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Evidence from the poorest regions of Vietnam**  
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# Health insurance and patient satisfaction Evidence from the poorest regions of Vietnam

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## Abstract

Even though health insurance is expanding rapidly in Vietnam, its coverage is not effective. There remain inefficiencies in the healthcare system with quality concerns, especially at primary care and in remote areas. However, very little is known about how health insurance is valued by people and whether health insurance coverage can translate into quality healthcare. This paper investigates the relationship between health insurance and patient satisfaction with medical care in the poorest regions of Vietnam. We use multi-level models for ordinal responses on a cross-sectional dataset of the poorest regions of Vietnam in 2012. We find that it is not health insurance coverage per se but the financial coverage that matters to improve patient satisfaction with medical care. Patient satisfaction depends on the breadth and depth of insurance coverage (i.e. services and medicines covered, co-payment rate for each service) and the ability to use health insurance to reduce medical costs via the co-payment mechanism.

*JEL Classifications:* I13

*Keywords:* Health insurance, patient satisfaction, Vietnam

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# 1 Introduction

Despite recent efforts toward Universal Health Coverage, the availability of health insurance has not been translated into effective coverage in Vietnam (Somanathan et al., 2014). One frequently cited reason is the chronic lack of funds and competent medical staff in primary care services, which serve as gate-keepers (Lieberman and Wagstaff, 2009; Somanathan et al., 2014). In 2013, only two-thirds of commune healthcare stations had a medical doctor (Somanathan et al., 2014). Due to inequalities in the allocation of human and financial resources between rural and urban regions, the shortage of healthcare workers and resources is even more severe in remote areas (Lieberman and Wagstaff, 2009; Somanathan et al., 2014). For example, in the North Western region, the poorest region of Vietnam, the share of commune healthcare stations with a medical doctor in 2013 was only one-third (Somanathan et al., 2014). Healthcare workers in rural and remote areas have to work under the shortage of medical equipment and continuous training (Takashima et al., 2017). People living in rural and disadvantaged regions face various socio-economic barriers to access, including long distance to healthcare facilities, poor service quality in primary care, and unaffordability (Tran et al., 2016). Whereas, they are more likely to use the lowest level of care (commune healthcare stations) which is of rather poor quality (ibid.). With limited resources in primary care (especially in rural and disadvantaged areas), combined with a lack of trust in the capability of medical staff (Thanh, 2015; Quoc, 2015), many insured patients decide to skip the referral line for tertiary care due to quality concerns (Thanh, 2015; Quoc, 2015). This creates overcrowding and excessive demand for tertiary care (Somanathan et al., 2013) and negatively affects the quality of care at this level. In many central and provincial hospitals, it is rather common that two or three patients have to share one bed (Cheng, 2014). The excessive demand, in turn, triggers informal payments in the health sector (Vian et al., 2012). Finally, because not all self-referred care is covered by the Social Health Insurance programme (SHI)<sup>1</sup>, the perceived poor quality of primary care leads to another issue: the non-use of health insurance among the insured who willingly skip the line and pay the total cost out-of-pocket (Thanh, 2015; Quoc, 2015).

Worryingly, another issue that weakens the effectiveness of the medical system is the discrimination against insurance holders by medical staff (see the media coverage by Dang, 2013; Kim and Vu, 2013; Duong, 2014). Among discrimination cases reported by the media, poor attitude of medical staff towards insured patients (normally in the form of a lack of friendliness and attention) is the most common (Duong, 2014). In a testimony to the National Assembly (i.e. the Parliament), the Vietnamese Minister of Health claims that the perceived discrimination is due to the huge quality gap between SHI-commissioned healthcare services (i.e. mostly public services) and premium services within the same public facilities (quoted in Duong, 2014). The premium services, which are uncovered by the SHI programme, are designed to target those who are willing to pay more to get better care. These services have been developed during the decentralisation and privatisation of healthcare services in the late 1980s and early 1990s as a departure from the centrally subsidized model. Public hospitals have been encouraged to collect user-fees to offset the sharp reduction in public subsidies while private investment into public hospitals has been allowed based on a profit-sharing mechanism (Ramesh, 2013).

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<sup>1</sup> The Insurance Law in 2008 mandated a higher co-payment rate for self-referred care. In 2014, it was then revised to exclude self-referred outpatient care in SHI coverage to discourage patients from skipping the referral system.

The decentralisation policy has allowed public service providers to generate and retain revenues to deal with the chronic lack of funds and low wages for medical staff (Ramesh, 2013; Lieberman and Wagstaff, 2009). Retained profits are partly shared among medical staff as bonus (Lieberman and Wagstaff, 2009) to compensate for the low public wage. Recently, with the aim of cutting government expenditure and improving public service quality, the Government has encouraged public service providers to become financially self-sufficient (Socialist Republic of Vietnam, 2015). The Ministry of Health has further urged public hospitals to become entirely independent of public finance. The privatisation in public hospitals has been further encouraged and many public hospitals have equipment owned by private partners (Ramesh, 2013). Therefore, under Vietnam's policy of social mobilisation of financial resources ('Xa hoi hoa' in Vietnamese), the transformation of public hospitals in Vietnam, is 'merely a form of privatisation in which services remain public but users have to pay for using them' (Ramesh, 2013, p.408). The concept of 'public hospitals' in Vietnam has become very questionable as they pursue profit while competing with facilities at lower levels (Ramesh, 2013). To generate more revenue, many public hospitals currently have two types of healthcare services, one being affordable and tied to the SHI for the general public and the other providing premium services for those who can afford and willing to pay for them out-of-pocket. The two differ in terms of service fees, capitation rates, facilities and infrastructure, leading to a difference in waiting lines and waiting time (Duong, 2014). Services covered by SHI are lowly priced with price caps and a list of drugs covered while premium services are more flexible in their pricing and prescription, offering patients more luxurious and expensive services based on their willingness to pay (Ministry of Health, Ministry of Finance, 2009). Uninsured people who can not afford premium services can choose the public services and pay the total amount out-of-pocket, whereas insured people who use public services can benefit from the cost sharing in the form of co-payments. As a result, the existence of two levels of quality within the same facility may have undesirable effects for the insured who are sometimes discriminated against by medical staff (Dang, 2013; Kim and Vu, 2013; Duong, 2014). The undesirable behaviour of medical staff may be triggered by the goal of profit maximization of public hospitals in Vietnam (Ramesh, 2013), whereby they tend to favour patients who pay more for premium services.

All suggests that the Vietnamese healthcare system is having many inefficiencies and quality issues (Takashima et al., 2017), which are not necessarily resolved by the provision of health insurance. We, however, know very little about how health insurance is valued by people and whether health insurance coverage translates into quality healthcare for those in need. With quality concerns, evaluating healthcare quality in Vietnam has become more urgent than ever, especially in poor and remote regions which have far more limited healthcare resources and access (Somanathan et al., 2014; Tran et al., 2016). Among quality measures, patient satisfaction, a subjective quality measure, is an important indication of how much the current healthcare system satisfies the need of patients despite its challenges and limitations. In the context of the rapid health coverage expansion in Vietnam and the limitations in the quality of care in rural areas (Tran et al., 2016), it is important to investigate if health insurance is able to make rural people, especially the poor and the vulnerable, satisfied with the care they receive.

Despite the mounting literature on patient satisfaction determinants, little is known about the relationship between health insurance and patient satisfaction. Health insurance is sometimes examined as a control variable in a very thin literature on this topic. Additionally, this limited literature is overly represented by studies on the American

system. A multivariate analysis of parents of children with special care needs in the US shows that lack of health insurance, among other determinants, is associated with patient dissatisfaction with care (Nguoi and Flores, 2006). Similarly, children of all types of insurance face challenges in accessing specialty care, among which parents of children insured through Children’s Health Insurance Program (CHIP) report the highest levels of frustration in getting treated (Kreider et al., 2016). Another study finds no significant difference in satisfaction with acute medical care between Medicare and private insurance holders (Clark and Gesell, 2010). In a descriptive analysis, Castillo-Laborde et al. (2017) compare the performance of the Chilean public health insurance and the private scheme regarding patient satisfaction and many other indicators. They find a larger proportion of private insurance holders being satisfied or very satisfied with the health system (Castillo-Laborde et al., 2017). These studies are very few and scattered among the vast literature on patient satisfaction. Studies for the former Soviet Union countries, which are probably the most similar health systems to Vietnam’s, are more about general satisfaction with healthcare (Footman et al., 2013; Luck et al., 2014) or patient and physician evaluations (Luck et al., 2014) rather than the relationship between health insurance and patient satisfaction. For Vietnam, to the best of our knowledge, no reliable evidence is available on patient satisfaction in general and its relationship with health insurance in particular. This is probably because of the heavy focus on objective measures such as accessibility (Tran et al., 2016), out-of-pocket payments (Jowett et al., 2003; Nguyen, 2012; Nguyen and Wang, 2013; Wagstaff, 2010), affordability (Tran et al., 2016) and utilisation (Wagstaff, 2010; Nguyen, 2012; Nguyen and Wang, 2013; Guindon, 2014; Palmer et al., 2015). In the context of the rapid health coverage expansion in Vietnam, it is useful to investigate how health insurance affects the level of satisfaction with medical services to unravel patients’ expectations and preferences. However, as discussed above, due to its subjective nature, patient satisfaction or patient evaluations should be used together with other objective quality assessments. For Vietnam, research on patient satisfaction with medical care will compliment the current literature on objective quality measures in mapping a complete picture of healthcare quality.

