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The Causal Effect of Retirement on Health Services Utilization: Evidence from Urban Vietnam

Thang Dang*

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Abstract

Access to medical services is significantly essential for retaining and improving health status for aging population. Whilst retired individuals tend to have more time for the use of health services, there is only inadequate evidence evaluating the causal effect of retirement on health services utilization. To fulfill this gap in the literature especially from developing countries, this paper estimates the causal effect of retirement on the probability and the frequency of doctor visits at public health facilities in urban Vietnam. Employing authorized retirement ages for both men and women in Vietnam as instruments for the probability to be retired, the paper shows that retirement significantly increases some outcomes of outpatient health services for both male and female. In particular, the baseline 2SLS estimates indicate that men who are retired are more likely to have any outpatient medical visit than those who are not retired by about 36.1%. Meanwhile, retirement rises both the likelihood and the frequency of outpatient visits for female by roughly 31% and 1.75 times respectively. However, this paper finds statistically insignificant impacts of retirement on utilization outcomes for inpatient services.

Keywords: Retirement; Health services utilization; Developing countries
JEL Classifications: J26, I10, C26

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1 Introduction

Retirement is a momentous point in the life of any person when he or she makes an employment transtion from an active status in the labor market to not working. With certain changes in the pattern of time use from daily routines (Hurd and Rohwedder 2013), retirement therefore probably causes multidimensional consequences such as disposable income, leisure activities, social interations, psychology-related issues (Fabrizio and Franco 2017; Lee and Smith 2009; Rohwedder and Willis 2010), and well-being and life satisfaction (Bonsang and Klein 2012; Lee and Kim 2017). Among outcomes induced by retirement, researchers have paid their enormous attention to health-related effects such as weight (Chung et al. 2009), illness (Johnston and Lee 2009), mental health (Butterworth et al. 2006; Heller-Sahlgren 2017), health-seeking behaviors (Ayyagari 2016), physical activities (Kämpfen and Maurer 2016) and mortality (Bloemen et al. 2017; Hernaes et al. 2013). This study provides evidence on the causal effect of retirement on health services ulitization using data from urban Vietnam.

Access to health services is essential to determine health outcomes, especially for older people because the aging process is more likely to impose health problems for older people than younger ones. As a consequence, utilizing health services is expected to be a judicious strategy to maintain one's health stock. From individuals' perspective, retirement might be a point that changes their health services use behaviors. Moreover, when there is an adjustment in health care services for a population with an increasing aging part, the potential retirement-induced issues of health care systems and pension systems as well are also important to be discussed from the perspective of public policies. Therefore, thoughtful knowledge about the causal effect of retirement on health services utilization arguably provides better implications for the reform of both health care

sytems and pension systems in many countries (Caroli et al. 2016; Coe and Zamarro 2015).

Importantly, the literature shows that the production of reliable estimates of the causal relationship between retirement and health services utilization is an arduous assignment with observational data. There are several reasons for this problem. First, there are many determinants for a retirement decision including both observed and unobserved ones. Observation data typically lacks the latent variables for instance genetic that both affects the retirement decision and health services utilization outcomes. Second, health outcomes in general may affect the decision of retirement or equivalently there is a problem of reverse causality. These reasons potentially result in a consequence that the estimates for the reliable causal link between retirement and health service utilization are unachievable. To address this problem, many previous studies employ legal ages for retirement in many countries to instrument for exogenous changes in retired status among observations to estimate the causal effect of interests (Caroli et al. 2016; Coe and Zamarro 2015). This study uses normal ages for retirement for both male and female that are legally regulated in Vietnam as an instrumental variable (IV) for the decision of retirement. The retirement ages are 60 for men and 55 for women in Vietnam. This study limits the analysis to urban areas of Vietnam where retirement ages only work there. This is due to a fact that in an agriculture-based economy like Vietnam, citizens who involved in the agricultural production work with all lives and retirement is not clear in rural areas.

