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# Retirement and health services utilization in a low-income country*

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**Abstract**

We estimate the causal effects of retirement on health services utilization in Vietnam. Using authorized retirement ages as instruments for exogenous changes in retirement, we find positive and strong effects of retirement on outpatient health services in the public health sector. Retirement increases the probability of an outpatient visit by 51 percentage points for males and 36 percentage points for females, and the frequency of outpatient visits by 1.4 times for males and 2 times for females. However, we find no effect on the use of public inpatient services as well as private health services.

**KEYWORDS**

health services utilization, retirement, Vietnam

**JEL CLASSIFICATIONS**

J26; I10; C26

## 1 | INTRODUCTION

Population aging has become a key demographic trend facing the globe in the years to come (United Nations, 2019). The number and the share of older people from the total population have both increased in all countries. The global population aged 60 and over is about 962 million (13%) in 2017 and it is expected to reach 2.1 billion (22%) in 2050 (United Nations, 2017). Population aging has engaged massive concern from worldwide governments as well as policymakers because of its

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induced social and economic consequences. One of the key problems related to policies designed for coping with population aging which has been strongly debated is how an increasing retired population affects the current healthcare systems (Whiteford & Whitehouse, 2006) because retirement is a pivotal juncture among older people making substantial changes in their employment status, lifestyles and time use (Hurd & Rohwedder, 2013) and thus leading to various effects on disposable income, leisure activities, social interaction, health and well-being (Bonsanga & Klein, 2012; Fabrizio & Franco, 2017; Lee & Kim, 2017; Rohwedder & Willis, 2010). Such a concern is especially important for the group of low- and middle-income countries where it is the home of a dominant proportion of the global older population[1] (United Nations, 2019) and importantly the burden of retirement on health services is very large there (World Health Organization, 2017). Understanding the link between retirement and the individuals' behavior of health services utilization would not only shed light on the demand for healthcare services among aging and retired people but also provide useful policy implications for policymakers in terms of the design and the function of the healthcare system which is better-fit for an older population.

Retirement may influence health services utilization in several manners. On the one hand, it likely increases the use of medical care services. This is because retirement is more likely to impose negative effects on physical and mental health outcomes (Behncke, 2012; Bonsang et al., 2012; Coe & Zamarro 2011; Coe et al., 2012; Eibich, 2015; Insler, 2014; Shai, 2018), leading to utilizing more health services as a judicious strategy to maintain retired people's health stock. Moreover, retired people have more time for checking their health at health facilities and thus their opportunity costs of time for using health services would be considerably lower than those still working. On the other hand, retirement may reduce healthcare utilization, in particular for high-cost services or services which require co-payments from patients because retirement decreases older people's income. Also, the reducing effects of retirement on health services utilization might come from a healthier lifestyle, for example doing more exercise and physical activities, and eating diets (Bertoni et al., 2018; Godard, 2016). Therefore, being informed about changes in health services utilization at retirement is very important to understand the costs of retirement to the healthcare system, providing useful information to the related policy-making process (Caroli et al., 2016; Coe & Zamarro, 2015). We examine the causal effects of retirement on health services utilization using data from urban Vietnam.

A fundamental challenge facing the causal estimation of the link between retirement and health services utilization using observational data is the potential endogeneity of retirement to health and health services utilization. This problem may be due to omitted variables such as genetic characteristics that likely affect both the retirement decision and the outcomes of health services utilization. In addition, the problem of reverse causality, for example, ill people who use more health services are likely to retire early (Dwyer & Mitchell, 1999), may prevent us from estimating the causal effects of retirement on health services utilization. To address the endogeneity of retirement to health services utilization, previous studies employ legal ages for retirement to instrument for exogenous changes in retired status to estimate the causal effects (e.g. Caroli et al., 2016; Coe & Zamarro, 2015; Lucifora & Vigani, 2018). We use the normal ages for retirement for both males and females 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.

Vietnam is an interesting case for the study of health services utilization impact of retirement. The Vietnamese population has been increasingly aging over the last few decades (United Nations Population Fund, 2011). This demographic change engenders important challenges for the healthcare system in providing sufficient healthcare services to older people in this low-income country.

[1]By 2050, there is about 80% of the global older population living in low- and middle-income countries (Shetty, 2012).

In this context, an insightful understanding of how the elderly and retirees make their decision on health services utilization is vital to public policy implications related to the design of the healthcare system. We limit our analysis to urban areas of Vietnam where the legal ages of retirement work stronger than in rural areas. This is because, in an agriculture-based economy in rural Vietnam, citizens who are involved in agricultural production work with all lives and retirement is not clear in rural areas.

We find that retirement has positive impacts on some outcomes of health services utilization in urban Vietnam. However, these effects only exist for outpatient services in the public health sector. In particular, retired individuals are more likely to use an outpatient health service in the public health sector than those who are not retired by nearly 51 percentage points for men and about 36 percentage points for women. Moreover, retirement increases the number of outpatient visits at public health facilities by about 1.4 times for males and nearly 2 times for females. There is no effect on public inpatient services measured by both the probability of using any service and the number of services used. For health services from the private health sector, the paper finds statistically insignificant effects on any outcomes.

Our paper relates to several strands of the literature. First, it contributes to a growing literature documenting the causal effects of retirement on health. Prior evidence mainly focuses on outcomes of physical and mental health and well-being including physical health (Coe & Zamarro, 2011), illness and diseases (Behncke, 2012; Insler, 2014; Johnston & Lee, 2009; Shai, 2018), mental health and cognitive abilities (Atalay et al., 2019; Bonsang et al., 2012; Butterworth et al., 2006; Celidoni et al., 2017; Coe et al., 2012; Eibich, 2015; Fabrizio & Franco, 2017; Heller-Sahlgren, 2017; Rohwedder & Willis, 2010), psychological well-being (Charles, 2004), health-seeking behaviours (Ayyagari, 2016; Bertoni et al., 2018; Godard, 2016; Kämpfen & Maurer, 2016; Müller & Shaikh, 2018) and mortality (Bloemen et al., 2017; Hernaes et al., 2013; Kuhn et al., 2010). Recent studies importantly examine retirement effects on health service utilization, and they show mixed effects. On the one hand, existing evidence shows either negative effects (Eibich, 2015; Lucifora & Vigani, 2018; Nielsen, 2019; Shai, 2018) or no effect (Hagen, 2018; Nielsen, 2019). On the other hand, there is evidence of the increasing effects of retirement on health services utilization (e.g. Zhang et al., 2018).

Moreover, many available papers are based on data from developed countries and there is an extreme lack of studies investigating the causal effects of retirement on health and health services utilization from developing countries. Zhang et al.'s paper (2018) using data from China is so far the only paper implemented for developing countries. Therefore, by showing the positive effects of retirement on health services utilization in Vietnam, we contribute additional results to limited knowledge about how retirement changes health and health services utilization in developing countries where there is a dominant share of the global older population (United Nations, 2019).