This paper examines patient satisfaction by investigating the association between health insurance and satisfaction with care of those who live in the remote and poor areas of Vietnam. We employ multilevel ordered logistic regression models and a dataset that covers the poorest and most disadvantaged communes in Vietnam. To our knowledge, the present paper is the first study to investigate subjective quality evaluation of healthcare services in Vietnam. Our study contributes to the literature in several ways. First, we pioneer in researching patient satisfaction in Vietnam especially for the rural remote areas where the quality of medical services is currently of big concern due to rural-urban inequality in health resource allocation. Second, we contribute to the under-researched literature on the relationship between health insurance and patient satisfaction.

## **2 Health insurance and healthcare delivery in Vietnam**

After the radical Reform in 1986 (often referred to as ‘Doi Moi’), Vietnam has been growing rapidly with impressive achievements in economic growth and poverty reduction (World Bank, 2016). During the same period, the health sector has been witnessing a large number of reforms to renovate the system which used to be centralised and heavily

subsidized by the state. In the late 1990s, after the privatisation and decentralisation of the system together with the introduction of user-fees, out-of-pocket payment rocketed to more than 70 percent of total healthcare spending (Somanathan et al., 2014). Therefore, in the 1990s, the government introduced a series of policies to incrementally expand health coverage and finally, in 2009, integrated different schemes into a single programme called the Social Health Insurance (SHI) (ibid.). Despite the shared basket of services, the consolidated programme continues the targeting approach from its predecessors by separating different eligible groups with varied premiums and co-payment rates. Currently, in the global wave of UHC, Vietnam is rapidly expanding health insurance coverage under SHI (Ngan, 2017) via binding legal documents and increased budgets (Somanathan et al., 2014). According to statistics of the Vietnam Social Security Agency (VSS), the SHI programme has expanded rapidly and reached 86.4 percent coverage (around 81 million people were covered) in December 2017 (cited by Ngan, 2017). This is remarkable progress given that the rate was only around 23 percent in 2004 and 64.8 percent in 2011 (Somanathan et al., 2014). Public health spending has steadily increased, accounting for 9 percent of the total public budget and 3 percent of GDP in 2010 (Barroy et al., 2014). Importantly, the rate of increase in government health spending is higher than that of GDP (ibid.), showing the strong political commitment to improve the healthcare system. Compared to other countries in the Western Pacific region, Vietnam has a high coverage of essential services and access on average (WHO, 2018). However, there remain gaps in financial protection for health (WHO, 2018), with more than 5 percent of the population incurring high out-of-pocket payments<sup>2</sup>. In 2015, out-of-pocket payments accounted for more than 43 percent of the total health expenditure (WB, 2018). All suggests the lack of breadth and depth of the health insurance coverage<sup>3</sup> and the unaffordability of health services to a proportion of the population. Additionally, despite the general access is relatively high (WHO, 2018), this is not the case for those living in rural and remote area (Tran et al., 2016).

Besides budgetary increases in health spending, the government has encouraged the participation of the private sector in healthcare delivery (Ramesh, 2013), leading to the emergence of privately-run healthcare facilities, especially in urban areas. The decentralisation and privatisation have been recognised by law since the 2000s (ibid.). Consequently, healthcare in Vietnam is currently delivered by a wide range of public and private service providers. Public facilities are highly hierarchical, including commune health stations, meso-district polyclinics, district hospitals, provincial hospitals, central hospitals, specialised hospitals and other uncommon facilities such as district maternity clinics ('Nha ho sinh'), medical service centres for vaccination and simple lab tests. In remote regions where commune health stations are far away, community medical officers at the village level are the first contact points of primary care, contributing greatly to the provision of public health services and first aid for rural people (Ministry of Health, 2013). Private facilities include private hospitals, polyclinics, specialised clinics, diagnostic testing centres, and evening clinics which are often run by general practitioners or specialists of public hospitals outside office hours. Another under-studied type of care is provided by traditional herbal physicians, which is unique for Vietnam and China

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<sup>2</sup> this is measured by the share of population with out-of-pocket payments higher than 25 percent of total household consumption or income

<sup>3</sup> The breadth and depth of health insurance are two dimensions of health insurance's financial protection. Coverage breadth refers to coverage rate, services and medicines covered while coverage depth refers to the co-payment rates for services or medicines covered

(Wahlberg, 2006). Interestingly, the rural population in Vietnam is very self-sufficient in the treatment of common illnesses using traditional herbal medicines, owing to a unique ‘ancient history of medicine, post-colonial isolation and extensive health delivery network’ (Wahlberg, 2006, p.1).

Despite the rich taxonomy, not all facilities are covered by the SHI programme. To participate in the programme, healthcare facilities need to apply and get commissioned by the VSS (Ministry of Health, Ministry of Finance, 2009). Service delivery under the SHI programme is predominantly provided by public facilities, as more than 81 percent of commissioned facilities in 2016 were public (Thao, 2016). Despite accounting for 19 percent of commissioned facilities, private facilities only made up 7 percent of total healthcare use in 2016 (ibid.). Because commissioned facilities are required to meet certain quality standards, small private clinics in rural areas are less likely to be part of the SHI programme. Additionally, services provided by herbal physicians are not covered by the SHI even though herbal medicine hospitals are part of the system. Importantly, depending on the depth and breadth of the coverage, not all services at SHI commissioned facilities (hereafter, SHI facilities) are covered. The availability of private services within public facilities (Ramesh, 2013; Barroy et al., 2014) further emphasises this issue.

As aforementioned, the notion of ‘public hospitals’ in Vietnam is challenged as many of them use privately owned equipment and private resources (Ramesh, 2013; Barroy et al., 2014). They even compete with lower level facilities (ibid.), allowing patients to skip the referral line and pay out-of-pocket if they wish. As a consequence, many patients prefer tertiary care due to their higher perceived quality with better medical staff and infrastructure (Ramesh, 2013) while financial measures to discourage self-referral are inadequate (Barroy et al., 2014). Over time, hospitals in big cities have become increasingly more competitive compared to lower levels of care, leading to a widening gap in healthcare quality among different levels of care and between geographical regions (rural/urban). Big hospitals also have the incentive to compete with the lower level facilities due to a revenue generation goal. This cross-level competition contributes to weakening the referral system of SHI, making it less attractive. It also partly contributes to the non-use of health insurance among insured patients when seeking care at tertiary facilities (Thanh, 2015; Quoc, 2015) because self-referred out-patient care at central and provincial hospitals are not covered (Socialist Republic of Vietnam, 2014).

### **3 Data and methodology**

We use a dataset from the base-line and end-line surveys of phase two of the largest poverty reduction programme in Vietnam called the National Target Programme for Poverty Reduction, often referred to as Programme 135 as it was first launched under Decision 135/1998/QĐ-TTg (Socialist Republic of Vietnam, 1998). The programme targets the poorest communes which have a high concentration of ethnic minorities living in remote and disadvantaged areas. Its total budget for phase two (hereafter, Programme 135-II) was approximately USD 1.1 billion, covering the 1,600 poorest communes in Vietnam in the period 2006-2010 (Nguyen et al., 2013). The dataset is owned by UNDP Vietnam under a commission work by Nguyen et al. (2013) to evaluate impacts of the Programme-II after its closure. The surveys were conducted in 2007 and 2012, aiming to cover around 6,000 households in 400 communes (both treatment and control) in 42 out of 45 provinces with P135-II (ibid.). Therefore, this sample is representative of the poorest



regions of Vietnam but not the whole country. Due to attrition, the endline survey only included 398 communes and 5,668 households (ibid.). The questionnaires of the surveys were developed based on that of the multi-purpose Vietnam Household Living Standards Surveys (VHLSS), the largest biannual surveys covering all topics ranging from education, health, labour, income and agriculture production to social assistance benefits. VHLSS questionnaires, in turn, have borrowed from the World Bank's LSMS surveys conducted in low and middle income countries.

In this study, the analysis is at the level of healthcare visits. Therefore, we only use the cross section in 2012 that consists of realised healthcare needs, i.e. either seeking healthcare or self-medication without a prescription. People were asked if they were having any health issue or health need that led them to seek healthcare over the last 12 months. If the response was yes, questions would follow regarding the type of facility visited, type of care, how satisfied they were with the care or the contact with the focal contact point (in the case of self-treatment, the first contact point will be a pharmacy or a drug stand in the local market), and how often the individual visited that specific facility over the last 12 months.

A visit is identified if the person sought healthcare or realised a need (without seeing a medical staff) over the last 12 months for any reason including illness treatment, check-up, vaccination, pregnancy check, abortion and contraception intervention, self-medication (i.e. buying medicines without prescription). The visits reported were actually 'realised actions' to cater to a medical need, no matter if the visits involved a contact with any medical facility or not. Notably, each visit recorded was related to a distinctive health need/health issue or health facility. If a person visited one facility multiple times for the same need, it was recorded as one visit with a frequency of visiting that specific facility. In case the person visited different facilities for the same health issue, then it was counted as different visits. The dependent variable named 'evaluation' is presented as a Likert scale rating, taking values from 1 to 5 for 'very unsatisfied', 'unsatisfied', 'neutral', 'satisfied' and 'very satisfied'. The independent variable of interest is health insurance coverage that denotes any type of health scheme. The sample includes 13,669 healthcare visits (i.e. realised needs) of 10,369 individuals from 4,556 households.

Because we are only interested in the effect of health insurance (the SHI programme particularly) on patient satisfaction, we disregard any realised need that is not linked to SHI facilities. We thus exclude private clinics, pharmacies (in case of self-medication), herbal physicians and other uncommon facilities (see Table 3 for the taxonomy of healthcare facilities covered and uncovered). The final sample includes 10,562 healthcare visits to SHI facilities of 8,660 individuals from 4,167 households. It is important to note that even though private facilities can be commissioned by the SHI if they meet the quality standards and apply to participate (Ministry of Health, Ministry of Finance, 2009), the majority of private facilities affiliated with the programme are large private hospitals and clinics in urban areas. In our sample, we categorise private facilities as ineligible for the SHI as it is safe to assume that private facilities in remote and disadvantaged areas are not large enough to be part of the programme. Similarly, services by herbal physicians are excluded because SHI only covers herbal care delivered at large herbal medicine hospitals, which are listed under the category specialised hospitals.

