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# Willingness-to-Pay for Family-Based Health Insurance: Findings From Household And Health Facility Surveys in Central Vietnam

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## Abstract

This study explores factors associated with people's willingness-to-pay (WTP) for family-based health insurance covering the whole family in central Vietnam. The amount of WTP was elicited by using a contingent value method in 2014 and the mean WTP was 2.27 percent of GDP per capita. Firstly, our study reveals that even the poor are willing to pay towards obtaining health insurance. Secondly, our regression analysis shows that the health insurance status of the household head, in addition to education, wealth level, and family size, is associated with WTP. Furthermore, our estimation results with restricted sample households whose designated health facility is the commune health station (CHS) confirm that healthcare service quality measures designed based on patients' past experiences at the CHS are significant predictors of WTP as they can affect people's valuation of the benefit of the health insurance.

**Keywords:** willingness-to-pay, health insurance, healthcare service quality, Vietnam

## 1. Introduction

Vietnam's social health insurance system was established in 1992, and the government has aimed at achieving universal health insurance coverage since 2009. Vietnam experienced a rapid increase in the coverage rate of social health insurance in the 2000's largely owing to the government subsidies to those enrolled (Ministry of Health and Health Partnership Group, 2013). By 2014, the coverage rate had reached 71%, yet the expansion of the coverage rate had slowed down and most of the covered population were being heavily subsidized to pay for their premiums (Ministry of Health and Health Partnership Group, 2016). In 2014, 45% of the insured population was fully subsidized and 30% was partly subsidized by the state (Ministry of Health and Health Partnership Group, 2016). Hence, while most of the insured population enjoy the benefit of health insurance with no or a small upfront payment, the government subsidies appear to impose a heavy burden on financial resources to operate the health insurance system, casting doubt on the sustainability of health financing.

The problem is aggravated due to the enrollment system being individual-based, except for schemes targeting socially disadvantaged groups such as the poor and ethnic minorities, requiring each member of the family to enroll in health insurance according to different entitlement groups. The co-existence of these health insurance schemes increases the complexity of managing different insurance groups, leading to overlooking some individuals or duplicate coverage for others since some are entitled to health insurance through multiple support policies. This raises concerns about the state budget being used to subsidize groups who have the ability to make their own contributions. The government should consider lowering or abolishing subsidies for people who have the ability to pay as well as introducing a unitary health insurance covering the whole family. To do so, we have to understand who has the ability to pay and how much people are willing to pay for family-based unitary health insurance.

Many other countries also have limited health budgets, and willingness-to-pay (WTP) has been discussed in an extensive range of literature. These papers attempt to identify factors affecting the demand for health insurance based on a theory presented by Arrow (1963) and Feldstein (1973) or the utility theory discussed in Liljas (1998).

The utility theory proposes that individual demand for health insurance is based on a comparison between the benefit of buying health insurance and the cost of medical care without health insurance, which is calculated based on past or current experience of illness and the expectation of falling ill in the future. Empirical results from early studies suggest that demand for health insurance is affected by household income level, educational attainment, household size, and healthcare expenditure as well as the availability of healthcare services (Dardanoni & Wagstaff, 1987; Chernew et al., 1997; Besley et al., 1999).

More recent studies in low- and middle-income countries have shown similar results. Nosratnejad et al. (2016) reviewed 16 studies including very low-income countries. (Note 1) Their review paper revealed that the mean WTP of households in these countries was 1.82% of GDP per capita and 2.16% of adjusted net national income per capita. Consistent results were found across studies: increases in household income, educational level, and family size correlated with higher WTP. In addition, a past experience of hospitalization and perceived poor health status correlated with higher WTP. Mixed results were reported for the variable of rural residence, employment statuses and distance to the nearest or preferred hospital. Most reviewed studies, however, focused only on family demographic and socio-economic characteristics and did not take into account supply-side factors. One study by Delavallade (2017) in India, which is not included in the review paper by Nosratnejad et al. (2016), examined the effect of supply-side characteristics on WTP. Her study evaluated the impact of a randomly offered free preventive check-up with professional practitioners on WTP and found that exposure to free medical check-ups had a positive impact by improving people's perception of the quality of healthcare. She further showed that the effect was larger for poorer households.

