group mean variables		
	Coef.	Std. Err.	Marginal Effect	Coef.	Std. Err.	Marginal Effect
School health insurance	-9.851	4.197	-4.295	-3.229	13.204	-1.398
Free health insurance	-7.337	5.535	-3.085	6.302	18.318	2.783
School health insurance * sex	0.761	4.582	0.329			
Free health insurance * sex	-2.800	6.315	-1.194			
School health insurance * age				-0.609	1.219	-0.263
Free health insurance * age				-1.429	1.678	-0.617
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations			3485			3485
Number of individuals			1846			1846

Note: the marginal effect for the expected value of outcome conditional on being uncensored.
 * significant at 10%; ** significant at 5%; *** significant.
 Source: Estimation from panel data of VHLSS 2006-2008.

5. Conclusion

Currently, the government of Vietnam has set up eight Millennium Development Goals (MDGs), in which there are four ones related to health: (i) Eradicate Extreme Poverty and Hunger, (ii) Reduce Child Mortality, (iii) Improve Maternal Health, (iv) Combat HIV/AIDS, Malaria and Other Diseases. Accordingly, provision of health insurance can contribute to achievement of these MDGs, and the government has set up an objective of full coverage of health insurance by 2015. Vietnam has been very successful in increasing the coverage of health insurance for the children recently. In 2006, 52.3 and 10.4 percent of children had school health insurance and free health insurance, respectively. After two years, in 2008, the percentage of children having school health insurance and free health insurance increased to 63.2 and 18.9 percent, respectively.

Although the coverage of health insurance for children increased, there is a question on the quality of health care services provided for the insured children. This paper measures the effect of school health insurance and free health insurance on the health care utilization and health expenditure for children from 6 to 14 years old in Vietnam. It is found that both health insurance schemes do not increase outpatient health contacts. It is possible that children have to attend school and they only visit health centers when very necessary. Having health insurance does not encourage children to visit the health centers more frequently. The school health insurance and free health insurance help the insured reduce the out-of-pocket spending per out-patient contact by around 14 and 26 percent, respectively. We do not find a statistically significant difference in the effect of both school health insurance and free health insurance between girls and boy as well as between different age groups.

References

- Ekman, B. (2007) Catastrophic health payments and health insurance: some counterintuitive evidence from one low-income country. *Health Policy* 83: 304–313.
- Davidoff Amy, Genevieve Kenney and Lisa Dubay (2005) Effects of the state children's health insurance program expansions on children with chronic health conditions. *Pediatrics* 116: 34-42.
- Greene, W. (2004) Fixed effects and bias due to the incidental parameters problem in the Tobit model. *Econometric Reviews* 23(2): 125 – 147.
- Harmon, C. and B. Nolan (2001) Health insurance and health services utilization in Ireland. *Health Economics* 10(2): 135-145.
- Jowett, M., P. Contoyannis and N. D. Vinh (2003) The impact of public voluntary health insurance on private health expenditures in Vietnam. *Social Science and Medicine* 56(2): 333-342.
- Labor Newspaper (2010) Khóc, cười bảo hiểm y tế học sinh: Có chất lượng thì mới bắt buộc. Báo Lao Động (Labor Newspaper), ngày 18/11/2010. <http://laodong.com.vn/Tin-Tuc/Khoc-cuoi-bao-hiem-y-te-hoc-sinh-Co-chat-luong-thi-moi-bat-buoc/21282>. Accessed 10 June 2011.
- Luong Nga (2004) Phụ huynh chưa tin tưởng vào Bảo hiểm y tế học sinh. Newspaper Vnexpress, on 26/6/2004, available at: <http://www.vnexpress.net/Vietnam/Xa-hoi/2004/06/3B9D3F33/>. Accessed 10 June 2011.
- Sapelli, C. and B. Vial (2003) Self-selection and moral hazard in chilean health insurance. *Journal of Health Economics* 22(3): 459-76.
- Sepehri A., Sisira Sarma and Wayne Simpson (2006) Does non-profit health insurance reduce financial burden? Evidence from the Vietnam Living Standards Survey Panel. *Health Economics* 15(6): 603–616.