As the data are nested at many levels, we employ three-level mixed-effects ordered logistic regression models for ordinal responses. We follow Agresti (2010) and Rabe-Hesketh and Skrondal (2008) on applied multilevel modelling for ordinal responses. We assume that healthcare visits (level 1) are nested in households (level 2) which then

cluster in communes (level 3). Based on the sampling method of the survey (Nguyen et al., 2013) which sampled communes and then households, we assume no variability of individuals within the same household and ignore the individual level to enable computational feasibility. This assumption is valid as the data were collected in the presence of all household members in one setting and the household heads would often answer the questions for any absent member. However, we also conduct several four-level attempts to confirm that the individual level can be ignored (see the robustness checks and appendices).

The covariates include health insurance coverage (dummy), the use of health insurance and other covariates, namely age, children under five (dummy), adults above 65 (dummy), gender, literacy, ethnicity (a dummy to specify if the person belongs to the ethnic majority), income-based poverty status, health status (the annual number of health issues reported based on the realised need), type of facility, the nature of the care (vaccination, reproductive care, illness treatment, check-ups), total out-of-pocket payment per visit, distance to and the frequency of using the facility. We combine different insurance schemes into one dummy variable because a preliminary analysis has shown that there is no sizeable difference in their effects. To account for the issue of not using insurance among the insured (Vuong, 2015; Somanathan et al., 2014), we use information on cost sharing to define the variable ‘the use of health insurance’. If a patient gets a cost reduction via the cost sharing mechanism of health insurance (co-payment), then that individual is considered using insurance upon utilisation.

We use both random-intercept and random-slope models. The random-intercept model assumes the commune and household-specific effects (the random-effects specification) do not depend on any covariate. However, to investigate the issue of discrimination against insurance holders, we suspect that the level of discrimination varies between communes and depends on the use of insurance coverage (i.e. a dummy that specifies the ability to get cost sharing for the care). We hence assume a slope at the commune level for health insurance usage.

## 4 Results

### 4.1 Descriptive statistics

Table 1 shows insurance coverage in the poorest communes in Vietnam in 2012. The coverage in the surveyed region was very high, with more than 82 percent of people being insured. This high coverage is due to the high concentration of the poor and ethnic minorities who benefited from free insurance by law (51.5 percent for all and 48.8 percent for those seeking care). Voluntary insurance in these regions accounted for a relatively small proportion (from 3.1 to 3.7 percent). This is consistent with the small coverage of this scheme in the general population (Somanathan et al., 2014) and may be due to a lack of awareness of insurance among ethnic minorities.

**Table 1: Health insurance coverage (%)**

	All people	Those seeking any care	Those seeking care at SHI facilities
Uninsured	17.27	18.04	12.22
Insurance for the poor	51.47	48.81	53.83
Insurance for assistance recipients	16.49	17.29	18.27
Compulsory insurance	1.83	2.23	2.26
Voluntary student insurance	3.67	3.15	2.23
Free insurance for children below 6	1.50	1.89	2.13
Voluntary insurance	3.11	3.59	3.71
Others (mostly private insurance)	4.66	5.01	5.35
Total	100	100	100
Number of observations	22,937	9,986	8,660

Weighted statistics at individual level. The number of observations is smaller due to missing values of insurance. SHI facilities exclude the use of private clinics, pharmacies for self-medication, herbal medicines and other facilities uncovered by the SHI.

Table 2 describes the use of insurance upon healthcare visit. Among visits of insured people, approximately 69 percent received a cost reduction (cost sharing) via co-payment when seeking care. Among visits to SHI facilities, the rate was over 88 percent, suggesting that more than 11 percent did not receive the cost reduction, probably due to self-referral (Vuong, 2015) (i.e. people skip the referral line and hence become ineligible for insurance reimbursement), or concern about discrimination (Dang, 2013; Kim and Vu, 2013; Duong, 2014) that prevented people from reporting that they have insurance to the care facility, or the preference for out-of-pocket premium services over public services because the former is of better quality (Vuong, 2015). Another explanation might be the use of uncovered services and medicine in SHI facilities, suggesting the lack of breadth and depth of the SHI coverage.

**Table 2: Health insurance coverage and cost sharing (%)**

	All visits	Visits to SHI facilities
Uninsured	17.05	10.59
Insured, no cost reduction when seeking care	25.97	10.43
Insured, with cost reduction when seeking care	56.98	78.98
Total	100	100
Number of observations	13,368	10,550
Among the insured	All visits	Visits to SHI facilities
Insured, no cost reduction when seeking care	31.32	11.67
Insured, with cost reduction when seeking care	68.68	88.33
Total	100	100
Number of observations	11,320	9,433

Weighted statistics at visit level. SHI facilities exclude the use of private clinics, pharmacies for self-medication, herbal medicines and other facilities uncovered by the SHI. Cost reduction (cost sharing) in Vietnam is in the form of co-payment.

Table 3 reports the types of care in relation to facilities used. The most visited facility was the commune health station (over 42 percent of visits), followed by district hospitals (16.7 percent). This finding is consistent with Tran et al. (2016) who suggested that commune level facilities are mostly used by people in remote and mountainous areas in Vietnam. Notably, self-medication (i.e. purchasing medicine at a pharmacy or even in a local market without any doctor prescription) seemed very common in the surveyed regions (17.7 percent) probably due to the limited health literacy of those living in disadvantaged regions. Interestingly, pharmacies in the surveyed regions could provide many services from vaccination, check-up to medicine sale for self-treatment or contraception. Additionally, self-treatment may also relate to other alternatives besides self-medication (such as home remedies or even superstitious activities), accounting for 1.4 percent of self-treatment activities. Commune health stations seemed to be the focal point for various types of care. Village medical support by community officers, a unique service for remote areas, seem to play a positive role in vaccination in the regions.

**Table 3: Type of care in relation to facility categories (%)**

	Vac.	Rep.	Check.	Ill.	Self.	Total
<b>SHI-commissioned facilities</b>						
Village medical support	21.44	2.06	1.25	1.77	0.00	1.57
Commune health station	55.44	40.22	51.80	51.44	0.00	42.40
Meso-district polyclinic	0.00	2.08	0.79	0.95	0.00	0.78
District hospital	4.02	34.94	19.34	20.15	0.00	16.67
Provincial hospital	1.67	11.79	5.20	7.75	0.00	6.13
Central hospital	0.00	0.94	2.67	2.60	0.00	2.11
Other types of hospital	0.00	0.27	2.21	1.56	0.00	1.33
<b>Non SHI-commissioned facilities</b>						
Private clinic or hospital	13.82	1.63	10.33	10.29	0.00	8.40
Pharmacy (self-medication)	2.08	0.86	4.99	0.00	98.59	17.72
Traditional herbal physician	0.00	0.00	0.20	2.16	0.00	1.51
Others	1.53	5.22	1.22	1.32	1.41	1.39
Total	100.00	100.00	100.00	100.00	100.00	100.00

Weighted statistics at visit level. N=13,669 visits. Vac.: Vaccination, Rep.: Reproductive care, Check.: Check-up, Ill.: Illness treatment, Self.: Self treatment

Table 4 illustrates the frequency of different satisfaction levels. Table 5 presents the mean satisfaction level by insurance coverage, type of facility and type of care. Only slightly more than five percent of evaluations were unsatisfied or very unsatisfied while more than 80 percent of evaluations were satisfied or very satisfied. On average, it seems that patients in the remote and disadvantaged regions of Vietnam in 2012 positively evaluated the quality of care, with all the gradings on average being above ‘neutral’ (evaluation=3) and close to ‘satisfied’ (evaluation=4). The rating was positive across type of care and facilities used. This is surprising given the concerns about poor quality (Barroy et al., 2014; Somanathan et al., 2014) and limited access (Somanathan et al., 2014; Tran et al., 2016) of care in those regions.

**Table 4: Patient satisfaction at SHI facilities(%)**

<b>Satisfaction level</b>	<b>Observations</b>	<b>Frequency</b>
Very unsatisfied	48	0.45
Unsatisfied	545	5.16
Neutral	1,384	13.11
Satisfied	8,179	77.42
Very satisfied	408	3.86
Total	10,564	100.00

Weighted statistics at visit level. This excludes the use of private clinics, pharmacies for self-medication, herbal medicines and other facilities uncovered by the SHI.

**Table 5: Patient satisfaction by health insurance, facility and type of care**

Visits to SHI facilities				
1=Very unsatisfied, 5=Very satisfied	Obs	Mean	SD	
<b>Health insurance coverage</b>				
Uninsured	712	3.75	.66	
Insurance for the poor	6,083	3.81	.62	
Insurance for assistance recipients	2,002	3.77	.59	
Compulsory insurance	153	3.89	.47	
Voluntary student insurance	165	3.76	.59	
Free insurance for children below 6	243	3.97	.50	
Voluntary insurance	166	3.86	.44	
Others (mostly private insurance)	626	3.71	.59	
<b>Facility categories</b>				
Village medical support	184	3.72	.63	
Commune health station	6,275	3.78	.63	
Meso-district polyclinic	120	3.86	.44	
District hospital	2,707	3.81	.57	
Provincial hospital	871	3.85	.50	
Central hospital	213	3.62	.83	
Other types of hospital	192	3.93	.40	
<b>Type of care</b>				
Vaccination	112	3.92	.37	
Reproductive care	260	3.74	.70	
Check-up	1,166	3.86	.71	
Illness treatment	9,023	3.78	.59	
Total	10,564	3.79	.61	

Weighted statistics at visit level, Obs: Observations, SD: Standard deviation. This excludes the use of private clinics, pharmacies for self-medication, herbal medicines and other facilities uncovered by the SHI.