In Vietnam, Lofgren et al. (2008) conducted one study in 2004 in the Bavi district, a rural district located in the northern part of the country, examining people's WTP for general health insurance. The majority of the population in their study was engaged in farming activities and was not covered by health insurance at the time of their survey. Their study revealed that half of the respondents prefer an out-of-pocket payment system and were not keen on paying for health insurance, even though 70-80% of the respondent household's WTP was higher than the lower range of premiums of the existing health insurance schemes. Their study also analyzed associated factors with people's WTP and showed that the amount of WTP was positively associated with household wealth, educational level, and healthcare need. More recently, Nguyen & Hoang (2017) made interviews to uninsured people in central Vietnam in 2014 and examined people's WTP for individual-based health insurance. They asked people's WTP by providing three different levels of the benefit package of co-payments rates. In their findings, they emphasized awareness of the benefits of social health insurance as a key factor associated with higher WTP.

Our study analyzes people's WTP surveyed in 2014 in the central region of Vietnam yet has distinct differences from the study conducted by Nguyen & Hoang (2017). One critical distinction is that our study examines people's WTP for the family-based health insurance. Our study in addition explores how supply-side factors are associated with WTP. Nguyen & Hoang (2017) examined the relationship between WTP and people's perceived quality of the health facility at which the insured people were registered, yet their study did not consider the structure of the healthcare service delivery system and did not incorporate any concrete quality measures. In Vietnam, public medical institutions still play a significant role in providing healthcare services, although the private sector has been growing in recent years. Public institutions are structured by level from central to local. Our study focuses on commune health stations (CHSs), which function as gatekeepers under the referral system, and investigates how the characteristics of CHSs as well as the healthcare service quality measures of CHSs designed based on patients' experience are associated with WTP. By doing so, we are making valuable contributions to the existing literature as few past studies have explored such associations.

The rest of this paper is organized as follows. Section 2 describes our data used for this study and provides detailed explanations about our econometric models. Section 3 then presents the estimation results. Section 4 summarizes the findings of this study and concludes our discussions.

## **2. Method**

### **2.1 Study Settings**

In 2014, with the participation of Hue University of Medicine and Pharmacy, our research team conducted a field survey in three provinces located in central Vietnam: Thua Thien Hue (January-February), Quang Tri (May-June), and Khanh Hoa (August-September). In these three provinces, city locations, lowland (coastal) and highland (mountainous) areas were purposefully chosen to have a representative sample of the central region of Vietnam. Three districts in Thua Thien Hue, three districts in Quang Tri, and two districts in Khanh Hoa were selected. In each selected district, 4 to 10 communes were randomly chosen, and 14 to 23 households were randomly chosen in each selected commune. Then, our survey team interviewed a total number of 761 households in 50 communes.

For our household survey, pre-prepared structured questionnaires were used to collect the socio-economic characteristics of the sampled households and individual family members including health insurance status and utilization of healthcare services over the past three months. We analyze people's WTP for health insurance obtained from our household survey because our household survey collected information about a representative sample of each commune. On the other hand, however, utilization of healthcare services provided by CHSs varied substantially across communes. For instance, the number of household members who reported an episode of illness and visited CHSs over the past three months were substantially different from one commune to another. Therefore, data obtained from our household survey were not suitable to construct any reliable healthcare service quality measures of CHSs. To overcome this problem, separately from our household survey described above, our research team conducted two different types of survey: CHS survey and CHS patient survey.

The CHS survey team visited CHSs in the same 50 communes as our household survey and collected information about CHSs such as the structure of the facility buildings, infrastructure of the facilities, details of health workers' attributes, and so forth. The CHS survey provided us with information about the actual condition of the CHSs. In addition, when the CHS survey team visited each CHS, 15 patients were randomly chosen from the list of the patients who visited the CHS and utilized healthcare services at the CHS over the past three months. Then, our survey team visited the selected CHS patient households (they were different households from our household survey) and made interviews by using the same structured questionnaires as our household survey. The CHS patient survey revealed their experiences at the sampled CHSs and helped us design reliable healthcare service quality measures of the CHSs from the patients' perspective.

