THE DEMAND FOR SELF-TREATMENT IN THE PUBLIC HEALTH INSURANCE: EVIDENCE FROM VIETNAM

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Self-treatment is playing an essential role in providing primary health care services for patients with minor ailments and cost efficiency in developing countries as well as developed countries where many hospitals are operating beyond their capacity and the quality of health care services in state-run hospitals is a great concern. This paper investigates the determinant factors affecting the demand for self-treatment. Specifically, the empirical results have shown a strong evidence to support our theoretical model. This analysis is based on a large nationwide sample of Vietnamese Household Living Standard Surveys conducted in 2006.

Keywords: Vietnam, health care, self-treatment, pharmacies

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1. Introduction

Self-treatment becomes a generally acceptable practice for many medical conditions such as minor ailments, and is perceived to cost less than both outpatient and inpatient treatment. For instance, the recent health care campaigns for promoting self-treatment of minor ailments have become dramatically impressive when one research shows that unnecessary general practitioner (GP) consultations for minor ailments instead of self-treatment are costing the National Health Service (NHS) £2 billion a year. Specifically, some governments have recently changed the regulations of prescribed medications and pursued their efforts to promote self-treatment. For example, the telephone helpline service in the UK provides basic home care advice on the most common symptoms. Rogers et al. (1998) argued that the government should support self-treatment as a way of managing the demand for formal health care. Recently, political parties in the UK are calling a national publicity campaign to persuade the public to be confident of self-treatment for minor ailments and teach children about the appropriate use of NHS services. By doing so, it helps to offset the budget deficit of NHS funding as predicted £10 billion in five years (source: http://www.allbusiness.com/government/elections-politics-campaigns/14128826-1.html).

The paper is to investigate the determinant factors affecting the demand for self-treatment in the public health care system. In the context of health care providers in Vietnam, the demand for health care treatments mainly includes self-treatment, outpatient and inpatient treatments. We briefly introduce definitions of three main health treatments commonly used in the health care sector. First, self-treatment is defined as a person

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buys medication either according to the previous prescription without re-diagnosis or without any diagnosis and previous prescriptions. More precisely, according to Stevenson et al. (2003), "self-treatment is defined as any treatment or therapy used without a physician's prescription or direct recommendation by a health care professional." There is nothing new in the perspective of patients taking responsibilities for their own health. Second, outpatient is defined as "a patient who is not an inpatient (not hospitalized) but instead is cared for elsewhere as in a doctor's office, clinic, or day surgery center". Intuitively, outpatient treatment means that a patient can visit a GP office, a private clinic, or a state health care providers, but does not stay overnight in there. Meanwhile, inpatient is defined as "a patient whose care requires a stay in a hospital, as opposed to an outpatient" (*Webster's New World-Medical Dictionary*).

Despite the fact that self-treatment becomes a generally acceptable practice for many medical conditions such as minor ailments, there has been a limited number of works on the determinants of demand for self-treatment. To fulfill the limitation of extant studies, this paper presents a theoretical model constructed to analyze the role of self-treatment; specifically in Vietnam. Over-the-counter (OTC) drugs can be used for self medication without advice or prescription of a physician. Our results demonstrate that decisions on when, and from where, to seek health treatment not only depend on the relative out-of-pocket payment for outpatient treatment and self-treatment, but also on the observable probability of successful self-treatment. Furthermore, this paper provides strong evidence related to the influence of socioeconomic life on self-treatment when individuals get sick.

This study employs data taken from the Vietnamese Household Living Standard Survey conducted in 2006 by the GSO. The data provide detailed information of a nationwide sample of Vietnamese population based on the characteristics of current household living standards; all individuals in a family, employment status including careers and industries, health and disability covering health status and insurance schemes.

This paper is organized into seven sections. Section one provides the introduction, background and purpose of the study. Section two provides a review of pertinent scholarly literature. Section three offers a brief review of current literature related to the demand for health care and health insurance, simultaneously introduces background information associated with the health care sector in Vietnam. The model utilized for this research is included in Section three, while in Section four a description of data and empirical strategy is presented. Finally, Section five summarizes the study's results. Recommendations for future research, along with the implications of the study are presented in Section six.