Second, our paper also relates to a large body of literature studying socio-economic determinants of health services utilization. Existing research has well documented the role of multiple factors in influencing the use of health services such as health insurance (Anderson et al., 2012; Card et al., 2008; Finkelstein et al., 2012; Harmon & Nolan, 2001), schooling (Dang, 2018), income (Bradley et al., 2018; Goda et al., 2011; Grépin et al., 2019), social networks (Deri, 2005), the organization of health services delivery (Strumpf et al., 2017; Zhong, 2011) and market medicine prices (Borrescio-Higa, 2015). The current paper otherwise focuses on the effects of retirement. In addition, our paper complements studies providing insights into the use of health services among elderly people (e.g. Chandra et al., 2010; Schellhorn et al., 2000).

The remainder of this paper is organized as follows. Section 2 provides information on the institutional background and describes data and the sample while Section 3 points out the estimation

strategy. Section 4 reports the empirical results, and Section 5 shows the results of the robustness checks and placebo tests. Finally, concluding remarks are made in Section 6.

# 2 | INSTITUTIONAL BACKGROUND AND DATA

## 2.1 | Institutional background

The population of Vietnam has started its aging process at a very rapid pace. In 2016, only 7% of the total population are aged 60 and over but this figure is projected to be about triple by 2040, making Vietnam become one of the fastest aging countries among the low-income world globally (World Bank, 2016a). Importantly, Vietnam's population aging is dominantly occurring among very low-income and vulnerable groups compared to other neighbouring Asian and OECD countries, suggesting that the large share of its population would become the elderly before achieving a high-income level (World Bank, 2016b). Moreover, there is a large proportion of older Vietnamese people living with a dependent status, income inadequacy and poor living conditions (Giang, 2012).

Vietnam is facing huge challenges in terms of its fiscal and managerial capacity to tackle the increasing aging of its population. Among expected consequences of population aging in Vietnam, understanding how an increasing share of retired people from its workforce affects the healthcare system in terms of health services utilized by the retired is very important to be concerned for designing and operating a better healthcare system that can sufficiently provide the elderly with the care they need.

The health services delivery system for the elderly care in Vietnam mainly relies upon a two-sector healthcare system in which both the public and the private health sector jointly work to provide health services (Hoai & Dang, 2017; Tat & Barr, 2006). The provision of health services mainly relies on the public sector in which the government has run a four-level network of state hospitals, curative care and health facilities across the country including national, provincial/municipal, district and commune (World Health Organization, 2012). The public health sector which is mainly financed by the government provides health services to almost all citizens, especially the poor although its quality is relatively lower than services from the private sector. Meanwhile, despite only accounting for a small share of health services provided, the private sector has become an increasingly important delivery channel in the national health system, providing health services with better quality but with high prices to high-income people (World Health Organization, 2012). Therefore, when examining the use of health services in Vietnam, it is crucial to look at both the public and the private health sectors (Dang, 2018).

## 2.2 | Data

We use pooled and cross-sectional data from three waves (2010, 2012 and 2014) of the Vietnam Household Living Standards Survey (VHLSS). The VHLSS is a nationally representative survey in Vietnam that has been conducted every 2 years. In each survey, the VHLSS contains key data on demographics, education, health, employment, household assets, household expenditure, housing and agricultural production from roughly 9,000 households and 40,000 individuals across Vietnam.

We use the section of health in the VHLSS to construct the outcome variables of health services utilization. These outcomes which are measured over the last 12 months and separately for the public and the private health sector include (1) the probability of having an inpatient visit, (2) the probability of having an outpatient visit, (3) the frequency of inpatient visits and (4) the frequency of outpatient visits. Using various measures for both the public and private health sectors allows us to investigate

whether retirement affects health services utilization differently for different health sectors. Moreover, we estimate the retirement effects on these outcomes separately for males and females to show whether there are gender differences in the effects.

We use the section of employment in the VHLSS to construct the variable of retirement. In particular, using answers to a question asking the respondent's current employment status, we construct an indicator for being retired: the respondents with retired status would take a value of 1 if the answer is 'being retired', or takes a value of 0 for other answers such as 'employed', 'unemployed', 'disabled' or 'not in the labour force'. The sectors of demographics and education are exploited to construct a set of control variables including schooling years, and dummies for the ethnic majority, being married, health insurance and six economic regions.

We use the current age of the respondents and the legal retirement age to construct the IV variable (a dummy for exposure to retirement). The respondents' exposure to retirement would take a value of 1 if their ages are larger or equal to the legal retirement age or the cut-off age (60 years old for males or 55 years old for females) or 0 otherwise. In Figure 1, we show that there are considerable increases in the rates of being retired following the legal retirement ages. Panel A of Figure 1 shows that the retirement rates for males aged 55–59 are around 0.22% but the rates go up to about 0.42% for males aged 60–64. The pattern is similar for females as shown in Panel B of Figure 1 in which the retirement rates are around 0.21% for those aged 50–54 and nearly 0.40% for those aged 55–59.

We restrict the main sample for the analysis to those aged within a bandwidth of ±5 from the cut-off point. In particular, we obtain a sample of 1,329 males aged 55–64 and a sample of 2,019 females aged 50–59. The statistical summary of the samples is specifically presented in Table 1.

## 3 | ESTIMATION STRATEGY

We employ the IV approach to estimate the causal effect of retirement on health services utilization in urban Vietnam. Using an IV strategy enables us to account for the problem of endogeneity of retirement and health services utilization. In particular, we use the legal ages of retirement for men (60 years old) and women (55 years old) to instrument for exogenous changes in the likelihood of being retired. These legal ages are expected to generate a significant change in the probability of being retired among older people. Let index the IV as $Exposure_i$ indicating the probability of exposure to retirement which mathematically is measured by:

$$Exposure_{ic} = \begin{cases} 1 \text{ if age}_{ic} \geq 60 \text{ for male or age}_{ic} \geq 55 \text{ for female} \\ 0 \qquad\qquad\qquad\qquad \text{otherwise} \end{cases} \tag{1}$$

In equation (1) $age_{ic}$ which is indexed for the age of the individual $i$ belonging to the cohort $c$ at the time of the survey is a forcing variable.