## 2.2 People's WTP for Family-Based Health Insurance

This study examines people's WTP for family-based unitary health insurance covering the whole family. To obtain people's WTP, we used open-ended hypothetical questions. (Note 2) The household head and his/her spouse were asked questions about WTP. Because there is no significant difference between responses from heads and spouses, we only use the answers given by household heads for this study. To elicit people's WTP for family-based health insurance, our survey asked the following contingent question:

*"Suppose that all the existing health insurance schemes were abolished and the government decided to provide only one unified health insurance plan that would allow all your family members to utilize any health service at district hospitals and commune health centers for free (without any payment), how much in total would you be willing to pay for it for all your family members?"*

Table 1. Willingness to pay for family-based health insurance (million VND)

	Obs.	%	Mean	S.D.	Min.	Max.
All	714	(100.0)	0.987	(0.901)	0	10
Poor (HCFP) households	83	(11.6)	0.495	(0.373)	0	1.6
Other households	631	(88.4)	1.052	(0.930)	0	10

Note. HCFP stands for healthcare fund for the poor whose premium is fully subsidized by the government.

Table 1 summarizes descriptive statistics of WTP. Among our 761 commune representative sample households, 714 households answered the question and gave their answers, whereas 47 households (6.2%) did not provide any response to the question. The mean WTP is 0.987 million VND (Note 3) accounting for 2.27% of GDP per capita, and 29 households provided zero answer. (Note 4) Our sampled households included 83 households covered by the Health Care Fund for the Poor whose premium is fully subsidized by the government. Their mean WTP is 0.495 million VND and only 5 households answered zero, implying that even the poor are willing to pay towards obtaining health insurance. The mean WTP among the other non-poor households is 1.052 million VND, which is much higher than that of the poor households. Wealth level is highly likely to be a predictor of WTP. Furthermore, these answers (amount of WTP) are assumed to express the satisfaction of Vietnamese people towards healthcare services at public health facilities. Thus, in our further analysis, we quantitatively analyze what kinds of family characteristics as well as supply-side factors relate to the amount of WTP.

## 2.3 People's WTP for Family-Based Health Insurance by Current Health Insurance Status

One of our focal points in this study is the association between the amount of WTP and health insurance status under the incumbent schemes for the purpose of obtaining insightful implications regarding public health policy. We investigate how the amount of WTP is associated with the health insurance status, namely enrollment and the

designated first contact point of the health insurance under the referral system. (Note 5) The registered first contact point can affect people's WTP because it determines the quality of healthcare services people can receive with/without health insurance and the total costs of receiving such healthcare services. Hence, exploring variations of the amount of WTP from this perspective will give us valuable information. The health insurance status of the household head could be different from that of other family members because the health insurance system as of 2014 was individual-based. In our hypothetical question, we implicitly assumed that the household head expected that the same health facility would be the first contact point of other family members as well once the family-based health insurance was introduced.

Table 2. Willingness to pay for family-based health insurance by designated health facility (million VND)

	Obs.	%	Mean	S.D.	Min.	Max.
<i>All</i>	714	(100.0)	0.987	(0.901)	0	10
No health insurance	151	(21.1)	0.873	(0.707)	0	5
Health insurance whose designated health facility is:						
Commune Health Station (CHS)	281	(39.4)	0.909	(0.904)	0	8
Public hospital except for CHS	255	(35.7)	1.151	(0.986)	0	10
Private clinic/hospital	27	(3.8)	0.889	(0.814)	0	4

Table 2 summarizes the descriptive analysis of WTP by the enrollment status and the designated health facility as the first contact point. We consider the following four groups: those who do not have any health insurance, those who have public health insurance whose designated health facility is the CHS, those who have public health insurance whose designated health facility is another upper-level public hospital, and those who have private health insurance. Approximately 21% do not enroll in any health insurance. 39% have public health insurance with the CHS as the first contact point and 36% have health insurance with other public hospitals. Only 4% have private health insurance. The uninsured state lower WTP (the mean of 0.873 million VND) as they may value the benefit of health insurance less. The mean amount of WTP for those who have public health insurance whose first contact point is the CHS is 0.909 million VND, which is still lower than that for those who have public health insurance whose first contact point is another upper-level public health facility (1.151 million VND). The mean WTP for those who have private health insurance is also lower (0.889 million VND) because their valuation of the benefit of public health insurance can be lower. These variations, however, can be caused by other factors that are simultaneously correlated with the health insurance status and also the amount of WTP. Therefore, this study furthermore examines the variations of the amount of WTP by employing multivariate regression models so that we can disentangle the multifaceted factors that shape people's WTP for the family-based health insurance.

