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Does health insurance matter in the hospital?

New evidence from patient-level medical records in Vietnam

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Abstract

Vietnam has achieved several Millennium Development Goals of the United Nations including child mortality reduction and maternal health improvement. The government of Vietnam aims to further improve health in Vietnam by expanding its public health insurance system originally introduced in 1993. Since health insurance is an essential tool to prepare for unexpected health shocks, the government plans to provide a public insurance system to cover eighty percent of its population by 2020. However, whether having health insurance is beneficial remains unclear and controversial. Some recent studies find positive impact of health insurance, while others argue that the quality of its services has been low due to limited coverage. In contrast to previous papers on Vietnam's health policy that use data from nationwide Vietnam Household Living Standard Survey, this research uses more detailed, randomly-selected, patient-level medical records from Viet Duc University Hospital, the largest public surgical hospital in Vietnam. Using precise information on each patient's treatment history and usage of health insurance, this paper provides new empirical evidence on the effect of health insurance. Regression analysis shows that insurance helps patients stay 1.6 days longer in hospital and pay 48.6 percent less for their treatments than uninsured counterparts. This study also finds that financial burden between the insured and uninsured patients is larger in rural provinces than in the capital-city Hanoi, suggesting the significant advantages of health insurance for people in under-developed areas with fewer public hospitals. These new findings from patient-level information in Vietnam contribute to the growing literature on health insurance policies in developing countries and are particularly informative when governments plan to introduce nationwide public health-insurance systems.

Keywords: Health insurance, treatment, length of stay, out-of-pocket payment

JEL Code: I13, I12, I10

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1. Introduction

Health care is a special service that contributes to the quality of life, and it has become the focus of considerable interest in both developed and developing countries over the past years. Especially in developing countries, health care is one of the most essential development strategies in addition to poverty reduction and economic growth. In order to improve health care quality and health outcomes, the governments of a number of developing countries are trying to upgrade facilities, improve capabilities of medical staff, and provide better health insurance systems. However, introducing a nationwide public health insurance system is controversial, as it is costly and remains unclear whether the benefits exceeds the cost. Therefore, examining the differences between insured and uninsured patients is of particular policy interest, and the answers depend on each country's health situation and insurance system.

Vietnam has achieved some of the United Nations' Millennium Development Goals (MDG) including the target of MDG1 on poverty eradication (United Nations, 2012). Despite this accomplishment, health shocks still constitute a cause for poverty because people face financial burdens (World Bank, 2004). Therefore, together with a higher living standard, health has becomes an important factor for further development of the nation. Health insurance, in this regard, is helpful in reducing financial burden in case of health shocks (Wagstaff, 2005), and health insurance holders also have higher chances of accessing health care services.

According to a report from the Ministry of Health in 2011 (MOH, 2011), National Health Insurance covered 50.8 million people or 58.2 percent of the total population in Vietnam. This number increased to 61.8 million by the end of 2013 according to the statistics of Vietnam's Social Insurance (VSI, 2014), which was equivalent to almost 69

percent of Vietnamese population at the time. The government encourages health insurance and aims to cover 80 percent of population by 2020 (VSI, 2015).

However, questions have been raised on whether having health insurance results in better outcomes in the hospital. This issue has been controversial, as some papers such as Finkelstein (2012), Josep and Schmidt (2010), Ruiz (2009) find positive impacts of health insurance on treatment results, while others argue that quality of service, given to insured patients, is low and limited (Alkenbrack and Lindelow (2015), Cheng (2015)). Vietnam is not out of this trend, and Palmer (2014) and Nguyen (2012) have evaluated the situation in Vietnam using the data from Vietnam Household Living Standard Survey. This study attempts to fill the gap in answering whether health insurance matters in the hospital by examining the new patient-level medical records at Viet Duc University Hospital (VDUH), the largest public surgical hospital in Vietnam. With such detailed information, this paper expects to provide new empirical findings by using an actual hospital's medical records to estimate the effects of health insurance.

In order to achieve this goal, this research randomly selected 1,393 medical records out of the total inpatient records of VDUH in 2014 to construct a new data set based on detailed administrative information and payment history of each patient. The findings of this paper suggest that insured patients stay 1.6 days longer at the hospital and pay 48.6 percent less than uninsured patients. Further analysis demonstrates that such impact is larger in rural areas where few hospitals are available for local patients, pointing to the significant advantages of health insurance. These findings contribute to the literature particularly for the case of Vietnam, where the government is active in introducing a nationwide public health insurance system.

The paper is organized as follows. The next section summarizes previous studies on the given topic; Section 3 provides background information on the health insurance system in Vietnam and introduces VDUH; Section 4 describes the patient-level dataset collected directly from VDUH; Section 5 explains the econometric model, Section 6 provides results and discussions, and Section 7 concludes with policy implications.

2. Literature review

A number of papers have discussed the impact of insurance on health outcome and health care utilization. It is an interesting but controversial topic especially when countries differ greatly in terms of standards of living and development level. Previous studies show that in some cases health insurance brings positive effects on health outcome and reduces out-of-pocket payment of patients but other findings show no significant impact on health utility or health care expenditure.