Table 6 provides information on the reasons for patient dissatisfaction with the medical care at SHI facilities in the surveyed regions. In general, bad attitude towards patients, ineffective treatment and lack of medicines were the most common reasons for dissatisfaction, accounting for 20.9, 19.6 and 15.3 percent of the total number of dissatisfied evaluations. Bad attitude of medical staff was common for both insured and uninsured patients. Notably, the high cost seems to affect those who did not or could not use health insurance for cost sharing the most (at 20.6 percent). This may indicate that the non-use of health insurance of insured patients was not out of choice as they had to use services uncovered by SHI. Interestingly, only 11.4 percent of uninsured patients reported high costs as the main reason for dissatisfaction, showing that insured and uninsured patients have different expectations regarding health costs when seeking healthcare at SHI facilities.

**Table 6: Reasons for patient dissatisfaction at SHI facilities (%)**

	Visits to SHI facilities			
	Uninsured	Insured		Total
		No cost sharing	Cost sharing	
Lack of facilities	2.31	2.68	7.07	5.49
Lack of medicines	2.64	4.50	21.55	15.33
Incapable medical staff	17.60	2.25	6.52	7.19
Bad attitude towards patients by medical staff	15.20	21.21	22.12	20.96
Long waiting time	26.15	14.58	6.10	10.69
Very high costs	11.46	20.64	3.71	8.33
The illness is not relieved	8.91	6.07	26.18	19.56
Unclean, unhygienic facilities	0.00	0.71	0.29	0.34
Informal payments	9.43	3.53	2.30	3.56
Unfair treatment by medical staff	6.30	2.41	1.61	2.44
Others	0.00	21.43	2.53	6.11
Total	100.00	100.00	100.00	100.00
Number of observations	91	135	421	647

Weighted statistics. The number of observations is rounded. This excludes the use of private clinics, pharmacies for self-medication, herbal medicines and other facilities uncovered by the SHI.

Table 7 presents the descriptive statistics of the control variables in the final sample of visits to SHI linked facilities in 2012. Among those seeking healthcare, 45 percent were men and around 72 percent were literate. The mean age was around 36, with two percent being below 5 years old and 8 percent over 65. Only 17 percent of those seeking care in SHI facilities were Kinh people due to the high concentration of ethnic minorities in the surveyed regions. On average, the surveyed people seemed rather healthy, with a mean value of only 1.37 self-reported health issues per year. The poverty rate was high in the sample, at 55 percent. This is expected given the high concentration of poverty among ethnic minorities in Vietnam (World Bank, 2016), which was also the rationale for having the largest poverty reduction programme in the regions. Distance to the medical facilities varied a lot because of the varied taxonomy of facilities. Similarly, out-of-pocket payment had a wide range due to variation in type of care, facility as well as the severity of the health issue.

**Table 7: Descriptive statistics of control variables in the final sample**

	Min	Max	Mean	Median	SD
Individual characteristics					
Age	0.00	110.00	36.36	36.00	20.25
Children under 5 years old	0.00	1.00	0.02	0.00	0.13
Elderly over 65 years old	0.00	1.00	0.08	0.00	0.28
Male	0.00	1.00	0.45	0.00	0.50
Literacy (dummy)	0.00	1.00	0.72	1.00	0.45
Belongs to the ethnic majority (Kinh)	0.00	1.00	0.17	0.00	0.38
Poor	0.00	1.00	0.55	1.00	0.50
Number of health issues p.a. (self-reported)	1.00	7.00	1.37	1.00	0.63
Healthcare visit characteristics					
Type of healthcare facility	1.00	7.00	2.92	2.00	1.31
Type of care	1.00	4.00	3.81	4.00	0.52
Distance to the care facility (km)	0.00	1500.00	19.22	5.00	50.57
Visit frequency to that specific facility p.a.	1.00	96.00	3.35	2.00	4.70
OOP payment (in USD)	0.00	9587.27	52.82	4.79	239.09

N=10,562 visits to SHI facilities of 8,660 individuals. SD: Standard deviation. OOP payment: Out-of-pocket payment

## 4.2 Multilevel results

Table 8 presents the results of three random intercept models, with model 1 including only health insurance (dummy) as the main explanatory variable, model 2 accounting for the use of health insurance for cost reduction and model 3 replacing the two variables with a categorical variable that separates different groups of users and non-users. As suggested, health insurance is positively related to patient satisfaction (model 1). However, when controlling for the actual use of health insurance for cost sharing (co-payment), the positive effect actually comes from cost sharing (model 2-3). That means the insurance itself does not lead to a higher satisfaction level, what matters is its actual financial coverage for those who use healthcare. Notably, model 3 suggests that those who were insured and used the insurance to reduce the costs were the most satisfied. Importantly, those who were insured but did not get cost sharing were less satisfied compared to the uninsured (even though the effect is statistically insignificant). This suggests that these insured individuals were those who had to use uncovered services and hence could not benefit from the financial coverage.

We also find intuitive and consistent results for other control variables. Literacy and social economic condition (proxied by poverty status) are not statistically significant. Gender is significant at the 10 percent level in model 1 only. Those belonging to the ethnic majority (Kinh people) on average are significantly less satisfied with healthcare. Older people are less satisfied with medical services, however, those above 65 are more satisfied with medical services compared to younger ones. This might imply a U-shaped relation between age and the level of satisfaction with healthcare.

Intuitively, healthcare-related variables seem to be the most significant drivers of satisfaction. Lower health status (higher number of self-reported health issues) is associated with a lower level of satisfaction with medical services. However, the frequency of use of the same facility does not affect the evaluation. Those visiting higher levels of healthcare system (above district level) are more satisfied than those who choose commune health stations. Among SHI facilities, other types of hospitals rather than central and

district level hospitals (specialty hospitals, military hospitals) seem to have the highest level of patient satisfaction. Regarding the type of care, it seems that vaccination in the poorest regions of Vietnam is doing better than illness treatment in making people satisfied probably because vaccination in Vietnam is mainly for children under 6 and free of charge by law. Longer distance to the facility leads to a higher level of satisfaction even after controlling for facility type. The effect of the total out-of-pocket payment is negatively significant but rather negligible in size.



**Table 8: Three-level random intercept models**

	(1)	(2)	(3)
Have health insurance	0.786*** (0.20)	-0.350 (0.23)	
Receive cost reduction upon visit thanks to health insurance		1.429*** (0.17)	
Health insurance and health insurance usage (base: no insurance)			
-Have insurance but do not receive cost reduction upon visit			-0.350 (0.23)
-Have insurance and receive cost reduction upon visit			1.079*** (0.20)
Age	-0.009*** (0.00)	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	0.126 (0.35)	0.077 (0.35)	0.077 (0.35)
Elderly over 65	0.525*** (0.17)	0.512*** (0.17)	0.512*** (0.17)
Male	-0.109* (0.07)	-0.102 (0.07)	-0.102 (0.07)
Literate	0.002 (0.09)	0.022 (0.09)	0.022 (0.09)
Belongs to the ethnic majority (Kinh)	-0.516*** (0.15)	-0.508*** (0.15)	-0.508*** (0.15)
Poor	-0.145 (0.12)	-0.147 (0.12)	-0.147 (0.12)
Number of self-reported health issues p.a.	-0.250*** (0.07)	-0.257*** (0.06)	-0.257*** (0.06)
Facility type (base: commune health station)			
-Village medical support	0.180 (0.24)	0.379 (0.25)	0.379 (0.25)
-Meso-district polyclinic	0.720* (0.37)	0.873** (0.38)	0.873** (0.38)
-District hospital	0.701*** (0.12)	0.716*** (0.12)	0.716*** (0.12)
-Provincial hospital	1.069*** (0.19)	1.145*** (0.19)	1.145*** (0.19)
-Central hospital	1.246*** (0.37)	1.628*** (0.36)	1.628*** (0.36)
-Other types of hospital	1.603*** (0.38)	2.088*** (0.36)	2.088*** (0.36)
Type of care (base: illness treatment)			
-Vaccination	1.732*** (0.42)	1.876*** (0.44)	1.876*** (0.44)
-Pregnancy and reproductive health care	0.282 (0.26)	0.381 (0.27)	0.381 (0.27)
-Health check-up	-0.108 (0.14)	-0.106 (0.14)	-0.106 (0.14)
Distance to the care facility (km)	0.001 (0.00)	0.002** (0.00)	0.002** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.002 (0.01)	-0.005 (0.01)	-0.005 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000** (0.00)	-0.000** (0.00)
Cutpoint 1	-8.443*** (0.39)	-8.388*** (0.40)	-8.388*** (0.40)
Cutpoint 2	-4.994*** (0.31)	-4.895*** (0.31)	-4.895*** (0.31)
Cutpoint 3	-2.631*** (0.29)	-2.502*** (0.29)	-2.502*** (0.29)
Cutpoint 4	6.317*** (0.35)	6.508*** (0.36)	6.508*** (0.36)
Variance (commune intercept)	1.928*** (0.33)	1.898*** (0.32)	1.898*** (0.32)
Variance (household intercept)	6.168*** (0.59)	6.121*** (0.60)	6.121*** (0.60)
N	10,307	10,307	10,307

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 9 compares the results of the random intercept and the random slope models. As suggested, the results are very consistent across the two sets of models in terms of the positive effect of the financial coverage of health insurance on healthcare satisfaction. This finding is also consistent with what is found in Table 8. However, in the random slope models, the effect size of the cost reduction increases from 1.3-1.4 to 1.4-1.5 ordered log-odd unit. Notably, the commune effect seems to depend on whether patient can receive cost reduction owing to health insurance : the variance of the slope is significant at one percent level. We then perform likelihood-ratio tests of the random slope model against the random intercept model, with the assumption that the latter is nested in the former. We get a p-value of 0.000, suggesting that the random slope model fits better than the random intercept model. We hence expand the random slope models in Table 10.