We next perform a two-stage least squares (2SLS) estimation procedure to produce the causal estimates of the link between retirement and health services utilization. The first stage and the second stage regressions are presented following, respectively:

$$Retired_{ic} = \alpha_0 + \alpha_1 Exposure_{ic} + \alpha_2 \boldsymbol{X'}_{ic} + \gamma_t + \theta_c + \varepsilon_{ic} \tag{2}$$

and

$$Utilization_{ic} = \beta_0 + \beta_1 \widehat{Retired}_{ic} + \beta_2 \boldsymbol{X'}_{ic} + \gamma_t + \theta_c + \epsilon_{ic} \tag{3}$$

**TABLE 1** Descriptive statistics

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| **Variables** | **All** | **55–59** | **60–64** | **All** | **50–54** | **55–59** |
| Public health sector | | | | | | |
| Probability of an inpatient visit (dummy) | 0.086 | 0.081 | 0.093 | 0.091 | 0.084 | 0.100 |
| Probability of an outpatient visit (dummy) | 0.375 | 0.334 | 0.439 | 0.365 | 0.330 | 0.411 |
| Frequency of inpatient visits (times) | 0.145 | 0.151 | 0.136 | 0.138 | 0.133 | 0.146 |
| Frequency of outpatient visits (times) | 1.436 | 1.319 | 1.621 | 1.395 | 1.176 | 1.682 |
| Private health sector | | | | | | |
| Probability of an inpatient visit (dummy) | 0.002 | 0.001 | 0.004 | 0.007 | 0.006 | 0.008 |
| Probability of an outpatient visit (dummy) | 0.134 | 0.128 | 0.144 | 0.176 | 0.169 | 0.185 |
| Frequency of inpatient visits (times) | 0.002 | 0.001 | 0.004 | 0.008 | 0.008 | 0.008 |
| Frequency of outpatient visits (times) | 0.478 | 0.510 | 0.427 | 0.703 | 0.613 | 0.822 |
| Retired (dummy) | 0.293 | 0.216 | 0.414 | 0.287 | 0.209 | 0.390 |
| Schooling years (years) | 10.183 | 10.333 | 9.946 | 9.098 | 9.399 | 8.702 |
| Majority (dummy) | 0.944 | 0.952 | 0.930 | 0.947 | 0.937 | 0.961 |
| Married (dummy) | 0.951 | 0.957 | 0.942 | 0.778 | 0.797 | 0.752 |
| Health insurance (dummy) | 0.704 | 0.689 | 0.728 | 0.621 | 0.588 | 0.664 |
| Red River Delta (dummy) | 0.255 | 0.237 | 0.283 | 0.235 | 0.230 | 0.242 |
| Midlands and Northern Mountainous (dummy) | 0.117 | 0.123 | 0.107 | 0.120 | 0.133 | 0.104 |
| Northern and Coastal Central (dummy) | 0.214 | 0.222 | 0.202 | 0.212 | 0.217 | 0.205 |
| Central Highlands (dummy) | 0.060 | 0.057 | 0.066 | 0.069 | 0.082 | 0.053 |
| Southeast (dummy) | 0.173 | 0.186 | 0.153 | 0.186 | 0.173 | 0.204 |
| Mekong River Delta (dummy) | 0.181 | 0.176 | 0.188 | 0.177 | 0.166 | 0.192 |
| Observations | 1,329 | 814 | 515 | 2,019 | 1,147 | 872 |

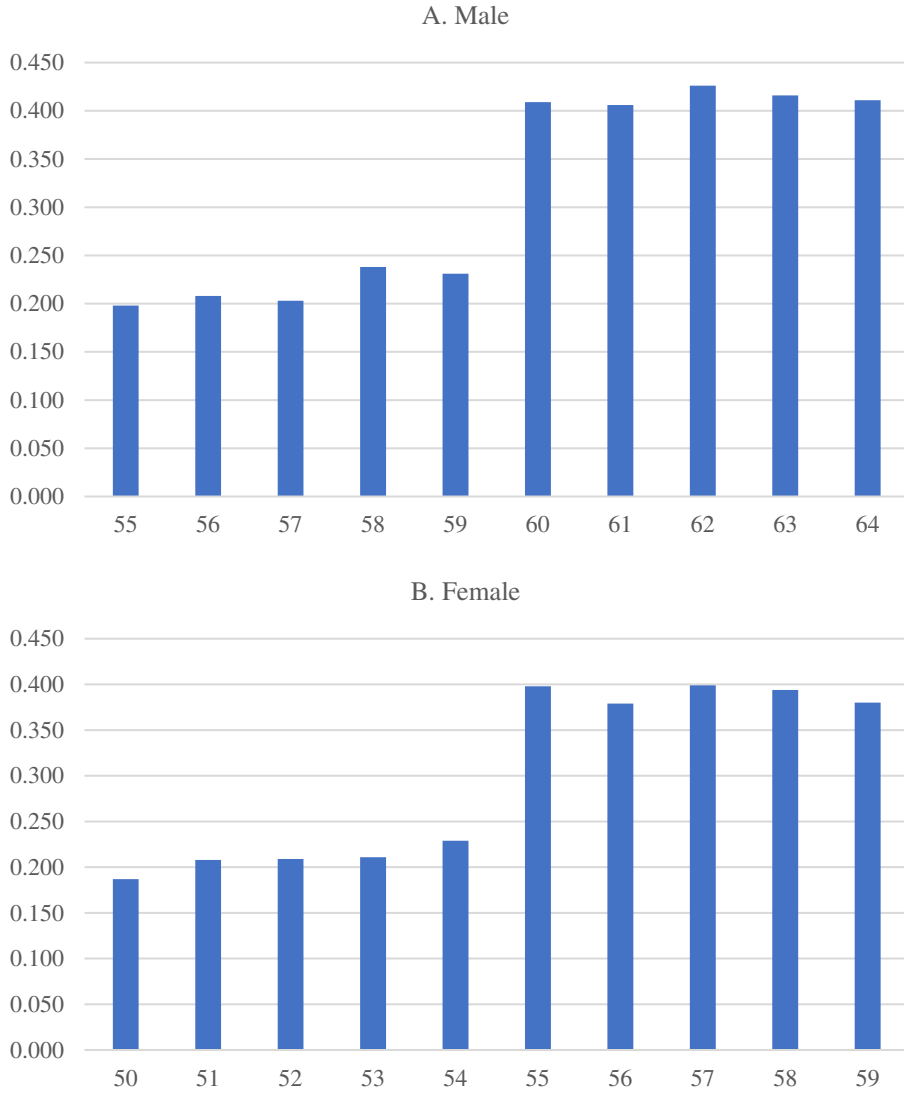


**FIGURE 1** Retirement rates by age

$Utilization_{ic}$ is an outcome of health services utilization for the individual $i$ of the birth cohort $c$. $Retired_{ic}$ is the likelihood of being retired. $\widehat{Retired}_{ic}$ in equation (3) is the predicted value of $Retired_{ic}$ from the first stage in equation (2). $\boldsymbol{X}_{ic}$ is a vector of control variables including years of schooling, dummies for the ethnic majority (*Kinh* or *Hoa* peoples), being married, health insurance and six economic regions in Vietnam (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta). $\gamma_t$ demonstrates survey year fixed effects. $\theta_c$ represents cohort fixed effects; $\varepsilon_{ic}$ and $\epsilon_{ic}$ are error terms in the first and the second stages, respectively.