Vietnam is an interesting case for the study of health services utilization impact of retirement. The Vietnamese population has been increasingly aging over last few decades (United Nations Population Fund 2011). This demographic change engenders important

challenges for the economy in terms of the capability of welfare, pension and health care systems in this low-income country. Therefore, how to sufficiently provide health care services for old people is a remarkable concern nowasday in Vietnam (Giang 2013). In this context, insightful understanding of how the decision of health services use among olders and retirees in particular is made is extremely vital to public policy implications related to the design of health care system. This study significantly provides information on the effect of retirement on health services utilization in Vietnam.

In this study, retirement is found to have positive impacts on some outcomes of health services utilization in urban Vietnam. Specifically, retirement rises the probability of having any outpatient visit by approximately 36.1% for men. Meanwhile, for women whose retired status tend to have a higher probability of having any use of outpatient health services by about 31% and a higher number of visits for outpatient health services by approximately 1.75 times compared to the female counterparts. It is note that retirement has no impacts on inpatient services utilization in urban Vietnam. The retirees have more time for medical check-ups theoritically and they are evidently favorable to outpatient visits at public health facilities in Vietnam.

This study provides some important contributions to the literature of the causal effect of retirement by some ways. First, almost previous studies on health consequences of retirement focus on developed countries and there is a lack of studies in the same topic devoted for developing countries. This study therefore contributes evidence to the literature for developing countries. Second, depsite there has been an increasing amount of studies devoted to study health-related impacts of retirement, the impact on health services utilization is so far limited from the existing literature. Hence, this study

contributes additional evidence on the causal impact of retirement on health services utilization.

The remainder of this paper is organized as follows. Section 2 describes the source of data and the sample for the empirical analysis as well while section 3 points out the estimation strategy used to estimate the causal effect of retirement on health services utilization. In terms of results, section 4 reports baseline estimates of interest and section 5 provides results for some key robustnes checks for the baseline estimates. Finally, discussion and conclusion are made in section 6.

2 Data

In this study, data comes from three waves of Vietnam Household Living Standards Survey (VHLSS). The VHLSS is a nationally representative survey in Vietnam that has been conducted by each two year period. In each survey, the VHLSS contains key data on demographics, education, health, employment, household's assets, household's expenditure, housing and agricultural production from roughly 9,000 households and 40,000 individuals across Vietnam. The first VHLSS wave was carried in 2002. This study limits the empirical analysis to data from three recent VHLSS waves: 2010, 2012 and 2014 waves.

Considering a fact that the exposure to retirement is only for those whose ages are larger or equal to the cutoff age that is the normal age of retirement (60 years old for male or 55 years old for female) whereas those aged less than the cutoff age are typically out of the exposure to retirement, this study uses a bandwidth of ± 5 from the cutoff point to form the sample for the analysis. In particular, this paper considers men aged 55–59 as

the control group and those aged 60–64 as the treatment group. Women aged 50–54 are treated as the control group and those aged 55–59 are used as the treatment group. Finally, there are 1,358 observations for the male sample with 829 controlled observations and 529 treated observations; and 2,061 observations for the female sample with 1,175 controlled observations and 886 treated observations. The statistical summary of the samples are specifically presented in Table 1.

Regarding outcome variables, this paper uses four variables as key proxies for outcomes of of health services utilization. These dependent variables consist of (i) *the probability of inpatient visit* that is measured by the likelihood whether the respondent uses at least an inpatient service at a public health facility over last 12 months, (i) *the probability of outpatient visit* that is measured by the likelihood whether the respondent uses at least an outpatient service at a public health facility over last 12 months, (iii) *the frequency of inpatient visits* that is measured by the total number of doctor visits for inpatient services at public health facilities over the last 12 months, and (iv) *the frequency of outpatient visits* that is measured by the total number of doctor visits for outpatient services at public health facilities over the last 12 months. Using different measures for health services allows this study to investigate the health services utilization consequense of retirement in details.