#### 2.4 Multivariate Regression Models: Family Characteristics

We conduct multivariate regression analysis firstly to investigate how family characteristics are associated with people's WTP. For this purpose, we use the data collected from households randomly selected in each commune. To carry out the estimation of regression models, because some observations of the WTP are censored at zero, Tobit models are employed. The summary statistics of explanatory variables are shown in Table 3. Because the household head is the primary decision maker in the context of the family-based health insurance, we consider ethnicity, age and gender, marital status, occupation or primary income generating activity, and the health insurance status of the household head. With respect to ethnicity, a dummy variable representing Kinh, the major ethnic group in Vietnam, is included. Another dummy variable representing the gender of the household head is also utilized. Age is included in linear form. (Note 6) We use another dummy variable to control for the influence of being widowed, divorced or separated. Educational attainment is measured by years of schooling. Occupation is classified into five categories: government staff, employees in the private sector, farmers, non-farm self-employed workers, and others such as unemployed and retired individuals. A set of dummy variables is included to examine how the health insurance enrollment status is associated with WTP.

In the literature, moreover, the following family characteristics are identified as factors associated with WTP: family size, wealth, family members' health condition, and household medical expenses. Wealth level is measured by a composite index created based on a household's ownership of various types of assets. To consider household members' health condition and recent medical expenditure, which are particularly important in the analyses of health-related issues, we prepare two distinct sets of explanatory variables. The first set includes the total number

of episodes of illness over the past three months. We construct this variable by adding the number of episodes of illness household members experienced. The second set comprises two variables that capture household medical expenses in the past three months, which are mostly spent for curative purposes at health facilities and also spent for purchasing medicines at pharmacies. Since medical expenditure is censored at zero and skewed to the right, we include a dummy variable that takes the value of 1 when households made a positive out-of-pocket payment over the past three months and 0 otherwise. In addition, the interaction term between the dummy variable of the positive out-of-pocket payment and the logarithm of the amount of out-of-pocket payment is included in the regression analysis. Lastly, to control for commune-level unobserved factors, commune fixed-effects models are estimated.

Table 3. Definitions and summary statistics of explanatory variables (all sample: n=714)

		Mean	S.D.	Min.	Max.
<i>Household head characteristics</i>					
KINH	Ethnicity: 1=Kinh, 0=Other ethnic group	0.878	(0.327)	0	1
FEMALE	Gender of household head: 1=Female, 0=Male	0.211	(0.409)	0	1
AGE	Age of household head	55.448	(14.692)	21	100
MARRIED	Household head is married: 1=Yes, 0=No	0.849	(0.359)	0	1
WID_DIV_SEP	Household head is widowed/divorced/separated (=1)	0.151	(0.359)	0	1
EDUC	Years of schooling household head has attained	7.546	(4.273)	0	16
GOV_STAFF	Government staff (=1)	0.052	(0.222)	0	1
PRIVATE_WORKER	Private sector employee (=1)	0.053	(0.225)	0	1
FARMER	Farmer (=1)	0.406	(0.491)	0	1
SELF_EMP	Self-employed worker (=1)	0.175	(0.380)	0	1
UNEMP_DEP_RET	Unemployed/Dependent/Retired (=1)	0.312	(0.464)	0	1
NO_HI	No health insurance (=1)	0.211	(0.409)	0	1
HI_CHS	Health insurance whose designated health facility is Commune Health Station (=1)	0.394	(0.489)	0	1
HI_PUBLIC	Health insurance whose designated health facility is public hospital except for CHS (=1)	0.357	(0.479)	0	1
HI_PRIVATE	Health insurance whose designated health facility is private clinic/hospital (=1)	0.038	(0.191)	0	1
<i>Household characteristics</i>					
FAMILY_SIZE	Number of family members	4.665	(1.583)	2	12
WEALTH	Wealth level is measured by a composite index created based on a household's ownership of various types of assets, ranging from 0 to 5	1.730	(0.845)	0	4.083
NUM_ILLNESS	Number of episodes of illness over the past 3 months	1.123	(1.138)	0	7
ANYOOP	Any medical spending out of pocket over the past 3 months: 1=Yes, 0=No	0.398	(0.490)	0	1
Log (OOP)	Log of (amount of medical spending out of pocket over the past 3 months in VND)	5.033	(6.281)	0	17.67