The survey year fixed effect $\gamma_t$ is used to control for potential time trends across surveys while the birth cohort fixed effect $\theta_c$ is used to control for cohort trends in the outcome. Standard errors are robustly clustered at the district level to account for potential correlations across birth cohorts within the same district. The linear probability model is used in both the first and the second stage

**TABLE 2** First stage: probability model for being retired

| | Male | | Female |
|---|---|---|---|
| **Dependent variable: retired** | **(1)** | | **(2)** |
| Exposure to retirement | 0.197*** (0.028) | | 0.167*** (0.024) |
| Survey year fixed effects | Yes | | Yes |
| Cohort fixed effects | Yes | | Yes |
| Controls | Yes | | Yes |
| R-squared | 0.289 | | 0.283 |
| F-test | 60.36 | | 62.61 |
| Observations | 1,329 | | 2,019 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

regressions. The coefficient $\beta_1$ in the second stage, which is inferred as the local average treatment effect (LATE) is the parameter of interest indicating the causal effect of retirement on health services utilization.

Furthermore, we additionally estimate the reduced-form effect of exposure to retirement on the outcomes of health services utilization using the following regression equation:

$$Utilization_{ic} = \varphi_0 + \varphi_1 Exposure_{ic} + \varphi_2 \boldsymbol{X}'_{ic} + \gamma_t + \theta_c + \xi_{ic} \quad (4)$$

The coefficient $\varphi_1$ shows the impact of exposure to retirement on health service utilization; and $\xi_{ic}$ is an error term. The results from equation (4) are used as an additional check for the IV estimates of the link between retirement and health services utilization.

# 4 | EMPIRICAL RESULTS

## 4.1 | First stage results

We start by presenting the first stage results of the effect of exposure to retirement on the probability of being retired. The results are presented in Table 2 separately for males (Column 1) and females (Column 2). We estimate a baseline specification in which survey year fixed effects, cohort fixed effects and a set of controls are included in the estimation model in both columns.

The results show significant and positive effects of the IV on retirement decisions for both males and females. Exposure to retirement increases the probability of being retired by about 19.7 percentage points for males (Column 1) and 16.7 percentage points for females (Column 2). These effects are highly statistically significant at the 1% level. These findings indicate that the legal retirement ages induce discontinuities in the probability of being retired for older people in urban Vietnam. Importantly, the *F*-test for the significance of the IV shows that exposure to retirement is a significant predictor of retirement decisions for both men and women (the *F*-test of the excluded instrument is greater than 10).

**TABLE 3** IV regressions on health services utilization

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.050 (0.082) | 0.513*** (0.144) | −0.129 (0.190) | 1.401* (0.849) | 0.012 (0.014) | 0.083 (0.102) | 0.012 (0.014) | −0.394 (0.496) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.070 (0.079) | 0.361** (0.144) | 0.063 (0.154) | 1.994** (0.917) | 0.014 (0.022) | 0.106 (0.110) | 0.004 (0.025) | 1.044 (0.989) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE 4** Reduced-form regressions on health services utilization

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.010 (0.016) | 0.101*** (0.028) | −0.026 (0.037) | 0.277* (0.167) | 0.002 (0.003) | 0.016 (0.020) | 0.002 (0.003) | −0.078 (0.098) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.012 (0.013) | 0.060** (0.024) | 0.011 (0.026) | 0.332** (0.153) | 0.002 (0.004) | 0.018 (0.018) | 0.0007 (0.004) | 0.174 (0.165) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE 5** IV regressions on health services utilization (robustness, without controls)

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.065 (0.082) | 0.534*** (0.150) | −0.070 (0.179) | 1.528* (0.993) | 0.014 (0.015) | 0.082 (0.104) | 0.014 (0.015) | −0.394 (0.484) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | No | No | No | No | No | No |
| Observations | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 | 1,329 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.098 (0.075) | 0.446*** (0.132) | 0.087 (0.153) | 2.712*** (0.865) | 0.011 (0.020) | 0.100 (0.105) | 0.001 (0.023) | 1.256 (1.063) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | No | No | No | No | No | No |
| Observations | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 | 2,019 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis.

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

**TABLE 6** IV regressions on health services utilization (robustness, excluding Ha Noi and Ho Chi Minh City)

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.046 (0.114) | 0.487*** (0.171) | −0.220 (0.266) | 0.641* (0.388) | 0.017 (0.020) | 0.164 (0.139) | 0.017 (0.020) | −0.041 (0.617) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 | 1,065 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.135 (0.119) | 0.517** (0.208) | 0.114 (0.236) | 2.934** (1.375) | −0.012 (0.025) | 0.113 (0.162) | −0.027 (0.031) | 1.598 (1.511) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,634 | 1,634 | 1,634 | 1,634 | 1,634 | 1,634 | 1,634 | 1,634 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE 7** IV regressions on health services utilization (Robustness, bandwidth: ± 3)

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.043 (0.070) | 0.456** (0.207) | −0.124 (0.198) | 1.369* (0.829) | 0.011 (0.012) | 0.073 (0.100) | 0.009 (0.012) | −0.358 (0.466) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 736 | 736 | 736 | 736 | 736 | 736 | 736 | 736 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.059 (0.072) | 0.322** (0.162) | 0.068 (0.139) | 1.771* (1.042) | 0.010 (0.019) | 0.096 (0.128) | 0.005 (0.036) | 0.988 (0.991) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 | 1,120 |

*Notes:* The samples are restricted to those aged 57–62 for males (Panel A) and 52–57 for females (Panel B). Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE 8** IV regressions on health services utilization (Robustness, bandwidth: ± 7)

| | Public health sector | | | | Private health sector | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A. Male | | | | | | | | |
| Coefficient | 0.064 (0.053) | 0.547** (0.225) | −0.144 (0.178) | 1.477* (0.821) | 0.014 (0.016) | 0.090 (0.118) | 0.019 (0.022) | −0.415 (0.488) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,983 | 1,983 | 1,983 | 1,983 | 1,983 | 1,983 | 1,983 | 1,983 |
| Panel B. Female | | | | | | | | |
| Coefficient | 0.085 (0.071) | 0.377** (0.159) | 0.058 (0.187) | 1.824** (0.828) | 0.011 (0.032) | 0.142 (0.134) | 0.008 (0.045) | 1.295 (1.260) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,896 | 2,896 | 2,896 | 2,896 | 2,896 | 2,896 | 2,896 | 2,896 |

*Notes:* The samples are restricted to those aged 53–66 for males (Panel A) and 48–61 for females (Panel B). Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

### 4.2 | Second stage results

Next, we present the IV estimates of the effects of retirement on health services outcomes using a baseline specification as same as one in the first stage in Table 3. The results are separately presented for the public health sector (Columns 1–4) and the private health sector (Column 5–8), and also for males (Panel A) and females (Panel B).