For the central explanatory variable of interests, this paper uses retired status that is measured based on the answer for the question about respondents' current employment status. Retired status takes a value of 1 if the answer is "being retired" and takes a value of 0 for other answers such as "employed", "unemployed", "disabled" or "not in the labor force". In addition, necessary control variables are included in the estimation

specification. These variables are schooling years, majority, married, health insurance, dummies for six geographical regions, survey year fixed effects and cohort fixed effects.

3 Estimation Strategy

This paper employs an instrumental variable (IV) approach to estimate the causal effect of retirement on health services utilization in urban Vietnam. Using an IV strategy enables this study to account for the potential problem of endogenity.

In particular, this paper uses formal ages of retirement for both Vietnamese men and women to instrument for exogenous changes in the likelihood of being retired. The ages of retirement that has been regulated by the Vietnamese legislation are 60 for men and 55 for women. These ages are expected to generate the significant discontinuities in the probability of retirement. Let's index instrumental variable is $Exposure_i$ that indicates the probability of being exposed to retirement. Mathematically $Exposure_i$ is measured by:

$$Exposure_i = \begin{cases} 1 \text{ if } age_i \geq 60 \; for \; male \; or \; age_i \geq 55 \; for \; female \\ 0 \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad \text{otherwise} \end{cases} \tag{1}$$

where age_i which is represented as the age of individual i at the time of survey is a forcing variable.

Then the paper implements a two-stage least squares (2SLS) estimation procedure to produce the causal estimate of the impact of retirement on health services utilization. In particular, the paper estimates the following regressions for the first stage and the second stage respectively:

$$Retired_i = \alpha_0 + \alpha_1 Exposure_i + \alpha_2 \boldsymbol{X'}_i + \gamma_t + \theta_c + \varepsilon_i \quad (2)$$

and

$$Utilization_i = \beta_0 + \beta_1 \widehat{Retired}_\iota + \beta_2 \boldsymbol{X'}_i + \gamma_t + \theta_c + \epsilon_i \quad (3)$$

where $Utilization_i$ is health services utilization outcomes for individual i; $Retired_i$ is the likelihood for individual i to be retired at the time of survey; $\widehat{Retired}_\iota$ in equation (3) is the predicted value of $Retired_i$ from the first stage in equation (2); $\boldsymbol{X}_i$ is a vector of control variables including (i) years of schooling, (ii) whether his or her ethnicity is the ethnic majority group (*Kinh* or *Hoa* peoples) in Vietnam, (iii) whether individual i was married, (iv) whether individual i has health insurance, and (v) dummies for six geographical regions in Vietnam: Red river delta, Midlands and northern mountainous areas, Northern and coastal central region, Central highlands, Southeastern area, and Mekong river delta; γ_t demonstrates survey year fixed effects; θ_c represents cohort fixed effects; and ε_i and ϵ_i are error terms in the first and second stages, respectively.

For the first-stage we apply a linear probability model with an ordinary least squares (OLS) estimator to estimate the association between exposure to retirement and the likelihood of being retired at the time of survey. This strategy is popular in the literature (Imbens and Lemieux 2008). Meanwhile, we apply a non-linear regression model for estimating the causal impact of interest in the second stage. In particular, we use Probit model when the dependent variable is the probability of doctor visit and Poisson model for the number of doctor visits. The coefficient β_1 in the second stage is the parameter of interest that indicates the causal effect of retirement on health services utilization. Importantly, the coefficient is technically infered as the local average treatment effect of (LATE) of the causal link of interest. Notably, standard errors from regressions are robustly clustered at the provincial level.

Furthermore, we also use a reduced form regression to evaluate the impact of exposure to retirement on outcomes of health services utilization using the following regression form:

$$Utilization_i = \varphi_0 + \varphi_1 Exposure_i + \varphi_2 \boldsymbol{X'}_i + \gamma_t + \theta_c + \xi_i \quad (4)$$

where the coefficient φ_1 shows the impact of being exposed to retirement on health service utilization; and ξ_i is an error term. We use (4) as an additional check for the causal link between retirement and health services ulitization.