When we switch to the better fit (random slope model), the effect of cost reduction on satisfaction increases in size from 1.07 (model 3, Table 8) to 1.18 (Table 10). Similar to the results from the random intercept models, when controlling for the financial coverage of health insurance, the coefficient of health insurance availability in the commune effect becomes insignificant albeit remaining positive. This suggests a positive relation between cost reduction enabled by health insurance and patient satisfaction in the surveyed regions. Notably, the positively significant signs of the slope in the commune effects suggest that commune-specific effects depend on the financial benefit of using insurance and that those using insurance to cut costs are more satisfied. Regarding other regressors, there are slight changes in size but not in the direction of all the effects. This means that the random slope model is a better fit in terms of providing more precise estimates in size rather than in the direction of the effects.

**Table 9: Three-level intercept and random slope models**

	(1) Intercept	(2) Slope	(3) Intercept	(4) Slope
Have health insurance			-0.350 (0.23)	-0.357 (0.23)
Receive cost reduction upon visit thanks to health insurance	1.315*** (0.14)	1.423*** (0.15)	1.429*** (0.17)	1.538*** (0.17)
Age	-0.009*** (0.00)	-0.009*** (0.00)	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	0.106 (0.35)	0.121 (0.36)	0.077 (0.35)	0.092 (0.36)
Elderly over 65	0.501*** (0.18)	0.506*** (0.18)	0.512*** (0.17)	0.519*** (0.18)
Male	-0.102 (0.07)	-0.106 (0.07)	-0.102 (0.07)	-0.105 (0.07)
Literate	0.025 (0.09)	0.035 (0.09)	0.022 (0.09)	0.032 (0.09)
Belongs to the ethnic majority (Kinh)	-0.464*** (0.15)	-0.393*** (0.15)	-0.508*** (0.15)	-0.441*** (0.15)
Poor	-0.146 (0.12)	-0.148 (0.12)	-0.147 (0.12)	-0.149 (0.12)
Number of self-reported health issues p.a.	-0.260*** (0.06)	-0.251*** (0.07)	-0.257*** (0.06)	-0.248*** (0.07)
Facility type (base: commune health station)				
-Village medical support	0.368 (0.25)	0.321 (0.24)	0.379 (0.25)	0.332 (0.25)
-Meso-district polyclinic	0.856** (0.38)	0.818** (0.37)	0.873** (0.38)	0.831** (0.37)
-District hospital	0.722*** (0.12)	0.717*** (0.12)	0.716*** (0.12)	0.709*** (0.12)
-Provincial hospital	1.149*** (0.19)	1.146*** (0.19)	1.145*** (0.19)	1.142*** (0.19)
-Central hospital	1.619*** (0.36)	1.597*** (0.37)	1.628*** (0.36)	1.603*** (0.37)
-Other types of hospital	2.099*** (0.37)	2.080*** (0.36)	2.088*** (0.36)	2.073*** (0.36)
Type of care (base: illness treatment)				
-Vaccination	1.879*** (0.44)	1.828*** (0.44)	1.876*** (0.44)	1.825*** (0.44)
-Pregnancy and reproductive health care	0.383 (0.27)	0.399 (0.27)	0.381 (0.27)	0.398 (0.27)
-Health check-up	-0.102 (0.14)	-0.091 (0.14)	-0.106 (0.14)	-0.090 (0.14)
Distance to the care facility (km)	0.002** (0.00)	0.002** (0.00)	0.002** (0.00)	0.002** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.005 (0.01)	-0.005 (0.01)	-0.005 (0.01)	-0.005 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000* (0.00)	-0.000** (0.00)	-0.000* (0.00)
Cutpoint 1	-8.149*** (0.36)	-8.132*** (0.37)	-8.388*** (0.40)	-8.375*** (0.40)
Cutpoint 2	-4.652*** (0.27)	-4.603*** (0.27)	-4.895*** (0.31)	-4.852*** (0.32)
Cutpoint 3	-2.258*** (0.24)	-2.183*** (0.24)	-2.502*** (0.29)	-2.432*** (0.30)
Cutpoint 4	6.761*** (0.34)	6.979*** (0.35)	6.508*** (0.36)	6.718*** (0.38)
Variance (commune intercept)	1.909*** (0.32)	1.386*** (0.29)	1.898*** (0.32)	1.356*** (0.29)
Variance (household intercept)	6.144*** (0.60)	6.265*** (0.62)	6.121*** (0.60)	6.240*** (0.62)
Variance (commune slope)		1.048*** (0.30)		1.062*** (0.31)
N	10,318	10,318	10,307	10,307

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 10: Three-level random coefficient models**

	(1)	(2)	(3)
Have health insurance	0.691*** (0.20)	-0.357 (0.23)	
Receive cost reduction upon visit thanks to health insurance		1.538*** (0.17)	
Health insurance and health insurance usage (base: no insurance)			
-Have insurance but do not receive cost reduction upon visit			-0.357 (0.23)
-Have insurance and receive cost reduction upon visit			1.180*** (0.21)
Age	-0.009*** (0.00)	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	0.123 (0.35)	0.092 (0.36)	0.092 (0.36)
Elderly over 65	0.531*** (0.18)	0.519*** (0.18)	0.519*** (0.18)
Male	-0.110 (0.07)	-0.105 (0.07)	-0.105 (0.07)
Literate	0.005 (0.09)	0.032 (0.09)	0.032 (0.09)
Belongs to the ethnic majority (Kinh)	-0.469*** (0.15)	-0.441*** (0.15)	-0.441*** (0.15)
Poor	-0.144 (0.12)	-0.149 (0.12)	-0.149 (0.12)
Number of self-reported health issues p.a.	-0.243*** (0.07)	-0.248*** (0.07)	-0.248*** (0.07)
Facility type (base: commune health station)			
-Village medical support	0.143 (0.24)	0.332 (0.25)	0.332 (0.25)
-Meso-district polyclinic	0.705* (0.37)	0.831** (0.37)	0.831** (0.37)
-District hospital	0.694*** (0.12)	0.709*** (0.12)	0.709*** (0.12)
-Provincial hospital	1.080*** (0.19)	1.142*** (0.19)	1.142*** (0.19)
-Central hospital	1.273*** (0.38)	1.603*** (0.37)	1.603*** (0.37)
-Other types of hospital	1.671*** (0.37)	2.073*** (0.36)	2.073*** (0.36)
Type of care (base: illness treatment)			
-Vaccination	1.719*** (0.42)	1.825*** (0.44)	1.825*** (0.44)
-Pregnancy and reproductive health care	0.309 (0.27)	0.398 (0.27)	0.398 (0.27)
-Health check-up	-0.097 (0.14)	-0.090 (0.14)	-0.090 (0.14)
Distance to the care facility (km)	0.002* (0.00)	0.002** (0.00)	0.002** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.003 (0.01)	-0.005 (0.01)	-0.005 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000* (0.00)	-0.000* (0.00)
Cutpoint 1	-8.479*** (0.40)	-8.375*** (0.40)	-8.375*** (0.40)
Cutpoint 2	-4.982*** (0.32)	-4.852*** (0.32)	-4.852*** (0.32)
Cutpoint 3	-2.580*** (0.30)	-2.432*** (0.30)	-2.432*** (0.30)
Cutpoint 4	6.560*** (0.37)	6.718*** (0.38)	6.718*** (0.38)
Variance (commune slope)	1.284*** (0.33)	1.062*** (0.31)	1.062*** (0.31)
Variance (commune intercept)	1.573*** (0.32)	1.356*** (0.29)	1.356*** (0.29)
Variance (household intercept)	6.311*** (0.62)	6.240*** (0.62)	6.240*** (0.62)
N	10,307	10,307	10,307

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Because Kinh people (those belonging to the ethnic majority) are less likely to be satisfied with medical services (see Tables 8-10), we run separate regressions for Kinh and non-Kinh ethnic groups in Table 11. We find that even though the effect of cost sharing is positively significant for both groups, it is more pronounced for non-Kinh peoples with a larger effect size.

Importantly, the effects of all other regressors seem to depend on ethnicity. The U-shaped relationship between age and satisfaction level is only found in non-Kinh peoples. Kinh men are less likely to be satisfied with medical services than Kinh women while the effect of gender is insignificant within non-Kinh groups. Distance to a healthcare facility is positively related to the satisfaction level of Kinh people (at 10 percent significance level) but not significant for the non-Kinh. The effects of type of facility and type of care between the two groups differ in magnitude rather than in the effect sign. The results seem to suggest that there are significant cultural differences that affect the ethnic differences in satisfaction level with medical care. Alternatively, this ethnicity-based discrepancy might be due to the difference in social referencing group between Kinh people and the non-Kinh, because ethnic minority peoples frequently tend to be poorer and left behind in various social development dimensions (World Bank, 2016).