Wagstaff, A. (2009) Estimating health insurance impacts under unobserved heterogeneity: the Case of Vietnam's health insurance for the poor. *Health Economics* 19(2): 189-208.

Wagstaff, A. and M. Pradhan (2005) Health insurance impacts on health and nonmedical consumption in a developing country. World Bank Policy Research Working Paper 3563. <http://ideas.repec.org/p/wbk/wbrwps/3563.html>. Accessed 10 June 2011.

Wagstaff, A., M. Lindelow, G. Junc, X. Ling, Q. Juncheng (2009) Extending health insurance to the rural population: an impact evaluation of China's new cooperative medical scheme. *Journal of Health Economics* 28: 1–19.

Wooldridge J. M. (2001). *Econometric analysis of cross section and panel data*. The MIT Press, Cambridge, Massachusetts London, England.

World Bank (2001) *Vietnam: growing healthy, a review of Vietnam's health sector*, Hanoi, The World Bank.

World Bank (2004) *Vietnam development report 2004: poverty*. World Bank in Vietnam, 2004. <http://sd-cite.iisd.org/cgi-bin/koha/opac-detail.pl?biblionumber=3008>. Accessed 12 June 2011.

Yip, W. and P. Berman (2001) Targeted health insurance in a low income country and its impact on access and equity in access: Egypt's school health insurance. *Health Economics* 10(3): 207-220.

Appendix

Table A.1. Descriptive statistics of explanatory variables

Variable	Type	2006		2008	
		Mean	Std. Dev.	Mean	Std. Dev.
Age	Discrete	9.768	1.687	11.702	1.681
Sex (male = 1, female=0)	Binary	0.500	0.500	0.501	0.500
Ethnic minorities (yes = 1)	Binary	0.198	0.399	0.200	0.400
Sick during the past 4 weeks	Binary	0.162	0.369	0.110	0.313
Sick during the past 12 months	Binary	0.357	0.479	0.348	0.476
Log of per capita income	Continuous	8.521	0.645	8.831	0.692
Household size	Discrete	5.151	1.575	5.039	1.561
Age of head	Discrete	42.90	11.73	44.32	11.20
Head without edu. degree	Binary	0.260	0.439	0.238	0.426
Head with primary education	Binary	0.301	0.459	0.298	0.458
Head with lower-secondary	Binary	0.262	0.440	0.274	0.446
Head with upper-secondary	Binary	0.152	0.359	0.163	0.369
Head with post-secondary	Binary	0.025	0.155	0.027	0.162
Head without spouse	Binary	0.125	0.331	0.129	0.335
Spouse without edu. degree	Binary	0.240	0.427	0.225	0.418
Spouse with primary education	Binary	0.296	0.457	0.290	0.454
Spouse with lower-secondary	Binary	0.208	0.406	0.230	0.421
Spouse with upper-secondary	Binary	0.109	0.312	0.103	0.304
Spouse with post-secondary	Binary	0.021	0.145	0.023	0.150
Urban (urban = 1; rural = 0)	Binary	0.190	0.393	0.191	0.393
Red River Delta	Binary	0.176	0.381	0.176	0.381
North East	Binary	0.144	0.352	0.144	0.352
North West	Binary	0.058	0.233	0.058	0.233
North Central Coast	Binary	0.135	0.342	0.135	0.342
South Central Coast	Binary	0.106	0.308	0.106	0.308
Central Highlands	Binary	0.104	0.305	0.104	0.305
South East	Binary	0.126	0.332	0.126	0.332
Mekong River Delta	Binary	0.151	0.358	0.151	0.358
<i>Mean group variables</i>					
Sick during the past 4 weeks	Continuous	0.135	0.252	0.137	0.253
Sick during the past 12 months	Continuous	0.351	0.364	0.351	0.365
Log of per capita income	Continuous	8.597	0.625	8.607	0.625
School health insurance	Continuous	0.538	0.441	0.554	0.440
Free health insurance	Continuous	0.197	0.318	0.193	0.313
Household size	Continuous	5.107	1.537	5.080	1.506

Source: Estimation from panel data of VHLSS 2006-2008.