4 Baseline Results

4.1 First-stage results

Table 2 presents the baseline first-stage result of the effect of retirement exposure on the probability of being retired. In the baseline specifications for both men and women, control variables include schooling years, majority, married, health insurance and dummies for six geographical regions in Vietnam. In addition, year of survey fixed effects are also included in the estimation model; and standard errors are robustly estimated and clustered at the provincial level.

The estimates show that there is a significantly positive association between exposure to retirement and the likelihood of retirement for both male and female. In particular, on average men whose ages from 60 years old and above are more likely to be retired than those age below 60 by about 21.7%. Meanwhile, women aged from 55 and above has a higher probability to be retired than those less than 55 years old by approximately 17%. Both estimates of interest are statistically significant at 1%. This

finding indicates that normal ages of retirement apparently work as discontinuities in the probability of retirement for both male and female individuals in urban Vietnam.

4.2 Second-stage results

The baseline estimates of the causal effect of retirement on health services utilization outcomes are reported in Table 3. In the baseline second-stage model, control variables also the same set of variables for the baseline first-stage model as presented in the previous sub-section.

For male, retirement increases the probability of visiting an inpatient and outpatient services at public health facilities. In particular, individuals who were retired more likely have an inpatient doctor visit by about 2.2% and an outpatient visit by roughly 36.1% relative to those who are not retired at the time of survey. However, while the estimate for outpatient visits is statistically significant at 1% the coefficient for inpatient loses its statistical significance at any traditional level. The effects of retirement on the number of inpatient visits and the number of outpatient visits are a 0.18-time reduction and a 0.51-time increase respectively. However, both these estimates are not statistically significant at any conventional level.

Next, the baseline estimates for female indicate that retirement has positive impacts on all outcomes of health services utilization. However, the paper finds that the impact is only statistically significant for outpatient health services. In particular, retirement increases the probability of outpatient doctor visit by approximately 31% and the number of outpatient doctor visits by roughly 1.75 times. The estimated coefficients of

retirement on inpatient services outcomes are statistically insignificant at any conventional level.

4.3 Reduced-form results

Table 4 shows the effect of exposure to retirement on health services utilization using reduced-form regressions. The results are found to be similar to the baseline estimates using IV regressions. Exposure to retirement increases the likelihood for a man to have an outpatient visit at public health facilities by about 7.8%. This effect is statistically significant at 1%.

Furthermore, women who were aged from 55 and above are more likely to visit an outpatient visit by about 5.3% and have a higher number of outpatient visits by around 0.3 times relative to those who were not exposed to retirement. These estimated coefficients for women are statistically significant at 5% and 10% respectively.

5 Robustness Checks

Next, the paper reports the results of robustness checks for the baseline IV estimates of the causal effect of retirement on health services utilization outcomes. There are two types of robustness checks including (i) using various specifications rather than the baseline specification, and (ii) using a sub-sample in which observations from two largest cities in Vietnam are excluded, which are implemented to show how sensitive the baseline estimates are. The results are specifically reported in Tables 5 and 6.

First, as shown in Table 5 the paper estimates two various specifications: (i) a parsimony specification that is created by excluding all control variables from the baseline specification (column 1), and (ii) an augmented specification that is generated by adding more variables related household characteristics (household head, household's total paid workers and poor household) into the baseline specification (column 2). It is noted that the paper also finds the positive association between exposure to retirment and the probability of being retired using both these specifications. The specific estimates for the first-stage using these various specifications are presented in Table A1 of Appendices.

The IV estimates of the causal impact of retirement on outcomes of health services utilization using both parsimony and augmented specifications are analogous to the baseline estimates in terms of both the direction and the statistical significance of the coefficients for both male and female. In particular, a male whose retired status on average has a higher probability to ulitize an oupatient health service by about 38.3% (column 1) or 35.4% (column 2) than those who are not retired. These coefficients are both statistically significant at 1%. Other coefficients for male are not statistically significant. Meanwhile, it is suggestive of being that retirement significantly increases the probability for a female to have an outpatient health care visit by approximately 39% (column 1) and 29.2% (column 2). Moreover, on average women with being retired probably have a larger number of outpatient visits by about 2.4 times (column 1) and 1.6 times (column 2) relative to those without being retired. The coefficients for both outpatient outcomes are statistically significant at 1% for the parsimony specification (column 1) and 10% for the augmented specification (column 2).