Insured patients may have more advantages in accessing health services as well as improving health outcomes compared to uninsured patients. This mechanism has been discussed in many studies across different countries. Finkelstein et al. (2012) evaluated a higher health care utilization through the case of an Oregon health care experiment in the United States. By using a lottery to give insurance to participants, they observed that after the first year, insured group showed higher utilization in hospitalization, primary care and preventive care as well. Furthermore, better physical and mental health was reported by those in the insured group. Similarly, Doyle (2005) estimated the impact of insurance on treatment process and mortality rate in cases of automobile accidents by using data from hospitals in Wisconsin, U.S. His findings show that uninsured patients received 20 percent less care (amount of treatment) and faced a higher mortality rate than insured

patients. This was due to uninsured patients being more likely to be transferred to cheaper and less equipped hospitals. In another study for the case of Ghana, Josep and Schmidt (2010) show that health outcomes of women and neonatal babies have been improved thanks to a National Health Insurance Scheme. The health outcomes cover prenatal care for women, birth delivery at hospital with high professional attendance and less birth complications. Ruiz et al. (2007) also found that health insurance in Colombia has increased the health service utilization among patients in lower economic groups including ambulatory, inpatient services, and medication consumption. In addition, Keng and Sheu (2013) showed that National Health Insurance in Taiwan has reduced the rates of death by 16-48 percent for the least healthy group. The least healthy and female participants are the groups that benefited most. In the case of China, Wagstaff (2009) estimated the impact of subsidized health insurance applied in 2003 to poor people in rural areas and concluded that China's New Cooperative Medical Scheme had increased both outpatient and inpatient medical service utilization. Investigating the impact of voluntary health insurance on health care utilization in Vietnam, Nguyen (2012) found that annual hospital visits of both inpatient and outpatient had increased by 45 percent and 70 percent respectively.

In discussions about financial burden, positive impact in reducing out-of-pocket payment has been found in a number of papers such as Finkelstein et al. (2012, 2008), Wagstaff (2011), Zhou (2009), and Sepehri (2006). On the other hand, several researches have argued that insurance had no impact on out-of-pocket payment in particular and health expenditure in general. Alkenbrack and Lindelow (2015) found that a community-based insurance in Lao PDR had significant impact on health utilization, but no significant impact on total out-of-pocket payment. Similarly, Cheng et al. (2015) also

reported that there was no evidence that out-of-pocket spending was reduced under New Cooperative Medical Scheme in China. For the case of Vietnam, using data from Vietnam Household Standard Survey in 2006 and 2008, Palmer (2014) showed that health insurance for children under six years old did not have significant impact on health care service expenditures per visit. In a previous study, which used the same data source from VHLSS in 2004 and 2006, Nguyen (2012) observed that voluntary health insurance had significantly increased the number of hospital visits but had no significant effect on out-of-pocket spending for health care services. These studies' findings can be explained by the nature of the data source. Beside hospital fees, the reported out-of-pocket payments also included other expenses such as additional required medicine or nutrition, transportation, bonus for doctor, etc. (Nguyen, 2012).

Among the rich literature on the impact of health insurance, Doyle (2005) is one of a few unique papers that use data from a hospital to examine its impact for the case of automobile accidents in the United States. Following his approach, this current paper also examines the health-insurance effects based on the data from accurate medical records at a hospital, for the first time in Vietnam, and thus adds new empirical evidence to the literature.

3. Background of the study

3.1 Health insurance system in Vietnam

Vietnam's Health Insurance Policy took effect in 1992 and has been regulated by the Ministry of Health. The Health Insurance System has been established in all provinces nationwide. Since January 1st, 2003, Vietnam's Health Insurance (VHI) was moved to Vietnam's Social Insurance (VSI). Through two decades of development with three time

revisions, VHI has gradually changed its financial mechanism, health care policy, and contribution to health care services. Health Insurance Law officially took effect in July 2009 with the approval of Vietnam's National Assembly.

According to the law, Vietnam's health insurance encourages the entire population's participation. Every citizen has the right to access health insurance. There are two types of health insurance: compulsory and voluntary health insurance. Compulsory insurance is applicable to following groups: public servants, employers in private sector with a labor contract duration of more than three months, retired public staff, organ donator, the poor and other beneficiaries (war veterans, war heroes, people of merit, special target groups, children under six, and the poor), students (school) health insurance (for students in all levels), etc. Voluntary health insurance is for the rest of the population outside of the compulsory health insured group as mentioned above.

Vietnamese government has been trying to insure the whole population through the national health insurance system. Figure 1 illustrates this progress of encouraging different target groups to join the system over the past years. These applied changes aim to give better benefits for insurance holders.