**Table 11: Three-level intercept and random slope models by ethnicity**

	Kinh		Non kinh	
	Intercept	Slope	Intercept	Slope
Have health insurance	0.280 (0.33)	0.283 (0.34)	-0.526 (0.38)	-0.542 (0.37)
Receive cost reduction upon visit thanks to health insurance	0.635* (0.32)	0.652** (0.32)	1.647*** (0.19)	1.764*** (0.20)
Age	-0.007 (0.01)	-0.007 (0.01)	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	-0.148 (0.82)	-0.124 (0.82)	0.122 (0.39)	0.114 (0.39)
Elderly over 65	0.310 (0.40)	0.310 (0.40)	0.558*** (0.19)	0.562*** (0.20)
Male	-0.219* (0.12)	-0.222* (0.13)	-0.097 (0.08)	-0.099 (0.08)
Literate	-0.181 (0.29)	-0.171 (0.29)	0.049 (0.10)	0.057 (0.10)
Poor	-0.060 (0.20)	-0.076 (0.20)	-0.172 (0.14)	-0.165 (0.14)
Number of self-reported health issues p.a.	-0.042 (0.10)	-0.043 (0.10)	-0.300*** (0.08)	-0.290*** (0.08)
Type of facility (base: commune health station)				
-Village medical support	0.698 (1.27)	0.627 (1.24)	0.369 (0.26)	0.337 (0.25)
-Meso-district polyclinic	1.975*** (0.47)	1.942*** (0.48)	0.802* (0.43)	0.758* (0.43)
-District hospital	0.660*** (0.23)	0.656*** (0.23)	0.766*** (0.14)	0.758*** (0.14)
-Provincial hospital	1.045*** (0.33)	1.046*** (0.33)	1.245*** (0.22)	1.244*** (0.23)
-Central hospital	1.558*** (0.51)	1.554*** (0.51)	1.609*** (0.49)	1.583*** (0.51)
-Other types of hospital	2.281*** (0.41)	2.286*** (0.42)	1.622*** (0.51)	1.548*** (0.50)
Type of care (base: illness treatment)				
-Vaccination	3.051*** (0.61)	2.984*** (0.57)	1.756*** (0.49)	1.726*** (0.49)
-Pregnancy and reproductive health care	-0.550 (0.54)	-0.527 (0.55)	0.536* (0.31)	0.550* (0.31)
-Health check-up	0.073 (0.19)	0.074 (0.19)	-0.196 (0.18)	-0.185 (0.18)
Distance to the care facility (km)	0.002* (0.00)	0.002* (0.00)	0.001 (0.00)	0.001 (0.00)
Visit frequency to that specific facility for the same health issue p.a.	0.022 (0.01)	0.022 (0.01)	-0.011 (0.01)	-0.012 (0.01)
OOP payment (in USD)	-0.000 (0.00)	-0.000 (0.00)	-0.000* (0.00)	-0.000* (0.00)
Cutpoint 1	-6.363*** (0.58)	-6.368*** (0.59)	-8.809*** (0.56)	-8.827*** (0.56)
Cutpoint 2	-3.586*** (0.53)	-3.582*** (0.54)	-5.112*** (0.45)	-5.096*** (0.45)
Cutpoint 3	-1.462*** (0.50)	-1.450*** (0.51)	-2.638*** (0.43)	-2.593*** (0.43)
Cutpoint 4	6.961*** (0.66)	7.017*** (0.68)	6.629*** (0.48)	6.827*** (0.50)
Variance (commune intercept)	0.396* (0.21)	0.319 (0.23)	2.292*** (0.40)	1.626*** (0.36)
Variance (household intercept)	4.162*** (0.77)	4.185*** (0.77)	6.869*** (0.79)	7.024*** (0.82)
Variance (commune slope)		0.216 (0.33)		1.227*** (0.39)
N	1,890	1,890	8,417	8,417

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 12 presents the intra-class correlation coefficients (ICC) for the random intercept and random slope models in Tables 8 and 10. ICC in this case is the ICC of the underlying linear model while the variances reported are of the cumulative probability model (see the methodology). The ICC are very high in all models, indicating that the within-household and within-commune correlation are significantly larger than zero. That means the random effects models are necessary to capture the heterogeneity within the study population. Importantly, in all models, nearly two-thirds of the variation is due to within-household correlation, suggesting that household-specific effects can explain most of the unobserved heterogeneity. If we allow commune-specific effects to depend on the use of health insurance for cost sharing, the variation from the intercept is larger than that from the slope. Finally, it seems that the random effects are consistent across Models 1-3 of both random intercept and slope models, suggesting that the fixed-effects specifications within random effects models are very robust.

**Table 12: Variance and intra-class correlation coefficients (ICC)**

	Random intercept models				Random slope models					
	Commune		Household		Commune(s)		Commune (i)		Household	
	Variance	ICC	Variance	ICC	Variance	ICC	Variance	ICC	Variance	ICC
Model 1	1.928	0.369	6.168	0.652	1.284	0.281	1.573	0.323	6.311	0.657
Model 2	1.898	0.366	6.121	0.650	1.062	0.244	1.356	0.292	6.240	0.655
Model 3	1.898	0.366	6.121	0.650	1.062	0.244	1.356	0.292	6.240	0.655

Commune(s) and commune (i) denote the statistics for commune-specific slopes and intercepts

## 5 Robustness checks

One can argue that sample selection bias can be problematic in our models if those who were not satisfied with healthcare or lived so far away from the nearest primary facilities would have abstained from seeking healthcare when needed. Consequently, we only observed the satisfaction level of those who sought healthcare in 2012. However, in this dataset, we used information on ‘realised care needs’ based on self-reported health issues, and hence observed any action taken to get treated including self-medication, professional herbal therapies, home remedies and so on. Therefore, for a robustness analysis, we re-ran the models with the full sample to include these types of visits to reduce the risk of selection bias due to the unmet need (see Appendices A1-A2). As expected, the results of full sample regressions are consistent with Tables 8-10, which makes the sample selection issue less likely. Additionally, we argue that healthcare is a special need that cannot be easily forgone. If sick, someone must take some action to feel better regardless of the involvement of professional care. Therefore, our broad definition of visit as ‘realised care need’ seems to be a good strategy to deal with the issue of sample selection. Even if we missed a small number of those forgoing medical treatment due to recall bias, our analysis remains valid and informative about the satisfaction level of those who were sick and managed to seek some care.

The issue of endogeneity of health insurance might be more problematic because health insurance was not randomly assigned. One could argue that those who were not satisfied with medical services for many unobserved reasons could have opted out in the voluntary scheme. However, the high coverage rate (over 82 percent), combined with

the relatively small voluntary insurance coverage (more than 3 percent) compared to free and compulsory insurance schemes in the surveyed regions helps to minimise that risk. Additionally, the issue of risk aversion in the voluntary scheme (Somanathan et al., 2014) seems to suggest that voluntary health coverage in Vietnam is mainly driven by need and health status, which was controlled for in our regressions (we used the number of self-reported health issues per year as a proxy for health status), rather than by satisfaction level.

For robustness checks, we also ran regressions controlling for household size, employment status and income as co-founders but these were removed from parsimonious models after Wald tests. We replaced the health insurance dummy with different health schemes (Appendix A4). Finally, we accounted for the variability of individuals within households and tried a four-level model. As suggested in Appendix A3, the variance of the individual level is not statistically significant, confirming that our assumption to ignore the individual level is valid.

## 6 Discussion and conclusion

We find that it is not health insurance coverage per se but the financial coverage when seeking healthcare that matters to improve patient satisfaction. In other words, patient satisfaction depends on the breadth and depth of coverage (services and medicines covered) and the ability to use health insurance to reduce medical costs via the co-payment mechanism.

Importantly, our results suggest that the claim of discrimination against insurance holders is unsupported at least in the poorest regions of Vietnam: those who used insurance upon utilisation to reduce health costs were more satisfied than those who did not have it and those who were insured but did not benefit from cost sharing (probably because they could not). The consistency in statistical significance of the slope as well as its positive signs across random slope models help rule out the claim of discrimination against the insured at least in our sample. This is positive news for the government in providing free health insurance and affordable healthcare for the poor and disadvantaged ethnic minority groups in the surveyed regions. Probably the discrimination phenomenon reported by the media (Dang, 2013; Kim and Vu, 2013; Duong, 2014) is due to media exaggeration of negative news. Another explanation might be that this issue is more rampant in central hospitals in big cities (see Dang (2013); Kim and Vu (2013); Duong (2014)) where patients are over-stressed with the chronic overcrowding and observe the visible difference between public services and premium services within the same facility. This comparison and sense of relative inequality was described in a testimony by the Minister of Health in 2014 (Duong, 2014). As discussed earlier in the literature, patient satisfaction is a subjective measure which depends on patient expectations, beliefs and feelings (Linder-Pelz, 1982; Williams, 1994). Having two lines of services within the same health centre may raise expectations, induce comparison and trigger the sense of unfairness and inequality among patients who are struggling to navigate in an overcrowded surrounding. Literature on happiness economics seems to suggest this explanation by highlighting something called ‘jealousy effects’ (Van Praag, 2011, p.124) via the inclusion of a social referencing process in measuring subjective inequality and happiness. Perhaps Vietnamese patients who use public services tend to feel discriminated if they compare themselves with those using premium services



because comparison negatively affects subjective feelings, subjective well-being as well as subjective inequality (Van Praag, 2011). However, it is notable that our data only represents the poorest regions of Vietnam, so the above explanations are mainly theory-based. In the future, it would be interesting to do the same research for empirical evidence if data are available for the whole of Vietnam.

Model 3 of Table 8 suggests that those who were insured and used health insurance to reduce the costs were the most satisfied. The fact that those who were insured but did not receive cost reduction were less satisfied compared to the uninsured (even though the effect is statistically insignificant) seemingly indicates that the former had to use uncovered services and hence could not benefit from the insurance. In this case, the unmet expectation of a cost sharing made them feel less satisfied than the uninsured. Therefore, the non-use of health insurance in this case was not a choice. This is consistent with the finding in Table 6 that one of the main reasons for patient dissatisfaction of those insured but not receiving cost reduction was the high costs. These individuals were even more dissatisfied than the uninsured (Table 8-10). This is intuitive as insured people often expect some cost reduction before seeking care and hence become easily dissatisfied when not covered while the uninsured visit healthcare without expecting a cost reduction. It is also consistent with the finding in Table 5: the insured and uninsured seem to have different expectations regarding medical costs associated with the care received. Therefore, the phenomenon of self-referral or deliberately not using health insurance (Vuong, 2015) is not an issue in the surveyed regions, probably because of the limited willingness to pay.