For both males and females, we find that there are only statistically significant effects of retirement on the use of outpatient health services (Columns 2 and 4), whereas there is no effect on the use of inpatient services (Columns 1 and 3) in the public health services. In particular, retirement raises the probability of having an outpatient visit by about 51.3 percentage points for males (Column 2, Panel A) and 36.1 percentage points for females (Column 2, Panel B). These effects are highly statistically significant at the 1% and 5% levels, respectively. The estimates in Column 4 show that retired individuals are found to have more times of outpatient visits in the public health sector by about 1.4 times per year (statistically significant at the 10% level) for males (Panel A) and nearly 2 times per year (statistically significant at the 5% level) for females (Panel B). These findings confirm heterogeneity in the effects of retirement on health services utilization in urban Vietnam by gender of retired people.

For the private health sector (Columns 5–8), we find no effect on any outcome of health services utilization for both inpatient visits and outpatient visits and for both males and females. These results suggest that private health services utilization does not change at retirement in urban Vietnam.

### 4.3 | Reduced-form results

We show the reduced-form effects of exposure to retirement on health services utilization in Table 4. We find similar results as the IV estimates in Table 3 in terms of the sign of the effects. We also find the statistically significant effects on public outpatient services but no effect on public inpatient services and also no effect on any outcomes of private health services.

The estimates in Column 2 indicate that exposure to retirement increases the likelihood of having an outpatient visit at a public health facility by about 10.1 percentage points (statistically significant at the 1% level) for males (Panel A) and 6 percentage points (statistically significant at the 5% level) for females (Panel B). For the effects on the frequency of public outpatient visits presented in Column 4, exposure to retirement raises the number of hospitalization by nearly 0.28 times (statistically significant at the 10% level) for males (Panel A) and about 0.33 times (statistically significant at the 5% level) for females (Panel B).

## 5 | ROBUSTNESS CHECKS AND PLACEBO TESTS

### 5.1 | Robustness checks

We provide the results of robustness checks for the baseline IV estimates of the causal effects of retirement on health services utilization outcomes. We implement two robustness checks including using a different specification for the estimation which excludes all control variables and using a sub-sample that excludes the observations from the two largest Vietnamese cities (Ha Noi and Ho Chi Minh City) to show how sensitive the IV estimates are. These results are present in Tables 5 and 6, respectively.

**TABLE 9** Placebo tests ('hypothetical' retirement ages: 55 for males and 50 for females)

| | First stage | Second stage: public health sector | | | | Second stage: private health sector | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Retired | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Panel A. Male | | | | | | | | | |
| Coefficient | 0.025 (0.028) | 0.078 (0.101) | 0.057 (0.059) | 0.144 (0.293) | 0.590 (1.406) | −0.024 (0.021) | 0.061 (0.134) | −0.041 (0.030) | −0.202 (0.375) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,865 | 1,865 | 1,865 | 1,865 | 1,865 | 1,865 | 1,865 | 1,865 | 1,865 |
| Panel B. Female | | | | | | | | | |
| Coefficient | 0.030 (0.032) | 0.071 (0.072) | −0.156 (0.191) | 0.052 (0.052) | −0.641 (1.162) | 0.0002 (0.031) | 0.001 (0.141) | −0.015 (0.051) | 1.000 (0.919) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 2,346 | 2,346 | 2,346 | 2,346 | 2,346 | 2,346 | 2,346 | 2,346 | 2,346 |

*Notes:* The samples are restricted to those aged 50–59 for males and 45–54 for females. Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

**TABLE 10** Placebo tests ('hypothetical' retirement ages: 65 for males and 60 for females)

| | First stage | Second stage: public health sector | | | | Second stage: private health sector | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Retired | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit | Probability: inpatient visit | Probability: outpatient visit | Frequency: inpatient visit | Frequency: outpatient visit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Panel A. Male | | | | | | | | | |
| Coefficient | 0.030 (0.035) | 0.098 (0.131) | 0.042 (0.060) | 0.151 (0.333) | 0.398 (1.258) | −0.022 (0.025) | 0.078 (0.143) | −0.044 (0.039) | −0.225 (0.399) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 972 | 972 | 972 | 972 | 972 | 972 | 972 | 972 | 972 |
| Panel B. Female | | | | | | | | | |
| Coefficient | 0.037 (0.041) | 0.089 (0.086) | 0.132 (0.187) | 0.066 (0.069) | −0.455 (1.107) | 0.001 (0.025) | 0.003 (0.090) | −0.029 (0.060) | 0.863 (0.888) |
| Survey year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,683 | 1,683 | 1,683 | 1,683 | 1,683 | 1,683 | 1,683 | 1,683 | 1,683 |

*Notes:* The samples are restricted to those aged 60–69 for males and 55–64 for females. Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 5 shows the IV estimates using a parsimony specification excluding all control variables.[2] We also find statistically significant effects of retirement on outpatient services utilization in the public health sector. The estimates in Column 2 suggest that retired individuals are more likely to take an outpatient visit than those who are working by about 53.4 percentage points (statistically significant at the 1% level) for males (Panel A) and 44.6 percentage points (statistically significant at the 1% level) for females (Panel B). Also, in Column 4, we find that retired people have a higher frequency of outpatient visits than unretired those by about 1.5 times (statistically significant at the 10% level) for men (Panel A) and around 2.7 times (statistically significant at the 1% level) for women (Panel B). As same as the baseline IV results in Table 3, we find no effect on the outcomes of public inpatient health services as well as the outcomes of both inpatient and outpatient health services in the private health sector.

Table 6 shows the IV estimates using sub-samples of 1,065 males and 1,634 females which excludes all observations from Ha Noi and Ho Chi Minh City. We perform such a sub-sample to test whether our baseline IV results in Table 3 are driven by observations from Ha Noi and Ho Chi Minh City, which are the two largest and most developed cities where the supply capability of healthcare services is relatively sizable compared to other provinces in Vietnam.

Accordingly, we find that the effects of retirement on health services utilization are consistent with the main IV estimates in Table 3 when the observations from Ha Noi and Ho Chi Minh City are eliminated.[3] In particular, retired men are more likely to have a doctor visit by 48.7 percentage points (statistically significant at the 1% level) and use an additional amount of 0.64 times (statistically significant at the 10% level) for public outpatient services than men who are working. For females, retirement increases the probability of having an outpatient visit and the frequency of outpatient visits by 51.7 percentage points (statistically significant at the 5% level) and 2.9 times (statistically significant at the 5% level), respectively.