Second, the paper estimates a sub-sample which excludes all observations from Ha Noi and Ho Chi Minh City using the baseline specification. Ha Noi and Ho Chi Minh City are two largest cities in Vietnam where the supply capability of health care services are sizable compared to other provinces in Vietnam. Moreover, people in these cities live with higher living standards. These characteristics of the largest locations in Vietnam likely affects the causal effect of interest in this study. The estimates using a sub-sample without observations from Ha Noi and Ho Chi Minh City therefore show how the effect of retirement on health services utilization changes. The results are specifically presented in Table 6. Accordingly, sub-samples of 1,089 individuals for male (nearly 80% of the corresponding baseline sample) and 1,676 individuals for female (nearly 81% of the corresponding baseline sample) are used. Notably, the paper also finds that exposure to retirement has a positive impact on the likelihood of being retired in this case. The first-stage estimate is presented in Table A2 of Appendices.

The IV estimates in Table 6 indicate that the results of the causal effect of retirement on health services utilization do not change in terms of the direction and the level of statistical significance when observations from Ha Noi and Ho Chi Minh City are eliminated compared to the baseline estimates. In particular, retired men are more likely to have an outpatient visit by about 38% than men without being retired. For female, retirement increases their probability of having an outpatient visit and frequency of outpatient visits by approximately 42.8% and 2.7 times respectively. Importantly, despite a fact that the direction and the level of statistical significance of the effect are kept, the magnitudes of the estimated effects in Table 6 are larger than the corresponding baseline effects.

6 Discussion and Conclusion

The study of the causal effect of retirement on health has become increasingly important in many countries when the reform of pension systems has been implemented because of the problem of aging population. Quantifying the health impacts of retirement among olders is important for public policy related to health care systems. An increasing body of relevant literature has devoted to estimate the causal effect of retirement on health status generally.

However, there is extremely lack of studies directly focusing on the causal link between retirement and health services utilization. Therefore the current paper significantly adds more empirical evidence to the related literature. This study's findings indicate that retirement increases some outcomes of health services utilization for both male and female. The baseline estimates demonstrate that while retirement only increases the likelihood of having an outpatient visit by about 36.1% for male, it rises both the probability of having a visit and the number of visits to outpatient services by approximately 31% and 1.75 times respectively for female.

It is important to indicate that the causal effect of retirement on health services utilization in this study is only statistically significant with outpatient services at public health facilities. In contrast, the paper fails to find any statistically significant estimates for inpatient doctor visits. Retirees probably have a different pattern of time use and consumption as well compared to active employees in a manner that retirees tend to consume more time-intensive goods such as medical care utilization rather than work-related goods. It is a rationale to explain that retired people have more time for taking care their health when they do not participate in activities from the labor market. As a consequence, retired people implement medical check-ups more frequently and

regularly than those who are engaging in the labor market. Because outpatient health services are typically visits to health facilities for checking minor health problems, the impact of retirement on this type of health services outcomes is probably apparent.

The current study's findings are consistent with Caroli et al. (2016), which suggests that health services utilization rises when people rearch their ages of retirement in Europe. However, Coe and Zamarro (2015) show that retirement lowers general doctor visits in both the United States and Europe. These few studies in this research topic were conducted in developed countries and the results are mixed on the causal relationship between retirement and health services utilization. This study essentially contributes additional evidence to the modest but growing literature using the context of developing countries.