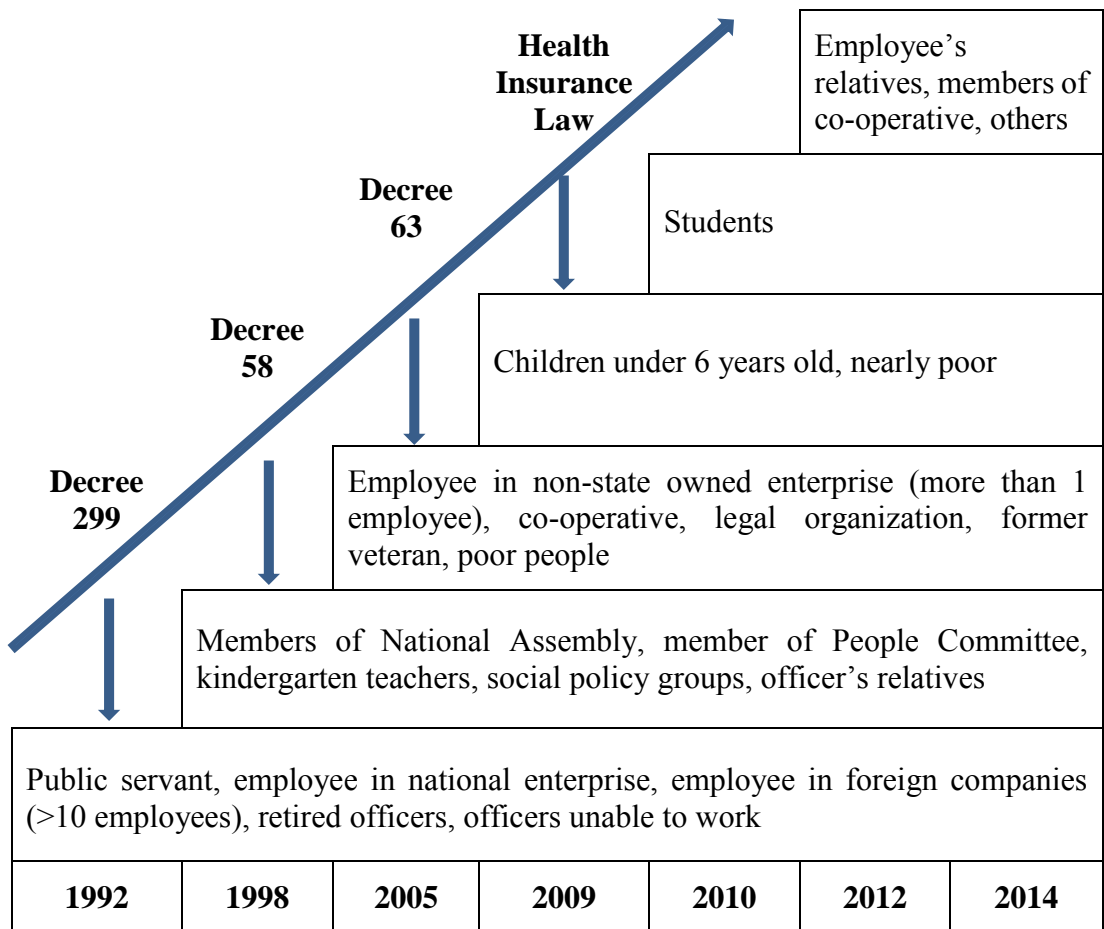


Figure 1: Insurance coverage process from 1992 – 2014 (Ministry of Health, 2011)

According to the 2010 annual report of Vietnam's Social Insurance (VSI, 2010), 58.5 percent of the population was insured, 69.8 percent of the compulsory insurance's target group has joined compulsory insurance, while only 21.1 percent of the voluntary insurance's target group has joined the insurance. Figure 2 demonstrates the increasing coverage of health insurance from 1993 to 2010 in Vietnam. The number of insurance participants has increased gradually over years. In 1993 when the health insurance was first introduced, the number of participants was 3.89 million. After thirteen years of

operation, this number increased by ten times to 36.8 million in 2006. Furthermore, four years later in 2010, 50.8 million people were covered by health insurance.