2. Literature review

In the field of health care services and demand for health insurance, many authors differentiate the patient behaviors or decisions as to whether they accept to be treated at the professional health care providers such as hospitals and private clinics or not, but do not consider the impacts of self-treatment. In other words, it is less likely to consider a self-treatment as a top priority when a person gets sick. Meanwhile, self-treatment is generally acceptable to patients with minor ailments and cost efficiency compared with GP consultations. For instance, on average, it costs £32 for a GP to treat a patient for a minor ailment, while a pharmacist can perform the same task for £17.75 (*The Times*, March 17, 2010). Self-treatment has been the subject of more studies. For instance, Rogers et al. (1998) argued that the government should support self-treatment as a way of managing the demand for formal health care. Specifically, in the UK, self-treatment has recently been a desire to control the budget deficit of the NHS with the strong support from all of political parties. However, there is little empirical evidence for the analysis of the demand for self-treatment.

In a recent study on pharmaceutical expenditures and drug access in Catalonia, Spain, Costa-Font et al. (2007) investigate the determinants of the demand for medicines. They find that out-of-pocket expenditures on medicines are not only sensitive to the effect of co-payments, but are also affected by demographics and self-medication.

The main objectives of previous researches are to conduct theoretical models and solve the optimal contracts and quantity achievement among insured people, insurance companies, and health

care providers (eg Ma & McGuire 1997, Grubera & Lettaub 2004, Goldman & Philipson 2007, and Ellis & Manning 2007). Moreover, in empirical work, there is a lack of appropriate sources of detailed information about self-treatment to analyze its role in demand for health care services.

3. Health sector in Vietnam

The Vietnamese government administers the health insurance fund and encourages voluntary health insurance without initial requirements for medical checks. As a result, unhealthy individuals are more likely to purchase health insurance than healthy individuals. Figure 1 outlines reasons why people do not have health insurance even though the government is mandated to provide insurance at a very low premium rate compared with the benefits that an insured patient can be reimbursed after the treatment at a state-run hospital. For instance, on average, the annual premium per person living in rural areas is VND180,000. Meanwhile, an insured patient can receive a maximum reimbursement amount of VND7 million per treatment at a state-run hospital (www.vietbao.vn, Sep. 14, 2006). Figure 1 illustrates healthy individuals are not willing to purchase health insurance. The ratio of healthy individuals without health insurance is accounting for 31.12% of total uninsured cases (17,526 uninsured individuals). Moreover, the empirical result of voluntary health insurance in the adult group shows that the coefficients of the voluntary buyer experience relatively largest gains of total hospital visits and maximize the utilities of outpatient services.

Currently, there are two types of health insurance in Vietnam. The first type is compulsory for those who have labor contracts at least three months in length. The premium rate is three percent of the salary written in the labor contract per month (base salary), of which the employer pays two percent and the employee one percent. Moreover, this type of health insurance also includes those who are retired or are receiving social benefits. This group receives a health insurance card without paying the premium rate.

The second option is voluntary health insurance, pupils and students are primary participants. Although it is called voluntary health insurance, almost all pupils and students are required to pay health insurance fees at the beginning of school year, except for those who are living in poor families. According to the Circular 06/2007/TTLT-BYT-BTC issued on March 30, 2007 by Ministry of Health and Ministry of Finance, the premium fees for pupils and students in urban areas ranges from VND60,000 to 120,000/person/year, and in rural areas, it ranges VND50,000 – 100,000/person/year. Meanwhile the annually premium fees for an adult living in urban and in rural areas are VND160,000 – 320,000, and VND120,000 – 240,000, respectively. Until now, the adults without formal employment have not been interested in participating in the voluntary insurance policy even though the current premium levels are very low as compared to the real hospital charges when they require medical care. On the one hand, these individuals are concerned about the low quality services provided by local state health care providers. On the other hand, they are not confident of the real benefits of health care insurance due to complicated procedures to obtain reimbursement and the cap policy for treatment as individuals can only be treated with the medicines and technical diagnoses on specific approval lists. Furthermore, many households in rural areas still consider the premium fees too expensive or unaffordable to purchase. As a result, people with health issues such as chronic or terminal diseases are more likely to participate in the voluntary program because there is no alternative policy from the government. This is the common practice in health insurance. In addition, the government administers two health care programs issuing free health care certificates for the poor and children under six years of age.