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Table 1. Description of variables

Variables	Male			Female		
	All	55–59	60–64	All	50–54	55–59
Public health care services						
Probability of inpatient visit (1/0)	0.086 (0.281)	0.083 (0.276)	0.091 (0.288)	0.088 (0.284)	0.082 (0.274)	0.097 (0.296)
Probability of outpatient visit (1/0)	0.372 (0.483)	0.339 (0.474)	0.423 (0.495)	0.359 (0.480)	0.328 (0.470)	0.401 (0.490)
Frequency of inpatient visits (times)	0.149 (0.672)	0.159 (0.757)	0.132 (0.509)	0.131 (0.560)	0.131 (0.634)	0.130 (0.444)
Frequency of outpatient visits (times)	1.463 (3.423)	1.397 (3.474)	1.567 (3.343)	1.369 (3.125)	1.168 (2.749)	1.635 (3.547)
Retired (1/0)	0.284 (0.451)	0.199 (0.400)	0.418 (0.494)	0.275 (0.446)	0.196 (0.397)	0.379 (0.485)
Exposure to retirement (1/0)	0.390 (0.488)	0.000 (0.000)	1.000 (0.000)	0.430 (0.495)	0.000 (0.000)	1.000 (0.000)
Schooling years (years)	10.256 (4.282)	10.431 (4.168)	9.981 (4.445)	9.117 (4.075)	9.391 (3.931)	8.754 (4.234)
Majority (1/0)	0.940 (0.237)	0.948 (0.222)	0.928 (0.258)	0.948 (0.223)	0.938 (0.241)	0.960 (0.195)
Married (1/0)	0.951 (0.215)	0.954 (0.209)	0.947 (0.224)	0.780 (0.415)	0.803 (0.398)	0.749 (0.434)
Health insurance (1/0)	0.705 (0.456)	0.691 (0.462)	0.726 (0.446)	0.617 (0.486)	0.585 (0.493)	0.660 (0.474)
Household head (1/0)	0.735 (0.442)	0.719 (0.450)	0.760 (0.428)	0.371 (0.483)	0.353 (0.478)	0.394 (0.489)
Household's total paid workers (workers)	1.346 (1.187)	1.415 (1.212)	1.238 (1.138)	1.412 (1.165)	1.451 (1.144)	1.360 (1.190)
Poor household (1/0)	0.021 (0.142)	0.019 (0.138)	0.023 (0.149)	0.027 (0.161)	0.031 (0.175)	0.020 (0.141)
Red river delta (1/0)	0.255 (0.436)	0.239 (0.427)	0.280 (0.449)	0.234 (.4236)	0.227 (0.419)	0.244 (0.430)
Midlands and northern mountainous areas (1/0)	0.123 (0.329)	0.134 (0.341)	0.106 (0.308)	0.120 (0.325)	0.129 (0.336)	0.108 (0.311)
Northern and coastal central region (1/0)	0.214 (0.410)	0.221 (0.415)	0.204 (0.403)	0.213 (0.410)	0.220 (0.414)	0.205 (0.404)
Central highlands (1/0)	0.057 (0.233)	0.054 (0.227)	0.062 (0.242)	0.071 (0.257)	0.085 (0.279)	0.052 (0.222)
Southeast area (1/0)	0.173 (0.378)	0.179 (0.383)	0.164 (0.371)	0.187 (0.390)	0.172 (0.377)	0.208 (0.406)
Mekong river delta (1/0)	0.177 (0.382)	0.174 (0.379)	0.183 (0.387)	0.174 (0.379)	0.167 (0.373)	0.183 (0.387)
Survey 2010 (1/0)	0.293 (0.455)	0.291 (0.454)	0.297 (0.457)	0.299 (0.458)	0.321 (0.467)	0.270 (0.444)
Survey 2012 (1/0)	0.318 (0.466)	0.332 (0.471)	0.297 (0.457)	0.334 (0.472)	0.336 (0.473)	0.332 (0.471)
Survey 2014 (1/0)	0.389 (0.488)	0.378 (0.485)	0.406 (0.492)	0.367 (0.482)	0.343 (0.475)	0.398 (0.490)
Observations	1,358	829	529	2,061	1,175	886