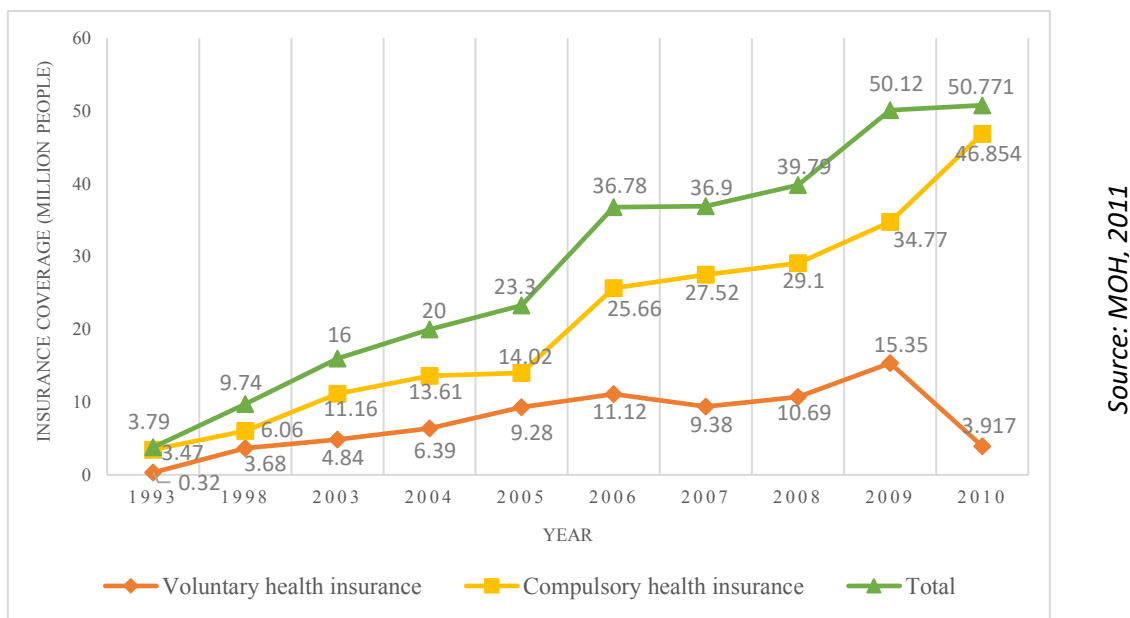
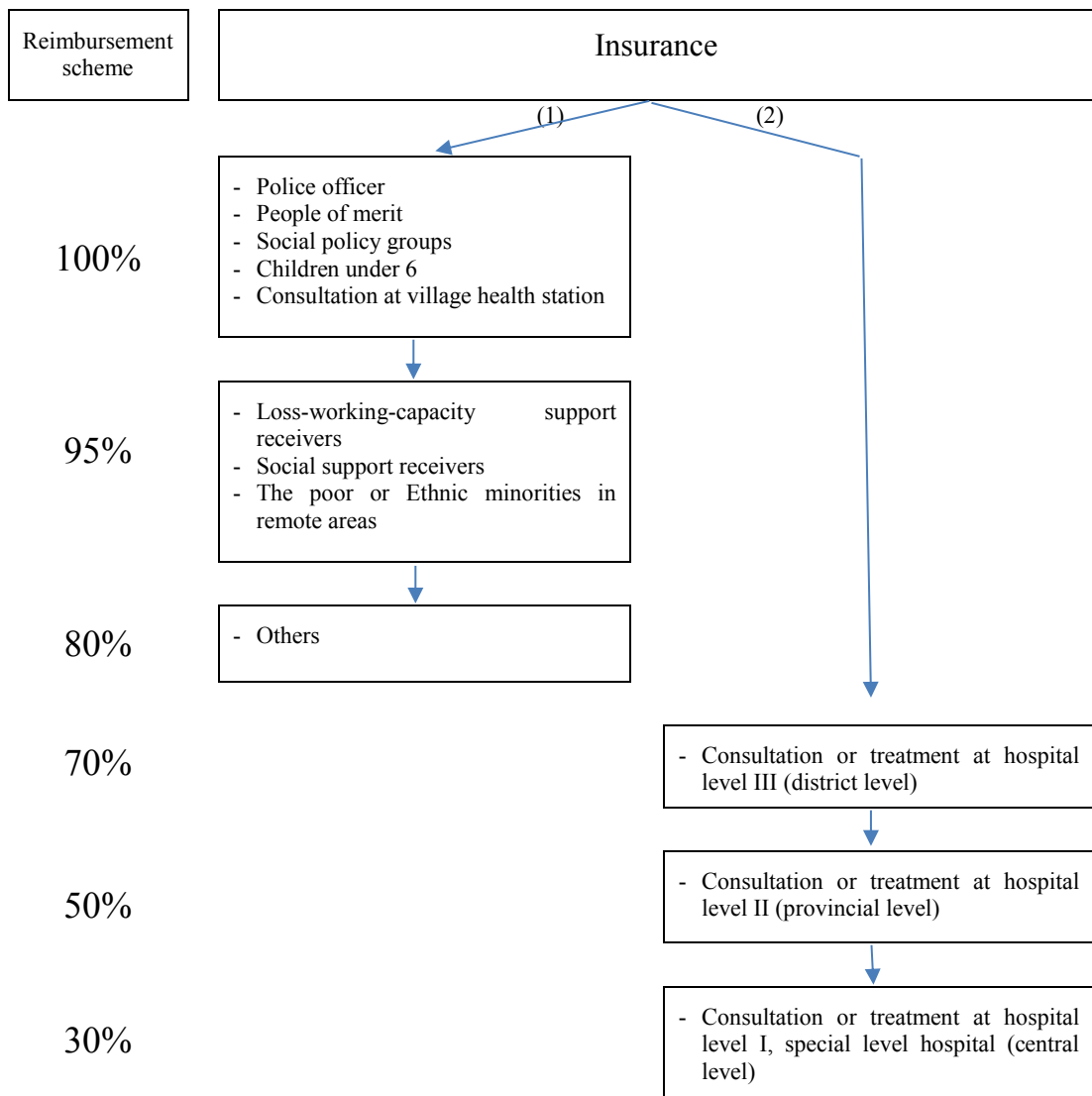


Figure 2: Insurance coverage by groups (1993-2010)

By the end of 2014, national health insurance covered 71.6 percent of the population (VSI, 2015). According to national strategy for health insurance coverage for the period 2015-2020 approved by National Assembly, VSI is implementing an action plan to reach a target of 80 percent coverage by 2020 (VSI, 2015). Health insurance is a government's social policy to help its holders to share the risk and reduce the financial burden for health care services. However, the benefit of health insurance is still debatable, and according to Khiet (2008) many people blame it on the poor services. Based on Vietnam's Household Living Standard Survey in 2006, 52 percent of annual outpatient service is paid with health insurance and around 60 percent of the insured group used health insurance when accessing health care services (Nguyen, 2012).

Based on the regulation of health insurance, when accessing the medical service in a partner hospital, upon displaying the insurance card at registration, the patient only pays the extra cost after insurance through a reimbursement scheme. The reimbursement scheme for insured patient is illustrated by Figure 3.



(1): Right way: Insured patient follows regulation of insurance from the registered health care station to higher level with reference of doctor

(2): Short way: Insured patient goes directly to higher level hospital than registered one.