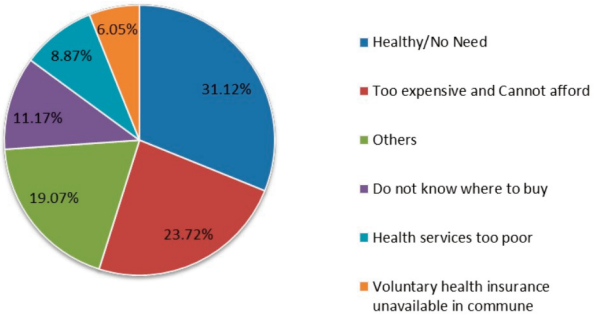

Figure 1: The reasons for 17,526 persons without health insurance in the survey 2006

4. Model

We build a model of demand for health care treatment with minor ailments. Patients do not

feel well and may catch only minor diseases such as seasonal flu, cough, headache, tiredness, minor ailment or unidentified causes. If they visit a pharmacy including traditional herbal drugstores to buy medication without diagnosis and previous prescription or with previous description but without re-diagnosis, this treatment is called the self-treatment. Otherwise, they visit a private clinic; local community health care centers, or general clinics, or hospitals to receive medical examinations and then buy medication for using at home, this treatment is called the out-patient treatment.

Suppose that a primary symptom can be diagnosed and cured by the two health care providers including either a drugstore as self-treatment or out-patient treatment.

If an individual chooses self-treatment when ill, then we can write his/her expected utility as:

$$EU^{ST} = U^{ST}(Y - \varepsilon + b(\nu_1,q_1) - e(\nu_1,p_1) - s_1) \quad (1)$$

Where ST denotes self-treatment, Y denotes an individual income, ε stands for an insurance premium, ν_1 denotes the number of self-treatments at a pharmacy or drugstore, p_1 represents out-of-pocket expenditures per self-treatment, q_1 denotes the quality services of self-treatment, s_1 is an opportunity cost during the self-treatment, $b(\nu_1,q_1)$ represents the benefit from the self-treatment, the benefit function $b(\nu, q)$ is assumed differentiate, increase and concave in ν and q, and strictly concave in q. The term $e(\nu_1,p_1) = \nu_1 * p_1$ represents total out-of-pocket expenses for self-treatment. Like buying over-the-counter medicines in developed countries, self-treatment expenses are not reimbursable.

If an individual chooses out-patient treatment when ill, then his expected utility is:

$$EU^{OP} = U^{OP}(Y - \varepsilon + b(\nu_2,q_2) - (e(\nu_2,p_2) - \pi(\nu_2,p_0)) - s_2) \quad (2)$$

Here, $\pi(\nu_2,p_0) = \nu_2 * p_0$ denotes reimbursement from the health insurance company if a patient has the health insurance and uses the baseline health care services, which are reimbursable according to the current health insurance policies. The different $p_{OP} = p_2 - p_0$ is out-of-pocket expenses per out-patient treatment. Other notations are similar to the self-treatment, but we use lower subscript denoted 2 to distinguish outpatient treatment from self-treatment.

A patient chooses the number of treatments (v) to maximize U(.) with given price per treatment. The first order necessary and sufficient condition for a local maximum U(.) is to take a partial derivative with respect to ν of Equation (1) & (2). We yield the following result:

$$p_{ST} = p_1 = b_{\nu 1}(\nu_1,q_1) \text{ , and } p_{OP} = b_{\nu 2}(\nu_2,q_2)$$

Now one may question which treatment is the optimal choice when ill. In order to solve the issue, we develop a basic model based on a Markov decision process model. This model is modified and developed from Sloan (2007). A patient can choose the self-treatment or the out-patient treatment to treat a given minor disease. Regardless of which method of treatment is chosen, there is a probability of successful treatment and a patient will recover. Therefore, without loss of generality, let a patient be two states as: sickness and recovery. Because self-treatment has less professional diagnosis and treatment than out-patient treatment does, its probability of success is lower than its counterpart. The objective of patients is to determine an optimal treatment that minimizes the long-run expected out-of-pocket expenses on health care services.