The fact that uninsured patients were more satisfied than insured ones who did not receive cost reduction highlights the lack of breadth and lack of depth of the SHI insurance coverage, which supports the argument by Somanathan et al. (2014) that SHI coverage in Vietnam does not lead to an effective coverage. In the context of moving toward UHC, this finding becomes highly policy relevant, as it challenges the effectiveness of the well-intentioned SHI programme.

Even though the random slope models are a better fit than the random intercept models, they are only slightly more precise in predicting the effect sizes. Generally, both groups of models suggest a positive relationship between the ability to use health insurance to cut medical costs (i.e. cost sharing via the co-payment mechanism) and patient satisfaction. The positively significant commune-specific slope in Table 10 is interesting, confirming our assumption that the commune effects depend on the ability to use insurance for cost sharing. It highlights the variation in how the insured and uninsured are treated among different communes. In general, the commune effects are larger for those able to use insurance for cost sharing when seeking SHI-commissioned care (positive slope of insurance usage implies that the commune effects are higher for insured people than the uninsured within the same commune). This might be a good area for future research in investigating within-commune variation in healthcare quality and patient satisfaction.

Because of the vast heterogeneity of the effects of social demographic variables on patient satisfaction (Batbaatar et al., 2017), it is difficult to compare it with other studies. Besides, it is important to emphasize the uniqueness of the dataset, which only looks at the poorest regions in Vietnam, while previous studies including those for former Soviet Union countries with relatively similar health systems (Footman et al., 2013; Luck et al., 2014) normally use a sample of the general population. Therefore, comparing our results with the literature should be done with caution.

Our results seem to disagree with the literature that finds higher levels of satisfaction for older people (Butler et al., 1996; Jackson et al., 2001; Kersnik, 2001; Atkinson and Haran, 2005; Bleich et al., 2009; Hekkert et al., 2009; Schoenfelder et al., 2011). We find a U-shaped relationship between age and satisfaction with healthcare by adding dummies that specify the most illness-susceptible groups (aged under 5 or above 65). Income-based poverty status is not significant, which is inconsistent with the positive effect found in the majority of other studies (Gulliford et al., 2006; Xiao and Barber, 2008; Footman et al., 2013). The reason is probably the extremely high prevalence of poverty in our surveyed areas while the other papers (Footman et al., 2013) investigate the general population. Another explanation might be the relatively low income inequality in the poorest areas of Vietnam because income inequality is more pronounced between rural and urban areas rather than within rural areas (World Bank, 2016). Interestingly, we find no general gender-based difference in patient satisfaction (the effect of gender is only slightly significant in one intercept model) while the literature finds significant effects (Batbaatar et al., 2017). However, when separating the sample by ethnicity, Kinh men are less satisfied with medical care than Kinh women. Another important finding is the difference in satisfaction level between Kinh people (the ethnic majority) and the others, suggesting that Kinh people (often the better-off) are less satisfied with medical services in general even after accounting for other social economic indicators (income and literacy). This suggests that Kinh people are more demanding with medical care received, signalling a cultural difference in perceiving and expecting the quality of public services of Kinh people and the others. Alternatively, this may also suggest the difference in reference groups for healthcare between Kinh and non-Kinh people.

The results of other variables related to care, health status and the facility used are very intuitive. People are more satisfied with higher levels of care which are further from home, however, this is only true for Kinh people. Interestingly, after controlling for facility type, distance to the facility is positively related to patient satisfaction. This indicates that Kinh people tend to prefer quality to accessibility and they are willing to travel farther to get better care. Another explanation is that Kinh people are more likely to live in commune and district centres whereas ethnic minority groups often live very remotely. The higher number of self-reported health issues per year is related to a lower level of patient satisfaction, whereas the frequency of going to the same health facility is not significant. This is consistent with a series of studies (Jackson et al., 2001; Danielsen et al., 2007; Hekkert et al., 2009; Rahmqvist and Bara, 2010; Schoenfelder et al., 2011; Footman et al., 2013) and the literature synthesis (Batbaatar et al., 2017) that suggests a negative relationship between health status and patient satisfaction. We find a negative relationship between total out-of-pocket payment and patient satisfaction but the effect size is negligible. This is probably due to the low capitation rate in those areas as well as the high rate of insurance usage among the insured (see descriptive statistics).

Some descriptive results are worth discussing. In general, the surveyed people, with or without insurance, are relatively satisfied with healthcare: the evaluation mean is close to ‘satisfied’. This is interesting given the concern over limited healthcare quality in rural areas due to inequalities in resource allocation (Somanathan et al., 2013) and limited accessibility (Tran et al., 2016). This probably can be explained by the fact that ethnic minority groups are less demanding regarding healthcare compared to the ethnic majority, whereas 79 percent of the evaluations are from the ethnic minority people.

In general, bad attitude towards patients, ineffective treatment and lack of medicines are the most common reasons for dissatisfaction in the surveyed areas. The rate of self-

medication in the surveyed regions is relatively high, at more than 17 percent of visits. Those who use self-medication seem as satisfied as those using professional care even in comparison with the district hospitals. This is probably because of the simplicity of health issues involved, as seeking self-medication can help cure the issue. Another explanation might be the easy access to (or even the lack of control in selling) antibiotics and specialty medicines in Vietnam (Duong et al., 1997; Larsson, 2003) which might lead to long-term negative effects. Traditional herbal therapies with professional physicians are also an important source of care in the rural poor areas in Vietnam and people seem to be satisfied with them.

We find that commune health stations can provide various types of care and are the most popular facility among people living in the poorest regions of Vietnam, which is similar to what is suggested by Tran et al. (2016), who study several rural and remote communes. Notably, the rate of self-medication is relatively high (17.7 percent) despite the high insurance coverage (more than 80 percent), suggesting a necessity to improve health literacy, raise the awareness of people, as well as to improve accessibility in the surveyed regions.

The biggest limitation of this study is the potential of omitted variable bias as a myriad of service-related characteristics are not controlled for. The latest systematic review on determinants of patient satisfaction (Batbaatar et al., 2017) summarises more than 30 co-founders to be investigated. Unfortunately, as general survey, our dataset does not have that luxury. However, we managed to cover many objective quality aspects (the type of care, facility type, accessibility) and affordability (proxied by out-of-pocket payments) which are found to be the strongest determinants of patient satisfaction (Batbaatar et al., 2017).

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**Table A1: Three-level random intercept models (full sample)**

	(1)	(2)	(3)
Have health insurance	0.493*** (0.13)	-0.017 (0.15)	
Receive cost reduction upon visit thanks to health insurance		1.087*** (0.14)	
Health insurance and its use (base: no insurance)			
-Have insurance but do not receive cost reduction upon visit			-0.017 (0.15)
-Have insurance and receive cost reduction upon visit			1.071*** (0.15)
Age	-0.007*** (0.00)	-0.008*** (0.00)	-0.008*** (0.00)
Children under 5	0.125 (0.28)	0.134 (0.29)	0.134 (0.29)
Elderly over 65	0.321** (0.14)	0.320** (0.14)	0.320** (0.14)
Male	-0.078 (0.05)	-0.068 (0.05)	-0.068 (0.05)
Literacy (dummy)	-0.021 (0.08)	-0.010 (0.08)	-0.010 (0.08)
Belongs to the ethnic majority (Kinh)	-0.317** (0.13)	-0.317** (0.13)	-0.317** (0.13)
Poor	-0.140 (0.10)	-0.139 (0.10)	-0.139 (0.10)
Number of self-reported health issues p.a.	-0.170*** (0.05)	-0.171*** (0.05)	-0.171*** (0.05)
Healthcare facility (base: commune health station)			
-Village medical support	0.121 (0.23)	0.301 (0.24)	0.301 (0.24)
-Meso-district polyclinic	0.518 (0.40)	0.617 (0.41)	0.617 (0.41)
-District hospital	0.621*** (0.11)	0.661*** (0.11)	0.661*** (0.11)
-Provincial hospital	0.960*** (0.17)	1.056*** (0.17)	1.056*** (0.17)
-Central hospital	0.917*** (0.33)	1.303*** (0.32)	1.303*** (0.32)
-Other types of hospital	1.348*** (0.33)	1.816*** (0.33)	1.816*** (0.33)
-Private clinics	1.159*** (0.20)	1.981*** (0.22)	1.981*** (0.22)
-Pharmacies (without prescription)	1.198** (0.53)	1.865*** (0.52)	1.865*** (0.52)
-Traditional herbal medicines	0.621** (0.27)	1.478*** (0.31)	1.478*** (0.31)
-Others	0.575* (0.34)	1.048*** (0.33)	1.048*** (0.33)
Type of care (base: self-treatment)			
-Vaccination	2.178*** (0.64)	2.102*** (0.62)	2.102*** (0.62)
-Pregnancy and reproductive health care	1.165** (0.57)	1.066* (0.55)	1.066* (0.55)
-Health check-up	0.506 (0.53)	0.346 (0.50)	0.346 (0.50)
-Illness treatment	0.626 (0.53)	0.448 (0.50)	0.448 (0.50)
Distance to the care facility (km)	0.002*** (0.00)	0.002*** (0.00)	0.002*** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	0.001 (0.01)	-0.001 (0.01)	-0.001 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000* (0.00)	-0.000* (0.00)
Cut-point 1	-7.544*** (0.64)	-7.324*** (0.61)	-7.324*** (0.61)
Cut-point 2	-4.309*** (0.59)	-4.053*** (0.56)	-4.053*** (0.56)
Cut-point 3	-1.835*** (0.59)	-1.557*** (0.56)	-1.557*** (0.56)
Cut-point 4	6.512*** (0.61)	6.836*** (0.59)	6.836*** (0.59)
Variance (commune intercept)	1.494*** (0.22)	1.469*** (0.21)	1.469*** (0.21)
Variance (household intercept)	4.979*** (0.45)	4.964*** (0.46)	4.964*** (0.46)
N	13,358	13,357	13,357