## 2.5 Multivariate Regression Models: Supply-Side Factors

The existing literature mostly focuses only on family demographic and socio-economic characteristics. This study additionally considers how supply-side factors including healthcare service quality measured based on patients' experience at health facilities relate to WTP. In doing so, we focus on CHSs and restrict our sample to households whose head registers the CHS as the first contacting point. This sample restriction leaves us only 1 or 2 observations in 5 communes and thus these communes are dropped from our analysis, which end up with 251

households for our analysis. Summary statistics of additional explanatory variables are shown in Table 4. Before we consider supply-side factors, we add two household attribute variables that represent household knowledge about doctor's availability at the CHSs and physical accessibility to the CHSs.

Table 4. Definitions and summary statistics of additional explanatory variables (restricted sample: n=251)

		Mean	S.D.	Min.	Max.
<i>Household characteristics</i>					
HH_DOCTOR	Do you know if any doctors are always available at CHS when it is open? 1=Yes, 0=No	0.976	(0.153)	0	1
DIST_CHS	Distance from home to CHS (km)	1.115	(0.892)	0.004	4
<i>Commune Health Station (CHS) characteristics</i>					
FEMALE_CHS	The head of CHS is female 1=Yes, No=0	0.327	(0.470)	0	1
NUM_DOC	Number of doctors working at CHS	1.084	(0.277)	1	2
NUM_BED	Number of beds at CHS	6.052	(3.350)	1	13
REFRIG	CHS is equipped with a refrigerator 1=Yes, No=0	0.689	(0.464)	0	1
<i>Measures of CHS healthcare service quality (commune average)</i>					
PRESC	Did you receive a prescription by a doctor? 1=Yes, 0=No	0.932	(0.102)	0.636	1.000
WAIT_TIME	How long had it taken to see a doctor since your arrival at the health facility? (minutes)	11.979	(5.979)	4.889	25.517
DISCUSS	Did you have enough time to discuss your health or medical problem with health workers? 3= Yes, definitely, 2=Yes, to some extent, 1=Not so much, 0=No	2.234	(0.232)	1.882	2.837
CONSUL	Were you satisfied with the length of consultation time with health workers? 3=Very satisfied, 2= Satisfied, 1= Dissatisfied, 0= Very dissatisfied	2.064	(0.147)	1.813	2.500
EXPLAIN	Did health workers explain the reasons for the treatment or action in a way that you could understand? 3=Yes, completely, 2= Yes, to some extent, 1=Not so much, 0= No	2.098	(0.237)	1.526	2.674
ANSWER	When you had an important question to ask health workers, did you get an answer that you could understand? 3=Yes, definitely, 2= Yes, to some extent, 1=Not so much, 0= No	2.051	(0.236)	1.474	2.628
TRUST	Did you have confidence and trust in health workers who examined and treated you? 3= Yes, definitely, 2= Yes, to some extent, 1=Not so much, 0= No	2.283	(0.283)	1.833	2.933

Supply-side variables are constructed from information obtained by the CHS survey (Table 4). From the CHS facility survey, we use information of their facility and workforce: the gender of the CHS head, the number of doctors, the number of beds, and whether the CHS was equipped with a refrigerator. Healthcare service quality measures were designed from the CHS patient survey by taking the average of patients' self-reported answers in the same commune about their evaluation of the quality of healthcare services based on own experiences over the past three months (Table 4). We include seven measures: whether patients received a prescription by a doctor, waiting time to see a doctor, the degree of having enough time to discuss with health workers, the degree of satisfaction with the length of consultation with health workers, and the extent to which health workers explained the reasons for treatment in an understandable way, the extent to which health workers answered important questions in a understandable way, and the degree of confidence and trust in health workers at the CHS. Our general hypothesis is that higher healthcare service quality leads to higher WTP.