Figure 3: Reimbursement scheme for insured patient by different levels

A premium for insurance is six percent of an individual's monthly salary. The permanent member needs to renew his or her health insurance every year as required by the respective insurance institution. Nowadays, a health insurance card is accepted in both public and private healthcare providers but public providers are the main actor. According to Nguyen Minh Thao, Vice Director of VSI, in 2010, there were more than 7,600 public and 300 private healthcare clinics, centers, or hospitals accepting national health insurance (Dung, 2010). Among these, VHI has over 1,900 partner hospitals including both state and non-state owned which were mentioned in a later report of Ministry of Health (MOH, 2011). Furthermore, partners include more than eighty percent of health care stations at district level. This number has been increasing continuously thanks to the development strategies in health care system in Vietnam.

3.2 Viet Duc University Hospital

Viet Duc University Hospital (VDUH) is a state-owned hospital at the central level. Although the hospital is located in Hanoi, the capital of Vietnam, VDUH's patients come from over forty different provinces and cities. The annual average inpatient of VDUH is about 40,000 patients as shown in Table 1, which also provides the number of VDUH's operations through 2009-2014. By the end of 2014, VDUH had 1,038 beds and plans to increase to 1,500 beds in the next three years.

Among inpatient cases, the number of insured patients has been increasing gradually over the last decade. The proportion of insured and uninsured patients for the past decade is demonstrated in Table 2.

Table 1: Statistics of VDUH's service 2009-2014 (VDUH, 2015)

No	Contents	2009	2010	2011	2012	2013	2014
1	Number of beds	975	944	955	1,010	1,010	1,038
2	Hospitalization day	330,956	345,670	352,793	363,910	416,264	406,734
3	Consultations	185,832	198,164	179,465	184,039	196,655	207,061
4	Out patients	30,547	38,604	33,522	36,871	54,588	57,717
5	Admitted patients	35,881	36,511	40,100	42,545	44,988	46,259
	Major operations	30,908	33,661	37,020	37,989	39,680	40,688
6	In schedule	20,134	21,976	22,861	25,534	26,658	28,060
	In emergency	10,774	11,685	14,159	12,455	13,022	12,628
7	Minor operations	2,091	1,614	1,680	1,887	2,319	2,147
8	Discharged patients	34,849	36,531	39,070	41,370	43,757	45,006
9	Mortality	261	252	216	178	142	161
10	Average length day	9.47	9.46	9.0	8.8	9.5	9.03
11	Mortality ratio (%)	0.75	0.69	0.55	0.43	0.32	0.35
12	X-ray	199,468	218,910	226,273	227,672	289,930	316,630
13	CT scanner	237,976	281,688	301,308	318,876	357,336	360,564
14	Ultrasound	54,450	61,024	69,705	76,768	87,005	94,303
15	Endoscopy	13,896	15,079	16,236	16,004	17,619	23,178
16	Test number	1,829,006	2,067,289	2,280,857	2,516,173	2,832,110	3,013,584
17	Blood number at blood bank (l)	5,404	5,490	5,731	6,009	7,231	7,955
18	PET/CT	224	362	402	325	499	691
19	Frequency of bed using (%) (comparison with real beds)	116	100.3	99.1	98.7	112.9	107

Table 2: Insured and uninsured proportion in VDUH 2005-2015 (%) (VDUH, 2015)

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Insured	25.51	36.23	42.02	43.97	44.29	48.25	49.93	52.46	55.65	59.87
Uninsured	74.49	63.77	57.98	56.03	55.71	51.75	50.07	47.54	44.35	40.13

As a public hospital, VDUH has signed a contract with insurance companies to automatically deduct expenses from the insurance company when the insurance holders access the medical service at the hospital. Patients only have to show the insurance card at the registration desk for consultation or admission. The financial system records each patient's detailed insurance profile. All the expenses covered by insurance will be automatically deducted when the patient is discharged from the hospital. Patients will only pay the extra expenses that are not covered by the insurance, as out-of-pocket payment or co-payment.

Since VDUH is the largest central surgical hospital with more than 1,000 beds as described above, it receives a large number of patients annually who are diversified by age, occupation, disease, living area, background, income, etc., which results in a large variation in the data used in this study.

4. Data

4.1 Data source and sample selection

This study uses individual-level data from the 2014 inpatient system of VDUH, which is a central surgical hospital receiving 40,000 inpatients on average every year. From the data acquired from the financial system in VDUH, this number in 2014 was 43,246 patients which includes 59.9 percent of insured patients and 40.1 percent of uninsured patients. Patients under 18 or over 70 years old were excluded as it is likely that these patients were compulsory insured. Furthermore, sponsor treatment or special care are also not the target of this study, hence patients with zero payment are also excluded. After filtering out the above mentioned observations, the total sample includes

33,481 observations, of which 55.6 percent are insured patients and 44.5 percent are uninsured patients. However, the financial system does not provide all needed information for research purposes. The finance system and administration system maintain their own databases. Instead, we used the finance system’s database to randomly select 1,501 patients with information including their insurance status as well as payment details. Information about age, gender, career, address (district, city/province), length of stay, admitted time, emergency, operation, ICU and out-of-pocket payment after insurance of these 1,501 patients was collected from paper-based medical records. Among these 1,501 cases, there were 89 patients with missing information, 3 cases outside of target age group (of 18 to 70), 4 non-residents and 12 patients with private insurance. Thus, we dropped these observations, and the final sample size was 1,393 observations that include 765 insured patients (54.9 percent) and 628 uninsured patients (45.1 percent) and no private insurance is included.