Additionally, regardless of the treatment method chosen, there is a probability that the method is not successful in the sick state and a patient needs to be treated at specific hospitals (in-patient treatment). Therefore, a patient may have to pay out-of-pocket expenses on in-patient treatment when a primary health care provider fails in treatment.

Where i denotes patient's state, i = 1 refers to sickness, and i = 2 refers to recovery. In the recovery state, a patient needs continuous treatment to reach full recovery and she/he rationalizes his/her action.

a indexes action, $a = ST$ refers to self-treatment, and $a = OP$ refers to out-patient treatment.

p_{ST} is out-of-pocket expenses per self-treatment and p_{OP} is out-of-pocket expenses per out-patient treatment. p_{IP} is out-of-pocket expenses per in-patient treatment regardless of the fact that a primary health care provider fails in treatment.

ω^a denotes the probability that a method of a is successful in treatment from sick state to recovery state. It is also called a transition process. In addition, ω^a_{ij} denotes the probability that the process makes a transition from the current state i to the state j when action a is taken.

The expected treatment expenses and state transitions rely only on the current state and action taken, hence the issue can be modeled by applying a Markov decision process (MDP). The five objects of an MDP in our context are defined as: (1) the set of states is indicated by $i \in \{1,2\}$, (2) the sets of action is indicated by $a \in \{ST, OP\}$, (3) decision points happen just before each treatment method is implemented, (4) the expected out-of-pocket expenses of taking action a in state i is denoted as E(i,a), therefore we yield E(1, a) = p_a + p_{IP}, and E(2, a) = p_a , for each $a \in \{ST, OP\}$.

All expected treatment expenses are bounded, and according to basic MDP theory, a stationary (time-invariant) optimal policy exists and the following recursion will be satisfied:

where k(i) is defined as the optimal expendi-

$$f + k(i) = \min_a \{E(i,a) + \Sigma_{j=1}^{2} \omega_{ij}^{a} k(j)\}, \text{ for } i = 1,2$$

ture function and f is a constant that equals the long-run expected average expenses. In other words, the above equation implies that the minimal health treatment expenses can be expressed as a function of the expected expenses for the current state and action plus the sum of expected expenses in future states, weighted by the probability of success in those states.

We denote $\varphi = [a_1, a_2]$ as a policy implying a decision rule, which indicates that a patient chooses action $a_i \in \{ST, OP\}$ in state $i \in \{1, 2\}$. When implementing the policy $\varphi = [a_1, a_2]$ induces a discrete-time Markov chain with the following state transition probabilities:

$$[\omega_{ij}^{a_i}] = \begin{bmatrix} 1-\omega^{a_1} & \omega^{a_1} \\ 1-\omega^{a_2} & \omega^{a_2} \end{bmatrix} \quad (4)$$

where each element of the matrix indicates the probability of a transition from state i to state j as action a_i is implemented. For instance, when $\varphi = [a_1, a_2]$ is used and the process is in sick state, then action a_1 is chosen, and the probability of making a transition to the recovery state is ω^{a_1}, and 1 - ω^{a_1} is the probability of remaining in the sick state. The transition probability for action a_2 is interpreted similarly.

From the basic Markov chain theory, a stationary policy induces the Markov chain, which can be characterized by a unique set of steady state probability. In particular, which policy φ is implemented, the stationary probability that the process is in state i is $\mu_i(\varphi)$, regardless of the initial state. When implementing the policy $\varphi = [a_1, a_2]$, the steady-state probabilities can be derived:

$$\mu_1(\varphi) = \frac{1-\omega^{a_2}}{\omega^{a_1} + (1-\omega^{a_2})}, \quad and \ \mu_2(\varphi) = \frac{1-\omega^{a_1}}{\omega^{a_1} + (1-\omega^{a_2})} \quad (5)$$