Table 2. Probability model for being retired: Baseline results

Dependent variable: Retired	Male	Female
	(1)	(1)
Exposure to retirement	0.217***	0.170***
	(0.029)	(0.026)
Schooling years	0.002	0.003
	(0.004)	(0.003)
Majority	0.102	–0.007
	(0.050)	(0.054)
Married	–0.257***	–0.028
	(.068)	(0.024)
Health insurance	0.083***	0.038*
	(0.031)	(0.021)
Red river delta	0.078***	0.046
	(0.056)	(0.060)
Midlands and northern	0.018	–0.135***
mountainous areas	(0.059)	(0.035)
Northern and coastal central	0.035	–0.067*
region	(0.042)	(0.037)
Central highlands	–0.070	–0.174***
	(0.052)	(0.036)
Southeast area	0.156***	0.105**
	(0.045)	(0.040)
Mekong river delta	Omitted	Omitted
Survey year fixed effects	Yes	Yes
Cohort fixed effects	Yes	Yes
Constant	0.231**	0.224***
	(0.087)	(0.061)
R-squared	0.101	0.085
Observations	1,358	2,061

Note: ***p < 0.01, **p < 0.05, *p < 0.1. Ordinary least squares are used. Robust standard errors are clustered at the provincial level and reported in parenthesis.

Table 3. IV regressions on public health services utilization: Baseline results

	Male	Female
	(1)	(1)
Probability of doctor visit		
Inpatient	0.022	0.078
	(0.075)	(0.078)
Outpatient	0.361***	0.310**
	(0.104)	(0.148)
Frequency of doctor visists		
Inpatient	−0.181	0.0009
	(0.186)	(0.167)
Outpatient	0.510	1.746*
	(0.756)	(1.004)
Observations	1,358	2,061

Note: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1. Robust standard errors are clustered at the provincial level and reported in parenthesis. IV-Probit and IV-Poisson regressions are used for probability of doctor visit and frequency of doctor visits respectively. Reported coefficients are marginal effects. Controls consist of schooling years, majority, married, health insurance, dummies for six geographical regions, survey year fixed effects and cohort fixed effects.

Table 4. Reduced-form regressions on public health services utilization: Robustness

	Male	Female
	(1)	(1)
Probability of doctor visit		
Inpatient	0.005	0.013
	(0.016)	(0.013)
Outpatient	0.078***	0.053**
	(0.023)	(0.025)
Frequency of doctor visists		
Inpatient	−0.039	0.0002
	(0.040)	(0.028)
Outpatient	0.111	0.296*
	(0.164)	(0.170)
Observations	1,358	2,061

Note: ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1. Robust standard errors are clustered at the provincial level and reported in parenthesis. Probit and Poisson regressions are used for probability of doctor visit and frequency of doctor visits respectively. Reported coefficients are marginal effects. Controls consist of schooling years, majority, married, health insurance, dummies for six geographical regions, survey year fixed effects and cohort fixed effects.

Table 5. IV regressions on public health services utilization: Robustness, various specifications

	Male		Female	
	(1)	(2)	(1)	(2)
Probability of doctor visit				
Inpatient	0.037	−0.009	0.096	0.077
	(0.071)	(0.074)	(0.075)	(0.078)
Outpatient	0.383***	0.354***	0.390***	0.292*
	(0.111)	(0.106)	(0.128)	(0.150)
Frequency of doctor visists				
Inpatient	−0.122	−0.236	0.017	−0.006
	(0.176)	(0.190)	(0.156)	(0.174)
Outpatient	0.743	0.401	2.401***	1.595*
	(0.681)	(0.737)	(0.872)	(0.973)
Observations	1,358	1,358	2,061	2,061

Note: ***p < 0.01, **p < 0.05, *p < 0.1. Robust standard errors are clustered at the provincial level and reported in parenthesis. IV-Probit and IV-Poisson regressions are used for probability of doctor visit and frequency of doctor visits respectively. Reported coefficients are marginal effects. Controls consist of schooling years, majority, married, health insurance, household head, household's total paid workers, poor household, dummies for six geographical regions, survey year fixed effects and cohort fixed effects.