4.2 Summary of the data

Medical records are the most accurate and important documents at a hospital and are directly related to patients and treatment details. Hence, this research has an access to the most reliable data within this source. Table 3 shows the descriptive statistics of both insured and uninsured groups in the data set.

Table 3: Summary statistics of dummy variables

Variable	Insured group (N=765)		Uninsured group (N=628)	
	Observation	%	Observation	%
<i>Area</i>				

- Hanoi	193	25.23	186	29.62
- Red river delta area	220	28.76	234	37.26
- NE-coastal area	138	18.04	103	16.4
- Northern mountain	90	11.76	34	5.41
- Northern central	121	15.82	67	10.67
- Other areas	3	0.39	4	0.64
<i>Female</i>				
- Female (1)	283	36.99	156	24.84
- Male (0)	482	63.01	472	75.16
<i>Job</i>				
- Public officer	84	10.98	41	6.53
- Worker	53	6.93	78	12.42
- Farmer	234	30.59	196	31.21
- Free job	141	18.43	197	31.37
- Others	253	33.07	116	18.47
<i>Income</i>				
- Good (1)	30	3.92	26	4.14
- Fair (2)	702	91.76	586	93.31
- Poor (3)	33	4.31	16	2.55
<i>Result</i>				
- Recovery (1)	104	13.59	71	11.31
- Better (2)	633	82.75	531	84.55
- Unchanged (3)	16	2.09	14	2.23
- Worse (4)	12	1.57	11	1.75
- Died (5)	0	0	1	0.16
<i>Emergency</i>				
- Yes (1)	261	34.12	391	62.26
- No (0)	504	65.88	237	37.74
<i>Operation</i>				
- Yes (1)	611	79.87	491	78.18
- No (0)	154	20.13	137	21.82
<i>ICU</i>				
- Yes (1)	13	1.7	11	1.75
- No (0)	752	98.3	617	98.25
<i>Injury</i>				
- Yes (1)	196	25.62	410	65.29
- No (0)	569	74.38	218	34.71
<i>Disease</i>				
- Head trauma	49	6.41	140	22.29
- Knee & lower leg injuries	47	6.14	67	10.67
- Biliary and pancreas	63	8.24	18	2.87
- Digestive organs	68	8.89	18	2.87
- Benign neoplasms	77	10.07	22	3.5

- Urinary calculus	54	7.06	33	5.25
- Hip and thigh injuries	18	2.35	26	4.14
- Abdomen back spine pelvis injuries	25	3.27	37	5.89
- Small bowel	31	4.05	17	2.71
- Multi-injuries	12	1.57	46	7.32
- Others	321	41.96	204	32.48

Table 3 shows comparable data in both groups by several variables. Regarding disease variable, medical records are kept in VDUH according to International Disease Code (IDC). The data set used in this study has 190 different disease codes by IDC (version 10). However, due to the purpose of the study, total diseases were grouped into top ten disease groups of VDUH in 2014, other diseases were put in “Others” group.

Table 4 below describes the discrete variables. Length of stay is the total number of days a patient is treated in hospital. The out-of-pocket payment is the co-payment from patient after insurance reimbursement which is collected and recorded in the hospital finance system. This payment has been converted from Vietnamese currency (VND) to US Dollar (US\$). The patient’s age information is provided at registration (age in 2014). Education is total years of patient’s education which is also provided at registration. The statistics above in Table 4 show a variety of observations with high standard deviations in all variables. The amount of out-of-pocket payment is high in comparison to the average GDP per capita of Vietnam in 2014, which is \$2,052 (World Bank data, 2015). This number is especially high for the control group (no insurance) with average co-payment of about \$450. The average length of stay is also long, which can be explained by the situation of this specific hospital. As a central hospital, VDUH is a referral hospital for serious cases from provincial hospitals. VDUH is also a referral hospital for surgery

in case of accidents. As a result, the length of stay at VDUH is expected to be longer than other regular, smaller hospitals.

Table 4: Summary statistics of discrete variables

Variable	Insured group (N=765)		Uninsured group (N=628)	
	Mean	SD	Mean	SD
Length of Stay (Days)	9.3542	7.3486	7.2850	5.1615
Out-of-pocket payment (US\$)	354.8660	963.5027	449.5792	848.9717
Age (years)	45.7281	14.1962	37.1210	12.6766
Education (years)	10.0458	3.0393	10.1640	2.7116

4.3 Dependent variables

The outcomes of this research are measured by two dependent variables: length of stay and out-of-pocket payment. First, length of stay is the number of days that a patient was admitted for treatment in VDUH. In the data set, the minimum stay is 1 day and the maximum is 62 days. In particular, Table 4 demonstrates that the mean value is 9.35 days for the treatment group and 7.28 days for the control group. Second, out-of-pocket payment is the amount of money that a patient pays after insurance reimbursement (in US\$). This variable takes the mean value of \$355 for the treatment group and \$450 for the control group.

4.4 Independent variables

Other information of patients and treatment processes are recorded and used as explanatory variables for estimation such as age, gender, region, income, education,

emergency, operation, ICU, disease etc. These variables are described under data summary (Table 3 and Table 4).