We further provide robustness checks using different bandwidths. In particular, we use a sub-sample of bandwidth of $\pm 3$ and another sub-sample of bandwidth of $\pm 7$ from the cut-off point. Using a bandwidth of $\pm 3$, we obtain sub-samples of 736 males and 1,120 females. The IV results in Table 7 are strongly robust to the baseline estimates although the estimates are slightly smaller.[4] For males (Panel A, Table 7), retirement increases the probability of having a doctor visit by about 45.6 percentage points (Column 2, statistically significant at the 5% level) and use an additional amount of 1.37 times (Column 4, statistically significant at the 10% level) for public outpatient services. For females (Panel B, Table 7), we find that retirement increases the probability of having an outpatient visit at a public health facility by 32.2 percentage points (Column 2, statistically significant at the 5% level) and the frequency of public outpatient visits by 1.7 times (Column 4, statistically significant at the 10% level).

Table 8 shows the IV estimates produced using a bandwidth of $\pm 7$ (sub-samples of 1,983 males and 2,896 females).[5] The results also indicate the highly robust estimates compared to the baseline estimates in Table 3. Panel A shows that retired males are more likely to have a public outpatient visit

[2]We also find statistically significant effects of exposure to retirement on retired status using this specification in the first stage as shown in Table A1. in Appendix (the *F*-test values of the excluded instrument are greater than 10).

[3]We also find statistically significant effects of exposure to retirement on retired status using these sub-samples in the first stage as shown in Table A2. in Appendix (the *F*-test values of the excluded instrument are greater than 10).

[4]We also find statistically significant effects of exposure to retirement on retired status using this specification in the first stage as shown in Table A3. in Appendix (the *F*-test values of the excluded instrument are greater than 10).

[5]We also find statistically significant effects of exposure to retirement on retired status using this specification in the first stage as shown in Table A4. in Appendix (the *F*-test values of the excluded instrument are greater than 10).

by 54.7 percentage points (Column 2, statistically significant at the 5% level) and use a higher number of public outpatient visits by 1.48 times (Column 4, statistically significant at the 10% level) than males who are not retired. Panel B shows that retired females have a higher probability of using a public outpatient service by 37.7 (Column 2, statistically significant at the 5% level) and use more public outpatient services by 1.82 times (Column 4, statistically significant at the 5% level) than non-retired females.

## 5.2 | Placebo tests

In this section, we provide the results of several placebo tests to verify the validity of the IV for both the outcomes in the first and the second stage regressions. In Table 9, we in particular use the fake legal ages of retirement eligibility for both men (55 years old) and women (50 years old) to test whether using such the hypothetical IV affects the results. We restrict the samples to those aged 50–59 for males and 45–54 for females.

Column 1, Table 9 shows that exposure to fake retirement eligibility does not affect the probability of being retired for both males (Panel A) and females (Panel B). Moreover, all estimates for the second stage in Columns 2–9 suggest that there is no effect on any outcome of health services utilization for both public and private health services. Importantly, the statistically significant effects on public outpatient services as found in Table 3 (Columns 2 and 4) also lose their statistical significance when using the fake IV in Table 9 (Columns 3 and 5).

We further perform additional placebo tests using other 'hypothetical' ages of authorized retirement, including 65 for males and 60 for females. We restrict the samples to those aged 60–69 for males and 55–64 for females. As shown in Table 10, we also find no statistically significant effects on both the probability of being retired (the first stage) and the outcomes of healthcare utilization (the second stage) and for both males (Panel A) and females (Panel B). These findings reassure the validity of the real legal ages of retirement as the valid IV for estimating the causal effects of retirement on health services utilization.

# 6 | CONCLUDING REMARKS

We study the causal effects of retirement on the outcomes of health services utilization using data from urban Vietnam. We find that retirement raises health services utilization only for outpatient services with large effects but not for inpatient services in the public health sector. Also, retirement does not affect any outcome of health services utilization outcomes in the private health sector. Our results are consistent with the findings from Zhang et al. (2018), which is the first study implemented for developing countries on this topic. In particular, Zhang et al. (2018) use data from urban China and disclose that retired people utilize more health services measured by the number of doctor visits, the number of hospital stays, expenditures for inpatient care and expenditures for self-treatment. However, our findings differ prior studies using data from developed countries which indicate that there are decreases in health services utilization following retirement (Eibich, 2015; Lucifora & Vigani, 2018; Nielsen, 2019; Shai, 2018), or retirement does not affect health services utilization (Hagen, 2018; Nielsen, 2019).

Our paper's results along with the findings from Zhang et al. (2018), therefore, show that the retirement effects on health services utilization in developing countries may be different compared to the effects in developed countries. We can account for this difference by understanding differences in

the institutional background of labour markets and economic conditions between developed and developing countries. In comparison with developed countries, the opportunity costs of time from using health services for those with a labour market active status would be relatively high because a large share of employees works with informal and low-skilled jobs as well as social protection mechanisms at the workplace for employees are not only insufficient but also ineffective in developing countries, especially low-income countries like Vietnam (McCaig & Pavcnik, 2015). Moreover, the supply capability of health services by the health system in developing countries is much lower than the demand for the use of health services, especially services for the poor at public health facilities, leading to long waiting time among users of health services. Therefore, spending time checking health status or using medical care even with public low-cost services would induce considerable trade-offs for workers, for example reducing income or even losing jobs. It is explained that retirement which leads to much lower opportunity costs of time would boost health services utilization in low-income countries such as Vietnam in our study and China in the study of Zhang et al. (2018).

Although showing positive effects of retirement on health services utilization in Vietnam, our paper finds large effects only on outpatient services in the public health sector. This finding can be explained by a fact that the costs for outpatient services are much lower than the costs for inpatient services and there is a very large constraint on the provision of health services compared to the demand (Minh et al., 2013). In addition, we find no effect on any outcome of health services utilization from the private health sector. This is because health services and medical care in Vietnam dominantly rely on the state's health system. Services provided by the private sector which are at very high costs and better quality often serve rich people who only account for a small share of the population (Ha et al., 2002; Nguyen & Wilson, 2017).

Understanding the behaviours of health services utilization among citizens is very essential for the design and performance of health systems (Sarma & Simpson, 2006). It is important to know whether retirement affects the use of health services in the context of increasing population aging worldwide, especially in developing countries where the pace of population aging is fast and there is a concern about the capacity of social care and health services provided to the elderly by the current health systems. Our findings in this paper would, therefore, contribute significant evidence to our understanding of how retirement affects health services utilization from a low-income perspective. Our paper may relate to the current public debate on if rising the legal age of retirement would be a good policy for coping with population aging in developing countries.