### 3. Results

#### 3.1 Analysis of WTP with All Sample: Family Characteristics

Table 5 presents the estimation results of analysis to examine how family characteristics are associated with WTP.

We estimate two models: one includes the number of episodes of illness family members experienced over the past three months and the other includes a dummy variable indicating any positive out-of-pocket payment over the past three months and its interaction term with the logarithm of the amount of out-of-pocket payment. Firstly, ethnicity, age and gender of household heads are not significant predictors of WTP. When household heads attain higher education, they are willing to pay more, meaning that more highly educated household heads tend to value the family-based health insurance more. Neither marital status nor the occupation of household heads is a significant predictor of WTP after controlling for their current health insurance status.

Table 5. Willingness to pay for family-based health insurance (all sample)

Dependent variable: Willingness to pay (million VND)	Family-based health insurance for the whole family			
	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
<i>Household head characteristics</i>				
KINH (=1)	0.029	(0.110)	0.042	(0.095)
FEMALE (=1)	-0.072	(0.074)	-0.065	(0.073)
AGE	0.000	(0.003)	0.000	(0.003)
MARRIED (=1)	(Reference group)		(Reference group)	
WID_DIV_SEP	0.135	(0.098)	0.120	(0.097)
EDUC (years)	0.0295***	(0.008)	0.0304***	(0.008)
GOV_STAFF (=1)	(Reference group)		(Reference group)	
PRIVATE_WORKER (=1)	-0.140	(0.289)	-0.135	(0.292)
FARMER (=1)	0.024	(0.243)	0.035	(0.240)
SELF_EMP	0.162	(0.269)	0.157	(0.269)
UNEMP_DEP_RET	-0.022	(0.259)	-0.019	(0.257)
NO_HI (=1)	-0.246***	(0.080)	-0.258***	(0.079)
HI_CHS (=1)	(Reference group)		(Reference group)	
HI_PUBLIC (=1)	-0.025	(0.106)	-0.015	(0.108)
HI_PRIVATE (=1)	-0.290**	(0.138)	-0.265*	(0.137)
<i>Household characteristics</i>				
FAMILY_SIZE	0.0571***	(0.018)	0.0543***	(0.018)
WEALTH	0.225***	(0.065)	0.214***	(0.065)
NUM_ILLNESS	0.0580*	(0.065)		
ANYOOP (=1)			-0.103	(0.402)
Log (OOP)			0.011	(0.029)
Commune fixed effects	Included		Included	
Pseudo R squared	0.125		0.123	
Observations	714		714	

Note. Tobit models are estimated, and cluster-adjusted standard errors are in parentheses; \* Significant at 10%; \*\* Significant at 5%; \*\*\* Significant at 1%.

With respect to the current health insurance status, households whose head does not enroll in any health insurance are willing to pay less compared to those who have public health insurance with the CHS as the first contact point. Interestingly, no significant difference can be found between those who have public health insurance with the CHS and with other upper-level public hospitals. In contrast, when household heads enroll in private health insurance, they are also willing to pay less for the public unitary health insurance for the whole family, which is probably



because household heads themselves prefer private health insurance to the public health insurance to cover their own medical expenses. Family size is positively correlated with higher WTP and wealthier households are willing to pay more. These findings are consistent with those in most of the literature. Lastly, we found that the total number of episodes of illness is positively associated with WTP, which may imply the presence of adverse selection, although in contrast the association between the total out-of-pocket payment for healthcare services and the amount of WTP is inconclusive.