Standard errors in parentheses, coefficients reported. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



**Table A2: Three-level random slope models (full sample)**

	(1)	(2)	(3)
Have health insurance	0.560*** (0.15)	0.021 (0.16)	
Receive cost reduction upon visit thanks to health insurance		1.100*** (0.14)	
Health insurance and its usage (base: no health insurance)			0.021 (0.16)
-Have insurance but do not receive cost reduction thanks to health insurance			1.121*** (0.16)
-Have insurance and receive cost reduction thanks to health insurance			
Age	-0.007*** (0.00)	-0.007*** (0.00)	-0.007*** (0.00)
Children under 5 years old	0.134 (0.28)	0.141 (0.28)	0.141 (0.28)
Elderly over 65 years old	0.333** (0.14)	0.323** (0.14)	0.323** (0.14)
Male	-0.080 (0.05)	-0.070 (0.05)	-0.070 (0.05)
Literate	-0.016 (0.08)	-0.008 (0.08)	-0.008 (0.08)
Belongs to the ethnic majority group (Kinh)	-0.286** (0.13)	-0.300** (0.13)	-0.300** (0.13)
Poor	-0.136 (0.10)	-0.133 (0.10)	-0.133 (0.10)
Number of self-reported health issues p.a.	-0.165*** (0.05)	-0.166*** (0.05)	-0.166*** (0.05)
Type of facility (base: commune health station)			
-Village medical support	0.157 (0.23)	0.342 (0.24)	0.342 (0.24)
-Meso-district polyclinic	0.502 (0.40)	0.608 (0.41)	0.608 (0.41)
-District hospital	0.619*** (0.11)	0.662*** (0.11)	0.662*** (0.11)
-Provincial hospital	0.921*** (0.18)	1.022*** (0.18)	1.022*** (0.18)
-Central hospital	0.876*** (0.33)	1.271*** (0.32)	1.271*** (0.32)
-Other types of hospital	1.366*** (0.33)	1.843*** (0.32)	1.843*** (0.32)
-Private clinics	1.172*** (0.20)	2.000*** (0.22)	2.000*** (0.22)
-Pharmacies (without prescription)	0.693*** (0.16)	1.547*** (0.19)	1.547*** (0.19)
-Traditional herbal medicines	0.578** (0.27)	1.446*** (0.31)	1.446*** (0.31)
-Others	0.507 (0.36)	1.031*** (0.34)	1.031*** (0.34)
Type of care (base: self-treatment)			
-Vaccination	1.769*** (0.41)	1.885*** (0.42)	1.885*** (0.42)
-Pregnancy and reproductive health care	0.746** (0.29)	0.844*** (0.29)	0.844*** (0.29)
-Health check-up	0.103 (0.22)	0.136 (0.22)	0.136 (0.22)
-Illness treatment	0.202 (0.18)	0.224 (0.18)	0.224 (0.18)
Distance to the care facility (km)	0.002*** (0.00)	0.002*** (0.00)	0.002*** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.001 (0.01)	-0.002 (0.01)	-0.002 (0.01)
OOP payment in USD	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)
Cut-point 1	-7.911*** (0.39)	-7.512*** (0.39)	-7.511*** (0.39)
Cut-point 2	-4.668*** (0.31)	-4.233*** (0.31)	-4.233*** (0.31)
Cut-point 3	-2.178*** (0.30)	-1.721*** (0.29)	-1.721*** (0.29)
Cut-point 4	6.173*** (0.34)	6.675*** (0.36)	6.675*** (0.36)
Variance(commune slope)	0.588* (0.35)	0.440 (0.34)	0.441 (0.34)
Variance(commune intercept)	0.961*** (0.33)	1.074*** (0.32)	1.073*** (0.32)
Variance(household intercept)	4.969*** (0.45)	4.950*** (0.45)	4.950*** (0.45)
N	13,408	13,407	13,407

Standard errors in parentheses. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A3: Three-level and four-level intercept models**

	(1)	(2)
Receive cost reduction upon visit thanks to health insurance	1.315*** (0.14)	1.315*** (0.14)
Age	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	0.106 (0.35)	0.106 (0.35)
Elderly over 65	0.501*** (0.18)	0.501*** (0.18)
Male	-0.102 (0.07)	-0.102 (0.07)
Literate	0.025 (0.09)	0.025 (0.09)
Belongs to majority racial group (Kinh)	-0.464*** (0.15)	-0.464*** (0.15)
Poor	-0.146 (0.12)	-0.146 (0.12)
Number of self-reported health issues p.a.	-0.260*** (0.06)	-0.260*** (0.06)
Facility type (base:commune health station)		
-Village medical support	0.368 (0.25)	0.368 (0.25)
-Meso-district polyclinic	0.856** (0.38)	0.856** (0.38)
-District hospital	0.722*** (0.12)	0.722*** (0.12)
-Provincial hospital	1.149*** (0.19)	1.149*** (0.19)
-Central hospital	1.619*** (0.36)	1.619*** (0.36)
-Other types of hospital	2.099*** (0.37)	2.099*** (0.37)
Type of care (base: illness treatment)		
-Vaccination	1.879*** (0.44)	1.879*** (0.44)
-Pregnancy and reproductive health care	0.383 (0.27)	0.383 (0.27)
-Health check-up	-0.102 (0.14)	-0.102 (0.14)
Distance to the care facility (km)	0.002** (0.00)	0.002** (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.005 (0.01)	-0.005 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000* (0.00)
Cutpoint 1	-8.149*** (0.36)	-8.149*** (0.36)
Cutpoint 2	-4.652*** (0.27)	-4.652*** (0.27)
Cutpoint 3	-2.258*** (0.24)	-2.258*** (0.24)
Cutpoint 4	6.761*** (0.34)	6.761*** (0.34)
Variance(commune intercept)	1.909*** (0.32)	1.909*** (0.32)
Variance(household intercept)	6.144*** (0.60)	6.144*** (0.60)
Variance(individual intercept)		0.000*** (0.00)
N	31	10,318

Standard errors in parentheses. This only include visits to SHI facilities

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table A4: Three-level intercept and random slope models, separating different types of insurance**

	(1)	(2)
Health insurance (base: no insurance)		
-Insurance for the poor	-0.017 (0.22)	-0.025 (0.22)
-Insurance for assistance recipients	-0.257 (0.24)	-0.270 (0.24)
-Compulsory insurance	0.139 (0.31)	0.157 (0.31)
-Voluntary student insurance	-0.290 (0.34)	-0.280 (0.35)
-Free insurance for children below 6	0.071 (0.36)	0.103 (0.37)
-Voluntary insurance	-0.663* (0.36)	-0.644* (0.37)
-Others	-0.566* (0.31)	-0.535* (0.31)
Receive cost reduction upon visit thanks to health insurance	1.338*** (0.16)	1.425*** (0.17)
Age	-0.009*** (0.00)	-0.009*** (0.00)
Children under 5	0.025 (0.38)	0.022 (0.38)
Elderly over 65	0.600*** (0.18)	0.603*** (0.18)
Male	-0.101 (0.07)	-0.103 (0.07)
Literate	0.046 (0.09)	0.055 (0.10)
Belongs to majority racial group (Kinh)	-0.444*** (0.15)	-0.389** (0.15)
Poor	-0.199* (0.12)	-0.198* (0.12)
Number of self-reported health issues p.a.	-0.255*** (0.07)	-0.248*** (0.07)
Type of facility (base: commune health station)		
-Village medical support	0.423 (0.27)	0.379 (0.26)
-Meso-district polyclinic	0.793** (0.38)	0.768** (0.37)
-District hospital	0.714*** (0.12)	0.709*** (0.12)
-Provincial hospital	1.137*** (0.19)	1.133*** (0.19)
-Central hospital	1.622*** (0.36)	1.610*** (0.37)
-Other types of hospital	2.066*** (0.37)	2.051*** (0.37)
Type of care (base: illness treatment)		
-Vaccination	1.690*** (0.42)	1.647*** (0.41)
-Pregnancy and reproductive health care	0.382 (0.27)	0.402 (0.27)
-Health check-up	-0.107 (0.14)	-0.090 (0.14)
Distance to the care facility (km)	0.001* (0.00)	0.002* (0.00)
Visit frequency to that specific facility for the same health issue p.a.	-0.002 (0.01)	-0.002 (0.01)
OOP payment (in USD)	-0.000* (0.00)	-0.000* (0.00)
Cutpoint 1	-8.125*** (0.40)	-8.119*** (0.40)
Cutpoint 2	-4.696*** (0.30)	-4.663*** (0.31)
Cutpoint 3	-2.330*** (0.28)	-2.272*** (0.29)
Cutpoint 4	6.579*** (0.35)	6.765*** (0.37)
Variance(commune intercept)	1.864*** (0.31)	1.407*** (0.29)
Variance(household intercept)	5.744*** (0.58)	5.865*** (0.60)
Variance(commune slope)		0.908*** (0.29)
N	9,916	9,916

Standard errors in parentheses. This only includes visits to SHI facilities

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

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