The patient's target is to find the policy that minimizes the long-run expected average treatment expenses. Because there are a finite state and unsuccessful treatment cases delivered in-patient health care services, then regardless of which state the process starts in, the long-run expected average expenses can be presented as a function of the steady-state probabilities:

$$f(\varphi) = \sum_{i=1}^{2} E(i, a_i)\mu_i(\varphi) \quad (6)$$

Policy No.	a_1	a_2	Expected expense function
1	ST	ST	$(p_{ST}+p_{IP})(1-\omega^{ST})+p_{ST}\omega^{ST}$
2	ST	OP	$[(p_{ST}+p_{IP})(1-\omega^{OP})+p_{OP}\omega^{ST}]/[\omega^{ST}+1-\omega^{OP}]$
3	OP	ST	$[(p_{OP}+p_{IP})(1-\omega^{ST})+p_{ST}\omega^{OP}]/[\omega^{OP}+1-\omega^{ST}]$
4	OP	OP	$(p_{OP}+p_{IP})(1-\omega^{OP})+p_{OP}\omega^{OP}$

There is a single point, α*, at which the patient is indifferent between self-treatment and out-patient treatment:

$$\alpha^* = \frac{p_{OP} + p_{IP}(\omega^{ST} - \omega^{OP})}{p_{OP}} \quad (7)$$

If $\frac{p_{OP}}{p_{ST}} > \alpha^*$, a self-treatment is preferred; otherwise, an out-patient treatment is preferred.

It is worth noting that $\omega^{ST} \leq \omega^{OP}$ the second term in the numerator of Equation (7) is non-positive. Therefore, as the successful probability of out-patient increases, the value of declines, implying that out-patient treatment is more likely to be a better option.

5. Data

The data used for this paper were obtained from the Vietnam Household Living Standard Survey conducted in 2006 by the GSO interviewing 9,189 households including 39,071 observations.

Table 1: Descriptive statistics of key variables

Variables	Description of variables	Obs	Mean	Standard Deviation
ln_incpc	Natural logarithm of income per capita	39,067	1.8016	0.6991
ln_rel_incph	Natural logarithm of the relative income per household at district level	39,067	-0.9800	0.5986
Edu	Number of years of education	39,071	6.5596	4.1393
Urban	1=urban; other = 0		0.2385	0.4262
Children	Number of children per household	39,071	1.8395	1.3337
Chronic	1=chronic disease, other=0	39,071	0.0804	0.2719
hlth_insu	1=have health insurance; other = 0	39,071	0.4709	0.4992
Pregnant	1=pregnant, other = 0	39,071	0.0219	0.1465
Unemploy	1=unemployment; other = 0	39,071	0.3398	0.4737
Smoking	1 = smoking; other =0	39,071	0.1811	0.3851
Gender	0=female; 1= male	39,071	0.4903	0.5000
Age	Age in years	39,071	30.9772	20.2848
Married	0 = single; 1 = married	39,071	0.4614	0.4985
Total ST-expenditure	Total self-treatment expenditure for age>6	18,426	0.0165	0.1711
ST_visit	Self-treatment visit for age>6	18,426	0.2025	0.4019
OP_visit	Outpatient visit for age >6	18,426	0.2306	0.4212

Source: The Survey of Vietnamese Household Living Standard conducted in 2006

The descriptive statistics for key variables is presented in Table 1.

6. Empirical strategies

In the context of self-medication, our empirical study is close to Costa-Font et al. (2007). We posit the demand for self-treatment as a function of health status (s), household income per capita (incpc), price of self-treatment per visit (p_n) and a specific vector of variables affecting the use of self-treatment services (z_i).

In considering the total out-of-pocket (OOP) self-treatment expenditure ($y_i=\Sigma_n p_n q_n$)^2 as the demand of self-treatment due to price heterogeneity that are not observed for each particular price of medications and other costs. It is worth noting that the OOP self-treatment expenditure only incurs when an individual gets sick or prevents illness.