Table 6. IV regressions on public health services utilization: Robustness, excluding Ha Noi and Ho Chi Minh City

	Male	Female
	(1)	(1)
Probability of doctor visit		
Inpatient	0.026	0.146
	(0.106)	(0.110)
Outpatient	0.380***	0.428**
	(0.142)	(0.210)
Frequency of doctor visists		
Inpatient	−0.278	0.012
	(0.268)	(0.247)
Outpatient	−0.293	2.654*
	(0.973)	(1.41)
Observations	1,089	1,676

Note: ***p < 0.01, **p < 0.05, *p < 0.1. Robust standard errors are clustered at the provincial level and reported in parenthesis. IV-Probit and IV-Poisson regressions are used for probability of doctor visit and frequency of doctor visits respectively. Reported coefficients are marginal effects. Controls consist of schooling years, majority, married, health insurance, dummies for six geographical regions, survey year fixed effects and cohort fixed effects.

Appendices

Table A1. Probability model for being retired: Robustness, various specifications

Dependent variable: Retired	Male		Female	
	(1)	(2)	(1)	(2)
Exposure to retirement	0.218***	0.213***	0.186***	0.170***
	(0.033)	(0.030)	(0.026)	(0.025)
Schooling years		0.003		0.003
		(0.004)		(0.003)
Majority		0.090*		–0.008
		(0.050)		(0.055)
Married		–0.247***		–0.026
		(0.067)		(0.029)
Health insurance		0.090***		0.037*
		(0.032)		(0.021)
Household head		–0.083**		0.007
		(0.034)		(0.029)
Household's total paid workers		–0.045***		0.006
		(0.009)		(0.010)
Poor household		0.052		-0.019
		(0.059)		(0.080)
Red river delta		0.086		0.045
		(0.060)		(0.060)
Midlands and northern		0.011		–0.136***
mountainous areas		(0.059)		(0.035)
Northern and coastal central		0.049		–0.068*
region		(0.045)		(0.037)
Central highlands		–0.072		–0.173***
		(0.051)		(0.036)
Southeast area		0.164***		0.103**
		(0.046)		(0.041)
Mekong river delta		Omitted		Omitted
Survey year fixed effects	Yes	Yes	Yes	Yes
Cohort fixed effects	Yes	Yes	Yes	Yes
Constant	0.210***	0.339***	0.227***	0.216***
	(0.025)	(0.091)	(0.024)	(0.068)
R-squared	0.056	0.120	0.044	0.085
Observations	1,358	1,358	2,061	2,061

Note: ***p < 0.01, **p < 0.05, *p < 0.1. Ordinary least squares are used. Robust standard errors are clustered at the provincial level and reported in parenthesis.

Table A2. Probability model for being retired: Robustness, excluding Ha Noi and Ho Chi Minh City

Dependent variable: Retired	Male	Female
	(1)	(1)
Exposure to retirement	0.189***	0.141***
	(0.029)	(0.025)
Schooling years	0.005	0.002
	(0.005)	(0.004)
Majority	0.092*	–0.00007
	(0.050)	(0.055)
Married	–0.249***	–0.023
	(0.083)	(0.023)
Health insurance	0.078**	0.040*
	(0.035)	(0.022)
Red river delta	0.036	-0.020
	(0.062)	(0.050)
Midlands and northern	0.006	–0.132***
mountainous areas	(0.059)	(0.035)
Northern and coastal central	0.027	-0.070*
region	(0.043)	(0.037)
Central highlands	–0.078	–0.175***
	(0.051)	(0.036)
Southeast area	0.117*	0.053
	(0.069)	(0.062)
Mekong river delta	Omitted	Omitted
Survey year fixed effects	Yes	Yes
Cohort fixed effects	Yes	Yes
Constant	0.217**	0.231***
	(0.098)	(0.064)
R-squared	0.083	0.059
Observations	1,089	1,676