### 3.2 Analysis of WTP With Restricted Sample: Supply-Side Factors

We furthermore investigate how supply-side factors and healthcare service quality relate to WTP. The estimation results are shown in Table 6. The first model examines how people's WTP are associated with the characteristics of the CHSs in addition to household's knowledge about the CHSs and physical accessibility to the CHSs. The second model in addition explores the associations between people's WTP and the quality measures of healthcare services provided at the CHSs. Our estimation results show that neither household's knowledge about doctor's availability nor distance to the CHS is a significant predictor of WTP. Some CHS characteristics are significant predictors of WTP. When the CHS head is female, people's WTP is lower. When the CHS has more beds and is equipped with a refrigerator, people's WTP is higher. These significant correlations, however, become insignificant after incorporating the quality measures of healthcare services provided at the CHSs.

Table 6. Willingness to pay for family-based health insurance (restricted sample)

Dependent variable: Willingness to pay (million VND)	Family-based health insurance for the whole family			
	Model 1		Model 2	
	Coefficient	Standard Error	Coefficient	Standard Error
Household head characteristics	Included		Included	
Household characteristics				
FAMILY_SIZE	0.056	(0.037)	0.052	(0.034)
WEALTH	0.205**	(0.085)	0.221**	(0.094)
HH_DOCTOR (=1)	0.321	(0.244)	0.192	(0.171)
DIST_CHS (km)	-0.064	(0.075)	-0.045	(0.057)
	Commune Health Station (CHS) characteristics			
FEMALE_CHS (=1)	-0.241***	(0.066)	-0.115	(0.208)
NUM_DOC	-0.025	(0.129)	-0.147	(0.175)
NUM_BED	0.0348*	(0.020)	0.013	(0.034)
REFRIGERATOR (=1)	0.330***	(0.118)	0.265	(0.162)
	Measures of CHS healthcare service quality			
PRESCRIPTION			0.857	(1.073)
WAIT_TIME (minutes)			0.011	(0.011)
DISCUSS			0.116	(0.421)
CONSUL			1.563**	(0.706)
EXPLAIN			-0.711	(0.556)
ANSWER			0.055	(0.478)
TRUST			0.298	(0.478)
District fixed effects	Included		Included	
Pseudo R squared	0.150		0.163	
Observations	251		251	

Note. Tobit models are estimated, and cluster-adjusted standard errors are in parentheses; \* Significant at 10%; \*\* Significant at 5%; \*\*\* Significant at 1%.

The estimation results of the second model reveal that the degree of satisfaction with the length of consultation time at the CHSs is a significant predictor of people's WTP. In other words, people value health insurance more

when they have sufficient time to consult with health workers. In sum, although there seems to be a complex relationship among the characteristics of the CHSs and the quality of healthcare services provided by the CHSs, healthcare service quality measures designed based on patients' past experience at the CHS are significant predictors of people's WTP for unitary health insurance covering the whole family.

#### 4. Conclusion

This study examines people's WTP for family-based health insurance in central Vietnam. The government of Vietnam sets a goal to achieving universal health insurance coverage by 2020 and one of the policy options to meet this goal is to modify individual-based health insurance schemes to family-based ones. Hence, our examination is very relevant to recent policy debates on how to achieve universal health insurance coverage without undermining its financial basis. For this study, the amount of people's WTP was elicited by using a contingent value method in 2014 and the mean WTP was 2.27% of GDP per capita. Our study firstly finds that the number of people who have no intention to pay to obtain family-based health insurance was small and even the poor who did not pay any premium under the incumbent health insurance scheme as of 2014 are willing to pay to obtain health insurance. This suggests that there is a possibility of lowering government subsidies for the poor, although any detrimental impact of this policy option must be ameliorated.

In 2004, Logfren et al. (2008) found that nearly half of people were unwilling to pay for health insurance in the northern region of Vietnam. Our survey results can be interpreted as evidence that people's skepticism towards health insurance has been reduced and people's understanding on the benefits of health insurance has been enhanced as health insurance coverage has been expanded, although the results might simply be because of regional differences and/or difference in the target groups. Nguyen & Hoang (2017) examined the same region as our study in 2014 and found that approximately 30% of uninsured people were unwilling to pay any premium for individual-based health insurance. Compared with their study, our study suggests that policy reforms shifting from individual-based towards family-based health insurance has the potential to improve the coverage rate further.