Beside the main variable of interest (insurance), the independent variables are grouped into two categories: personal characteristics and treatment characteristics. Personal characteristics include all possible information about the patient through registration: age, gender, region (by area, province and district level), income group and education year. Treatment characteristics include all information regarding treatment in hospital: whether the patient is in an emergency status or not (emergency), whether the patient needs an operation or not, the total number of operations required, whether the patient has an injury or not (injury status), which disease (disease code), whether the patient needs intensive care or not (ICU).

5. Empirical strategy

To evaluate the impact of insurance on outcomes for patients, this study applies the following regression equation using information about the treatment of patients in the hospital.

$$Y_i = \alpha + \beta_0 \text{Insurance}_i + \beta_1 T_i + \beta_2 X_i + u_i \quad (1)$$

Y_i is the outcome for patient i which is measured by length of stay and out-of-pocket payment. Insurance_i is the dummy variable indicating health insurance status of patient i . T_i and X_i are other control variables where T_i is treatment characteristics given to patient i , and X_i is personal characteristics of patient i . Following the literature³, this study also begins its analysis by using the Ordinary Least Square (OLS) model by controlling for key indicators of treatment and personal characteristics.

6. Results and discussion

The mean comparison of treatment outcomes in terms of length of stay and out-of-pocket payment (Table 4) shows that insured patients stay longer and pay less than the uninsured group. By using OLS and fully controlling for observed personal and treatment characteristics, the regression results are shown in Table 5 for both dependent variables.

³ See, for instance, Fangwen (2014), Krueger and Kuziemko (2013), Hamid et al. (2011), Chi et al. (2008), and Doyle (2005).

Length of stay is measured by number of days and out-of-pocket payment is transformed to log form. OLS estimation suggests that health insured patients stay 1.6 days longer and pay 48.6 percent lower out-of-pocket payment than their uninsured counterparts; these results are statistically significant at 1 percent.

Patients with health insurance are more likely to have a stable work (compulsory group), which allows them to be absent from work due to sickness without punishment according to the Labor Law. On the other hand, patients who run small private business at home or do seasonal work are more unlikely to be enrolled in health insurance. This group is more exposed to risk to losing work or reducing income due to their absence so they need to return to work as soon as possible. This potential reason explains the longer stays in the insured group which is not true for the uninsured group. After treatment in hospital, insurance expenses are automatically deducted based on the scheme explained in Figure 3. Thus, by having health insurance, insured patients have less financial burden when compared to uninsured patients since they pay less given the same conditions and services in the hospital.

Table 5: Effects of health insurance

Explanatory variable	Length of stay		Log out-of-pocket payment	
	Coefficient	Robust S. E.	Coefficient	Robust S. E.
Insurance	1.5511***	0.4150	-0.4858***	0.0770
Age in 2014	0.0326**	0.0158	0.0005	0.0029
Female	-0.5732	0.3974	-0.0087	0.0737
<i>Job</i>				
Public officer			Base	
Worker	-0.7533	0.9007	-0.2176	0.1670
Farmer	-0.9960	0.7638	-0.1176	0.1414
Free job	-1.1825	0.7375	-0.2164	0.1366

Others	-0.6935	0.6957	-0.2282*	0.1288
<i>Income</i>				
Good income group			Base	
Average income group	1.3660	0.9567	-0.0418	0.1768
Poor income group	1.7880	1.3891	0.1258	0.2573
Education	0.0035	0.0792	0.0190	0.0147
Emergency	1.7128***	0.4287	-0.0172	0.0793
Total number of operation	3.5443***	0.3566	0.9938***	0.0660
Intensive care service	8.0242***	1.3911		
<i>Disease</i>				
Head trauma			Base	
Knee & lower leg injuries	0.8278	0.8170	-0.1034	0.1511
Biliary and pancreas	2.8014***	0.9286	-0.0817	0.1720
Digestive organs	6.4605***	0.9580	-0.1422	0.1775
Benign neoplasms	2.5685***	0.9305	0.0051	0.1724
Urinary calculus	1.1394	0.9470	-0.5493***	0.1754
Hip and thigh injuries	2.1425*	1.1109	-0.0761	0.2058
Abdomen back spine pelvis injuries	2.0526**	0.9834	-0.0838	0.1821
Small bowel	1.4968	1.1105	-1.1344***	0.2057
Multi-injuries	1.2032	1.0234	-0.0261	0.1897
Others	2.1252***	0.6207	-0.3017***	0.1149
<i>District control</i>				
Intensive care days			Yes	
Constant	-1.1031	2.1535	0.0769***	0.0148
Constant			4.5700***	
Observation		1393		1393

* Significant level at 10%; ** Significant level at 5%; *** Significant level at 1%

Table 6 shows the heterogeneous effects of health insurance by regions. Panel A demonstrates the estimates in Hanoi and those in other provinces, while Panel B divides the sample into urban and rural areas. The results for length of stay in Panel A implies that insured patients in Hanoi stay 1.9 days longer than uninsured patients, while this number in other province group is 1.5 days; they are significant at 5 percent and 1 percent respectively.

Similar to the previous results, insured patients are more likely to have stable work as they can take days off due to sickness while uninsured patients do not have this luxury. Thus, insured patients can stay longer in the hospital in comparison with the uninsured group.