The general form of two-part model can be expressed as follows:

$$E[y|x]=Pr(y>0|x)E[y|x,y>0], \text{ and } y=1 \text{ if } y_i>0, \text{ and } y=\beta_0+\beta_x+\varepsilon \quad (8)$$

where y is the dependent variable and x is a vector of specific independent variables. The first part of the model, known as the hurdle specification, is estimated by using Probit regression to determine the probability of observing a positive self-treatment expenditure. The second part of model, known as the level specification, is estimated by using Generalized Linear Modeling (GLM). In regression, the dependent variable y is measured as logarithm of total OOP self-treatment expenditure. Using a GLM framework under heteroskedasticity, we estimate lambda and determine an error distribution family by employing Park's test. In particular, the estimated result of lambda is equal to 1.85 with standard error equal to 0.007. Hence, the Gamma or Poisson is the logical GLM alternative to OLS on log total OOP self-treatment expenditure. Here, we choose the

gamma distribution in GLM family. This two-part model is called Model (1) including total OOP self-treatment expenditure and self-treatment visit.

Since one cannot observe directly how many prescription drugs have been purchased as a result of previous out-patient visits, the ST_visit and OP_visit can be observed taking the value of 1 if there is respectively some visits at drugstores and professional health care providers. This is also unique characteristic of pharmaceutical consumption. In the conventional specification in most developed countries, patients have to provide a prescription from a physician before prescription medicines are sold or delivered. This means that pharmaceutical consumption is more likely to be positively correlated with the physician/doctor visits. For instance, Costa-Font et al. (2007) find the correlation (rho) positively consistent with the conventional expectation. However, for those countries where prescription medication is easy to purchase without any requirements of physician/doctor's prescriptions such as in Vietnam, rho may be negative. In particular, the rho of -0.46 indicates that the self-treatment visit, known as unobservable pharmaceutical consumptions, is negative related to the professional health care providers.

Table 2 presents the estimated results of Model (1) and (2). Column (1) is determined by using GLM with gamma distribution family and Probit regression is implemented in Column (2). Model (2) is estimated by using Heckman procedure in STATA. The estimation is implemented by using the sample of sick persons at least 6 years old during the last 12 months of the survey conducted in 2006.

The independent variables accounting for the effect of family income such as the household income per capita (ln_incpc) and the relative income per household at district level (ln_rel_incph) only have a statistically significant in Model (1). When concerning the sample selection, the regarding income variables have no significant impact implying that potential heterogeneity resulting from OP visit may put forth the remarkable influence on the results. In Table (2), the coefficient of income per capita is positive and statistically significant at the 1% level suggesting that the more income per capita, the more medicine expenditure and consumption demand. Meanwhile, the higher income households in the same district are less likely to prefer self-treatment services. Not surprisingly, the affluent patients have more comparative advantages to access better health care services than patients with lower income. These results are partly consistent with Costa-Font et al. (2007). They find that income has a significant effect on pharmaceutical use, but not on drug expenditure due to co-payment structure. These diverse results from previous studies are mainly due to the unique feature of health insurance policies in Vietnam. The health insurance companies only reimburse medicine expenditures which are on the approval lists and bought at the registered local state health care providers. Therefore, over-the-counter drugs and prescription medicines bought at pharmacies as self-treatment approach will not be reimbursed even though patients have health insurance.