## REFERENCES

Anderson, M., Dobkin, C., & Gross, T. (2012). The effect of health insurance coverage on the use of medical services. *American Economic Journal: Economic Policy*, *4*(1), 1–27.

Atalay, K., Barrett, G. F., & Staneva, A. (2019). The effect of retirement on elderly cognitive functioning. *Journal of Health Economics*, *66*, 37–53.

Ayyagari, P. (2016). The impact of retirement on smoking behavior. *Eastern Economic Journal*, *42*, 270–287.

Behncke, S. (2012). Does retirement trigger ill health? *Health Economics*, *21*(3), 282–300.

Bertoni, M., Brunello, G., & Mazzarella, G. (2018). Does postponing minimum retirement age improve healthy behaviours before retirement? Evidence from Middle-aged Italian workers. *Journal of Health Economics*, *58*(1), 215–227.

Bloemen, H., Hochguertel, S., & Zweerink, J. (2017). The causal effect of retirement on mortality: Evidence from targeted incentives to retire early. *Health Economics*, *26*(12), e204–e218.

Bonsang, E., Adam, S., & Perelman, S. (2012). Does retirement affect cognitive functioning? *Journal of Health Economics*, *31*(3), 490–501.

Bonsanga, E., & Klein, T. J. (2012). Retirement and subjective well-being. *Journal of Economic Behavior & Organization*, *83*, 311–329.

Borrescio-Higa, F. (2015). Can Walmart make us healthier? Prescription drug prices and health care utilization. *Journal of Health Economics*, *44*, 37–53.

Bradley, C. J., Neumark, D., & Walker, L. S. (2018). The effect of primary care visits on other health care utilization: A randomized controlled trial of cash incentives offered to low income, uninsured adults in Virginia. *Journal of Health Economics*, *62*, 121–133.

Butterworth, P., Gill, S. C., Rodgers, B., Anstey, K. J., Villamil, E., & Melzer, D. (2006). Retirement and mental health: Analysis of the Australian national survey of mental health and well-being. *Social Science & Medicine*, *62*, 1179–1191.

Card, D., Dobkin, C., & Maestas, N. (2008). The impact of nearly universal insurance coverage on health care utilization: Evidence from medicare. *American Economic Review*, *98*(5), 2242–2258.

Caroli, E., Lucifora, C., & Vigani, D. (2016). Is there a retirement—health care utilization puzzle? Evidence from SHARE data in Europe. In: *Dipartimento di Economia e Finanza Working Paper Series (49)*. Università Cattolica del Sacro Cuore.

Celidoni, M., Bianco, C. D., & Weber, G. (2017). Retirement and cognitive decline. A longitudinal analysis using SHARE data. *Journal of Health Economics*, *56*, 113–125.

Chandra, A., Gruber, J., & McKnight, R. (2010). Patient cost-sharing and hospitalization offsets in the elderly. *American Economic Review*, *100*(1), 193–213.

Charles, K. K. (2004). Is retirement depressing? Labor force inactivity and psychological well–being in later life. *Research in Labor Economics*, *23*, 269–299.

Coe, N. B., & Zamarro, G. (2011). Retirement effects on health in Europe. *Journal of Health Economics*, *30*(1), 77–86.

Coe, N. B., & Zamarro, G. (2015). Does Retirement Impact Health Care Utilization? CESR-Schaeffer Working papers.

Coe, N. B., von Gaudecker, H.-M., Lindeboom, M., & Maurer, J. (2012). The effect of retirement on cognitive functioning. *Health Economics*, *21*(8), 913–927.

Dang, T. (2018). Do the more educated utilize more health care services? Evidence from Vietnam using a regression discontinuity design. *International Journal of Health Economics and Management*, *18*(3), 277–299.

Deri, C. (2005). Social networks and health service utilization. *Journal of Health Economics*, *24*(6), 1076–1107.

Dwyer, D. S., & Mitchell, O. S. (1999). Health problems as determinants of retirement: Are self-rated measures endogenous? *Journal of Health Economics*, *18*(2), 173–193.

Eibich, P. (2015). Understanding the effect of retirement on health: Mechanisms and heterogeneity. *Journal of Health Economics*, *43*, 1–12.

Fabrizio, M., & Franco, P. (2017). Unhealthy Retirement? *Journal of Human Resources*, *52*(1), 128–151.

Finkelstein, A., Taubman, S., Wright, B., Bernstein, M., Gruber, J., Newhouse, J. P., Allen, H., & Baicker, K., Oregon Health Study Group (2012). The Oregon health insurance experiment: Evidence from the first year. *Quarterly Journal of Economics*, *127*(3), 1057–1106.

Giang, L. T. (2012). *Viet Nam Aging Survey (VNAS) 2011: Key Findings. Technical report*.

Goda, G. S., Golberstein, E., & Grabowski, D. C. (2011). Income and the utilization of long-term care services: Evidence from the Social Security benefit notch. *Journal of Health Economics*, *30*(4), 719–729.

Godard, M. (2016). Gaining weight through retirement? Results from the SHARE survey. *Journal of Health Economics*, *45*, 27–46.

Grépin, K. A., Habyarimana, J., & Jack, W. (2019). Cash on delivery: Results of a randomized experiment to promote maternal health care in Kenya. *Journal of Health Economics*, *65*, 15–30.

Ha, N. T. H., Berman, P., & Ulla Larsen, U. (2002). Household utilization and expenditure on private and public health services in Vietnam. *Health Policy and Planning*, *17*(1), 61–70.

Hagen, J. (2018). The effects of increasing the normal retirement age on health care utilization and mortality. *Journal of Population Economics*, *31*(1), 193–234.

Harmon, C., & Nolan, B. (2001). Health insurance and health services utilization in Ireland. *Health Economics*, *10*(2), 135–145.

Heller-Sahlgren, G. (2017). Retirement blues. *Journal of Health Economics*, *54*, 66–78.

Hernaes, E., Markussena, S., Piggottb, J., & Vestad, O. L. (2013). Does retirement age impact mortality? *Journal of Health Economics*, *32*, 586–598.

Hoai, N. T., & Dang, T. (2017). The determinants of self–medication: Evidence from urban Vietnam. *Social Work in Health Care*, *56*(4), 260–282.

Hurd, M. D., & Rohwedder, S. (2013). Heterogeneity in spending change at retirement. *The Journal of the Economics of Ageing*, *1*(2), 60–71.

Insler, M. (2014). The health consequences of retirement. *Journal of Human Resources*, *49*(1), 195–233.

Johnston, D. W., & Lee, W. (2009). Retiring to the good life? The short–term effects of retirement on health. *Economics Letters*, *103*, 8–11.

Kämpfen, F., & Maurer, J. (2016). Time to burn (calories)? The impact of retirement on physical activity among mature Americans. *Journal of Health Economics*, *45*, 91–102.