Moreover, patients from other provinces tend to be referred to provincial hospitals, which are near their home for further treatment after VDUH until recovery. This means they might need to stay some days more at the provincial hospital after discharging from VDUH. At the same time, insured patients from Hanoi can choose to stay at VDUH until full recovery for a number of reasons. For example, when family members are too busy to provide care for them, patients choose to stay in hospital. That is why the gap between insured patients and uninsured patients stay from other provinces at VDUH is lower than Hanoi’s group given treatment in 2014.

More interestingly, the financial gap between insured patients and uninsured patients from Hanoi is smaller than patients from other provinces. The insured group accordingly pays around 33 percent and 55 percent less than the uninsured group. As explained above, patients from Hanoi stay longer until full recovery and they have to incur the costs for these extra days as compared to standard treatment of central level at VDUH. This reason leads to higher out-of-pocket payment and the financial gap is smaller for these patients than those from other provinces.

Table 6: Heterogeneous effects of health insurance by regions

Variable	Length of stay		Log out-of-pocket payment	
	Hanoi	Other provinces	Hanoi	Other provinces
<i>A. Hanoi vs. Other provinces</i>				

Insurance	1.9230**	1.5447***	-0.3279**	-0.5450***
Robust S. E.	0.7574	0.4851	0.1342	0.0943
Full controls	Yes	Yes	Yes	Yes
Observation	379	1,014	379	1,014

B. Urban vs. Rural areas

	Urban	Rural	Urban	Rural
Insurance	0.8858	2.1099***	-0.4626***	-0.5002***
Robust S. E.	0.6634	0.5411	0.1225	0.1028
Full controls	Yes	Yes	Yes	Yes
Observation	571	822	571	822

* Significant level at 10%; ** Significant level at 5%; *** Significant level at 1%
 Full controls include all personal and treatment characteristics

Moreover, the story is different between urban and rural areas. Among the urban group, insured patients stay 0.9 days longer (not statistically significant) and pay 46 percent less than uninsured patients but these numbers are 2.1 days and 50 percent in the rural group (statistically significant at 1 percent). This is potentially because patients from rural areas who are referred to VDUH from lower levels are likely to have more serious diseases. For example, they are like to come to the hospital only when they cannot withstand discomfort or pain any longer, because they are unlikely to check their health annually. Another reason is that their health condition is not be as good as people in urban areas because of their daily nutrition consumption or working environment which affects their health significantly. These background can explain why, given insured, the length of stay of patients in rural area is still longer than that of patients from urban area in comparison with uninsured patient. However,

just insured patients are financially supported by health insurance reimbursement thus they can bear the cost of staying longer compared to uninsured patients. These estimations are in line with the previous results from the full sample.

Table 7: Heterogeneous effects of health insurance for the case of injury

Specifications	Dependent variables	Insurance coefficient	Robust S. E	Full controls	Obs.
<i>A. For total injured patient</i>					
	Length of stay	1.2928**	0.6144	Yes	606
	Log out-of-pocket payment	-0.5221***	0.1253	Yes	606
<i>B. Injured patient from Hanoi vs. Other provinces</i>					
Hanoi	Length of stay	1.7481	1.1118	Yes	137
	Log out-of-pocket payment	-0.2080	0.2696	Yes	137
Other provinces	Length of stay	1.0459	0.7121	Yes	469
	Log out-of-pocket payment	-0.5946***	0.1429	Yes	469

* Significant level at 10%; ** Significant level at 5%; *** Significant level at 1%
Full controls include all personal and treatment characteristics

Table 7 shows estimation results for injured patients. Estimated parameters are consistent with the previous results, which indicate that health insurance is correlated with 1.3 days longer stay and 52 percent lower out-of-pocket payment in case of injury.

Among literature related to this topic, there are few papers that use patient data from respective hospitals. Doyle (2005) found that uninsured patients stay less than insured patients in case of automobile accidents in the United States. In terms of health financing, a number of studies found similar results that health insurance is helpful in reducing out-of-

pocket payment as mentioned in the literature. The findings in this study are consistent with the previous results. However, as mentioned in the literature review, Nguyen (2012) who also examines the case of Vietnam found no significant impact of voluntary health insurance on out-of-pocket payment. This is partly because data on out-of-pocket payment includes all expenses related to the treatment such as transportation or accommodation expenses. In this study, by using actual data from hospital with exact information of out-of-pocket payment in hospital, results suggest new evidence that health insurance is associated with 48.6 percent lower in out-of-pocket payment. literature.

7. Conclusion

Improving health quality is one of the most important targets of Vietnam among all MDGs. Vietnam is trying to cover eighty percent of the population with health insurance by 2020. By using the data from 1,393 inpatients of VDUH in 2014, this paper shows that insured patients have significantly higher advantages compared with uninsured patients, such as longer hospital stay and lower out-of-pocket payment. Further analysis suggests that the financial burden between the insured and uninsured patients is larger if patients come from rural areas, and health insurance is helpful for patients particularly in case of injury.

The new empirical findings of this study contributes to the literature and suggests that having health insurance is associated with several advantages, especially with regards to reducing the financial burden for patients' treatments in hospital. By using detailed patient-level medical information from hospital data, this study provides convincing impact of

compulsory and voluntary insurance on hospital stay and expenditure, which has not been shown in the literature for the case of Vietnam.

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