This paper secondly explores associated factors with WTP for the family-based health insurance of Vietnamese people who are mostly already enrolled in individual-based health insurance schemes. Our regression results show that the current health insurance status of the household head, and their educational attainment, wealth level, and family size, are significant predictors of WTP for unitary health insurance covering the whole family. Moreover, our estimation results with restricted sample households whose head has health insurance designated to the CHSs confirms that healthcare service quality measures, particularly the length of consultation with health workers, are positively associated with people's WTP as they can affect people's valuation of the benefits of having family-based health insurance.

Taking these findings into account, policymakers can discuss how to establish a more sustainable health insurance system in Vietnam. In particular, to raise the value of health insurance, it is crucial for policymakers to understand the importance of improving the quality of healthcare services at primary healthcare facilities as they are highly likely to be the first contact point with public health insurance under the referral system in Vietnam. Among the various aspects of healthcare service quality, the length of consultation time is the most influential factor. These findings are not only useful to Vietnam, but also have implications to other low- and middle-income countries that plan to introduce the scheme of universal health insurance coverage under hierarchical health service delivery systems.

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#### Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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## Notes

Note 1. The reviewed studies are in Burkina Faso (Dong et al., 2003; Dong et al., 2004), Cameroon (Binam et al., 2004), Nigeria (Ataguba et al., 2008; Onwujekwe et al., 2010), Bangladesh (Ahmed et al., 2016), India (Dror et al., 2007; Ghosh et al., 2011; Kumar et al., 2015), Iran (Asgary et al., 2004), China (Bärnighausen et al., 2007), and Vietnam (Lofgren et al., 2008). Nosratnejad et al. (2014), by themselves, conducted one study in Iran.

Note 2. When addressing WTP, we have to consider potential biases influencing our results. Firstly, there might be a strategic bias and a compliance bias. The former means that respondents purposely answer with a lower amount of WTP than the true one for the purpose of influencing the results of the survey. The latter bias occurs when respondents want to please interviewers and give answers that they think the interviewers want to hear. The former would cause underestimates and the latter would lead to overestimates of people's WTP. Secondly, as our question was an open-ended WTP question, there was the possibility that people gave zero answers in protest, or strategically answered with a lower amount of WTP. This also would lead us to underestimate people's WTP. Thirdly, there might be a starting point bias, which means people's reference is likely to be set at the starting point. Fourthly, the respondents might not have comprehended the questions in the way in which the researchers intended. The direction of these biases is very difficult to predict, and our study is not free from any of these biases and there is no way of checking for the existence of bias. Nevertheless, although bias may have occurred, the questions were extremely simple to avoid respondents misunderstanding. For the question of WTP for the poor and children aged 6 or less in particular, the question was simple and just asked how much respondents were willing to pay for exactly the same health insurance benefit as the current one.

Note 3. When compared with the results of a study by Logfren et al. (2008), the amount of WTP was higher in our survey even taking inflation into consideration that the average WTP for households was 0.018 million VND. However, due to the different study target group, we could not compare the results between the uninsured in the study by Logfren et al. (2008) and the insured in our study. Expansion of health insurance coverage might enhance people's awareness of the benefit of health insurance and raise their valuation, although it might simply reflect regional differences.

Note 4. Nguyen & Hoang (2017) elicited people's WTP for individual-based social health insurance with co-payment rates of 0 to 20% in 2014 and showed that 26.9 to 28.4% respondents answered that they were unwilling to pay any premium. Among those who answered that they were willing to pay a premium, the mean amount of WTP ranged from 0.401 million VND to 0.579 million VND per person.

Note 5. The Law on Health Insurance entitles patients to receive healthcare services at any health facility without any geographical or technical restrictions, and patients are given the freedom to choose a health facility. Yet, to receive the full benefit of the insurance, enrolled people are required to register one health facility as a first point of contact. When doctors diagnose that patients need to be treated at higher levels of care, patients are referred to higher-level health facilities from the designated health facility. If patients bypass the registered health facility, they cannot receive the full benefit of health insurance and they must pay higher co-payments (Ministry of Health and Health Partnership Group, 2013).

Note 6. Our analytical results are not altered even when a set of dummy variables that represent six age groups:

19-29, 30-39, 40-49, 50-59, 60-69, and 70 and above, is used to control for age effects.

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