Table 2: The demand for self-treatment and self-treatment expenditure

	Model (1)		Model (2)	
	(1) Total ST-expenditure	(2) ST -visit	(3) ST-visit	(4) OP_visit
ln_incpc	0.3518***	0.0918***	0.0014	0.0330
	(0.1288)	(0.0329)	(0.0211)	(0.0357)
ln_rel_incph	-0.1620	-0.0853***	-0.0119	-0.0448
	(0.1219)	(0.0297)	(0.0184)	(0.0321)
morbility	0.5371***	0.3275***	-0.0635*	0.5950***
	(0.0351)	(0.0084)	(0.0366)	(0.0091)
edu	0.0109	-0.0020	-0.0002	0.0015
	(0.0140)	(0.0037)	(0.0023)	(0.0040)
children	-0.0492	-0.0018	-0.0047	-0.0534***
	(0.0469)	(0.0124)	(0.0086)	(0.0134)
chronic	1.0105***	0.3651***	0.0676***	0.2588***
	(0.1212)	(0.0317)	(0.0223)	(0.0331)
hlth_insu	-0.0724	-0.1390***	-0.0730***	0.1709***
	(0.0922)	(0.0251)	(0.0182)	(0.0268)
unemploy	0.3889***	0.0845**	0.0325	-0.0105
	(0.1267)	(0.0335)	(0.0201)	(0.0358)
smoking	-0.1206	0.0098	-0.0060	-0.0969**
	(0.1321)	(0.0356)	(0.0231)	(0.0388)
age	8.6008***	1.9002***	0.6355***	0.6407*
	(1.2310)	(0.3629)	(0.2085)	(0.3781)
age2	-7.5015***	-1.8250***	-0.6684***	-0.4029
	(1.3610)	(0.3977)	(0.2225)	(0.4132)
married	-0.1229	-0.0157	-0.0206	0.0823**
	(0.1285)	(0.0324)	(0.0200)	(0.0351)
gender	-0.0868	-0.0326	0.0126	-0.0542*
	(0.1001)	(0.0277)	(0.0175)	(0.0296)
urban	-0.0019	0.0120	0.0443**	-0.1307***
	(0.1136)	(0.0304)	(0.0209)	(0.0334)
N	18422	18422	18422	18422
pseudo R2		0.1486		

Park test for Model (1): lambda = 1.85 and SE = 0.007. GLM family chosen Gamma. In Model (2), Mills lambda = - 0.22**, SE = 0.092, and rho = - 0.46. We implement the regressions by using the sample of sick persons at least 6 years old during the last 12 months of the survey

data conducted in 2006. The estimation includes provincial dummies and constant but not reported in Table. Total ST means buying medications at pharmacies or traditional drugstores without prescriptions and with previous prescriptions but not re-diagnosed. Standard errors are in parentheses under coefficients. * significant at 10%; ** significant at 5%; *** significant at 1%.

The perceived severity of sickness has positive and strongly significant impacts on both medicine use and medicine expenditure in Model (1). However, when considering selectively corrected samples in Model (2), we see that the more severe illness a patient is diagnosed with, the fewer self-treatment visits, but the more out-patient visits. It indicates that self-treatment approach can only be taken in case of less serious diseases. This result is consistent with our hypothesis that the self-treatment approach can treat only minor ailments. It is worth highlighting that implementing the corrected sample selections facilitates recognition of the limited self-treatment approach.

The patients suffering chronic diseases have to purchase and use more drugs than the no chronic diseases. The coefficients of chronic in both Models are positive and statistically significant at the 1% level. The results are in part consistent with findings by Costa-Font at el. (2007). In their paper, patients with chronic diseases found strongly significant effects on drug expenditure and general physician visits. This suggests that the patients with chronic pain have to visit general physician to obtain a prescription before accessing necessary medicines. Furthermore, the co-payment policies for patients suffering chronic pain affect the OOP expenditure. Meanwhile, we recognize that the chronic-pain patients in Vietnam can access prescription drugs with or without a general physician/doctor's script, but have to pay out-of-pocket if self-treatment is chosen, regardless of whether they have health insurance or not.

Patients covered by health insurance are more likely to prefer OP treatment over self-treatment. The estimated results of health insurance (hlth_insu) show a strong evidence of negative effects on self-treatment visits, but positive impacts on out-patient visits. Under current health insurance policies, patients with any type of health insurance are facing similar policies related to drug coverage and hospital fees. Of course, no reimbursement occurs if the self-treatment method is chosen.

Finally, it is expected that patients in urban areas would prefer the professional health care provider to self-treatment because more health care providers work in urban areas than rural ones. However, the coefficients of urban in Model (2) show conversely. There are several reasons such as treatment cost, quality of services, waiting times, and minor diseases causing this result.

7. Conclusion

This study provides strong evidence related to the influence of self-treatment on socioeconomic life when individuals get sick. Therefore, the policy makers should consider this matter when creating new regulations related to the control and distribution of prescription drugs and over-the-counter medicines. In health insurance policies, the extension benefit is necessary to enable the insured to buy and reimburse the prescription medicines under the approval drugs in the list. By doing so, it might contribute to reduce overburdened hospitals. This policy has been promoted by the UK■

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