Kuhn, A., Wuellrich, J. P., & Zweimuller, J. (2010). Fatal Attraction? Access to Early Retirement and Mortality, IZA Discussion Paper No. 5160.

Lee, J., & Kim, M. (2017). The effect of employment transitions on physical health among the elderly in South Korea: A longitudinal analysis of the Korean Retirement and Income Study. *Social Science & Medicine*, *181*, 122–130.

Lucifora, C., & Vigani, D. (2018). Health care utilization at retirement: The role of the opportunity cost of time. *Health Economics*, *27*, 2030–2050.

McCaig, B., & Pavcnik, N. (2015). Informal employment in a growing and globalizing low-income country. *American Economic Review*, *105*(5), 545–550.

Minh, H. V., Phuong, N. T. K., Saksena, P., James, C. D., & Xu, K. (2013). Financial burden of household out-of-pocket health expenditure in Viet Nam: Findings from the national living standard survey 2002–2010. *Social Science & Medicine*, *96*, 258–263.

Müller, T., & Shaikh, M. (2018). Your retirement and my health behavior: Evidence on retirement externalities from a fuzzy regression discontinuity design. *Journal of Health Economics*, *57*, 45–59.

Nguyen, M. P., & Wilson, A. (2017). How could private healthcare better contribute to healthcare coverage in Vietnam? *International Journal of Health Policy and Management*, *6*(6), 305–308.

Nielsen, N. F. (2019). Sick of retirement? *Journal of Health Economics*, *65*, 133–152.

Rohwedder, S., & Willis, R. (2010). Mental retirement. *Journal of Economic Perspectives*, *24*(1), 119–138.

Sarma, S., & Simpson, W. (2006). A microeconometric analysis of Canadian health care utilization. *Health Economics*, *15*(3), 219–239.

Schellhorn, M., Stuck, A. E., Minder, C. E., & Beck, J. C. (2000). Health services utilization of elderly Swiss: Evidence from panel data. *Health Economics*, *9*(6), 533–545.

Shai, O. (2018). Is retirement good for men's health? Evidence using a change in the retirement age in Israel. *Journal of Health Economics*, *57*, 15–30.

Shetty, P. (2012). Grey matter: Ageing in developing countries. *The Lancet*, *379*(9823), 1285–1287.

Strumpf, E., Ammi, M., Diop, M., Fiset-Laniel, J., & Tousignant, P. (2017). The impact of team-based primary care on health care services utilization and costs: Quebec's family medicine groups. *Journal of Health Economics*, *55*, 76–94.

Tat, S., & Barr, D. (2006). Healthcare in the New Vietnam: Comparing patients' satisfaction with outpatient care in a traditional neighborhood clinic and a new, western–style clinic in Ho Chi Minh City. *Social Science & Medicine*, *62*, 1229–1236.

United Nations Population Fund (2011). *The Aging population in Viet Nam: Current status, prognosis, and possible policy responses*. UNFPA.

United Nations (2017). *World Population Ageing 2019: Highlights*. Population Division: Department of Economic and Social Affairs.

United Nations (2019). *World Population Prospects 2019: Highlights*. Population Division: Department of Economic and Social Affairs.

Whiteford, P., & Whitehouse, E. (2006). Pension challenges and pension reforms in OECD countries. *Oxford Review of Economic Policy*, *22*(1), 78–94.

World Bank (2016a). *Taking Stock–An Update on Vietnam's Recent Economic Developments, Special Focus: Promoting Healthy and Productive Aging in Vietnam*. World Bank Vietnam.

World Bank (2016b). *Live Long and Prosper: Aging in East Asia and Pacific*. World Bank.

World Health Organization (2012). *Health Service Delivery Profile: Viet Nam*. Developed in collaboration between WHO and the Ministry of Health.

World Health Organization (2017). *Global strategy and action plan on ageing and health*. World Health Organization.

Zhang, Y., Salm, M., & van Soest, A. (2018). The effect of retirement on healthcare utilization: Evidence from China. *Journal of Health Economics*, *62*, 165–177.

Zhong, H. (2011). Effect of patient reimbursement method on health-care utilization: evidence from China. *Health Economics*, *20*(11), 1312–1329.

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## APPENDIX A

**TABLE A1** First stage: probability model for being retired (robustness, without controls)

| | Male | Female |
|---|---|---|
| **Dependent variable: retired** | **(1)** | **(2)** |
| Exposure to retirement | 0.197*** (0.030) | 0.182*** (0.023) |
| Survey year fixed effects | Yes | Yes |
| Cohort fixed effects | Yes | Yes |
| Controls | No | No |
| R-squared | 0.245 | 0.240 |
| F-test | 65.20 | 51.61 |
| Observations | 1,329 | 2,019 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis.

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

**TABLE A2** First stage: probability model for being retired (robustness, excluding Ha Noi and Ho Chi Minh City)

| | Male | Female |
|---|---|---|
| **Dependent variable: retired** | **(1)** | **(2)** |
| Exposure to retirement | 0.173*** (0.029) | 0.134*** (0.026) |
| Survey year fixed effects | Yes | Yes |
| Cohort fixed effects | Yes | Yes |
| Controls | Yes | Yes |
| R-squared | 0.274 | 0.256 |
| F-test | 67.03 | 56.71 |
| Observations | 1,065 | 1,634 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE A3** First stage: probability model for being retired (robustness, bandwidth: ±3)

| | Male | Female |
|---|---|---|
| **Dependent variable: retired** | **(1)** | **(2)** |
| Exposure to retirement | 0.208*** (0.041) | 0.181*** (0.037) |
| Survey year fixed effects | Yes | Yes |
| Cohort fixed effects | Yes | Yes |
| Controls | Yes | Yes |
| R-squared | 0.315 | 0.297 |
| F-test | 62.72 | 62.89 |
| Observations | 736 | 1,120 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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

**TABLE A4** First stage: probability model for being retired (robustness, bandwidth: ±7)

| | Male | Female |
|---|---|---|
| **Dependent variable: retired** | **(1)** | **(2)** |
| Exposure to retirement | 0.220*** (0.045) | 0.195*** (0.048) |
| Survey year fixed effects | Yes | Yes |
| Cohort fixed effects | Yes | Yes |
| Controls | Yes | Yes |
| R-squared | 0.304 | 0.299 |
| F-test | 61.35 | 61.91 |
| Observations | 1,983 | 2,896 |

*Notes:* Robust standard errors are clustered at the district level and reported in parenthesis. Controls consist of schooling years, and dummies for ethnic majority, married, health insurance and six geographical regions (Red River Delta, Midlands and Northern Mountainous, Northern and Coastal Central, Central Highlands, Southeast and Mekong River Delta).

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