Health Capacity to Work among Older Adults in Viet Nam

Long Thanh Giang, Aiko Kikkawa, and Donghyun Park*

In this paper, we estimated the additional health capacities to work of older Vietnamese adults by applying the Milligan–Wise and Cutler–Meara–Richards-Shubik methods with various nationally representative datasets. In following these methods, we postulated that older adults' mortality rates, life expectancies, and health statuses were comparable to their younger counterparts. We found that there were significant differences in employment rates between various groups of older male and female adults, in which women generally had higher capacities to work than men if they both had similar mortality rates. Along with other sociodemographic and economic factors, health status is a significant factor in determining the probability of being employed for older adults. Based on these findings, we discuss needed policy options, with a focus on health-related issues, for Viet Nam to unleash the potential work capacities of older adults.

Keywords: capacity to work, employment, health, older adults, Viet Nam

JEL codes: C53, J14, J21

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Received April 3, 2023; Published

Asian Development Review, Vol. 41, No. 1, pp. 195–225
DOI: 10.1142/S0116110524400080

I. Introduction

The 21st century will be marked by dramatic population aging worldwide, a phenomenon that can no longer be ignored (UNFPA and HelpAge International 2012). The United Nations (2019) forecasts that the world's older population (defined as those aged 60 and above) is expected to increase from about 910 million in 2020 to about 2.3 billion in 2050 (or from about 12% to 22% of the world population). In low- and middle-income countries with shallow coverage of retirement and other social protection benefits, an increasing number of older persons will put heavier responsibilities on both public finances and family support networks. To cope with reduced family bonds due to smaller average family sizes and increased migration, along with low coverage provided by social protection systems, working is a common practice for a large number of older persons in low- and middle-income countries as they need to secure income for themselves later in life (UNFPA and HelpAge International 2016).

Viet Nam, which has one of the most rapidly aging populations in Asia (UNFPA 2011), is facing such issues. Data from the Population and Housing Census (PHC) show that the older population (aged 60 and above) in 2019 was 11.4 million (or 11.9% of the total population) (General Statistics Office [GSO] 2020a). Population projections from the GSO (2020b) show that the number of older persons will reach 28.6 million (or 24.9% of the total population) in 2049. Along with the process of population aging, Viet Nam will face other challenges in terms of income security for older persons because the current social protection system has limited coverage in terms of both participation and benefits. Do (2021) showed that just 50% of older persons were covered by retirement or social assistance schemes, while income from social protection accounted for only 20% of an older person's total income on average (MOH et al. 2021). Financial support from adult children is still important but has decreased over time, as observed from national surveys of older persons during the past 10 years. To have independent income sources, working has become more common among older Vietnamese persons: In 2011, 45.3% of older men and 34.9% of older women earned income through employment (VWU 2012), and in 2019, the respective rates were 52.7% and 34.7% (MOH et al. 2021).

Previous studies have highlighted the differences in employment rates among different older groups in Viet Nam: Younger persons, men, those living in rural areas, and members of the Kinh population (ethnic majority) usually have higher rates of employment than their respective counterparts, including persons of more advanced age, women, those living in urban areas, and members of ethnic minorities

(see, for example, Knodel and Truong 2002, Giang and Pfau 2007, Giang and Le 2015, Giang and Le 2018, and GSO 2021). Many studies have discussed the factors associated with the employment status of older persons in Viet Nam, but none of them discussed how improvements in health could contribute to increased work capacity for older Vietnamese men and women.

Since the official retirement ages for Vietnamese men and women are, respectively, 60 and 55 under the Law on Social Insurance in 2014, it is important to compare people at preretirement ages and those at postretirement ages in terms of work capacity. As this paper is to the best of our knowledge the first to discuss this issue in Viet Nam, we aimed to explore how health status along with different sociodemographic and economic factors shapes employment decisions, and what is the scale of "untapped" health capacity to work among Vietnamese older adults (defined as those aged 50 and over). Given the assumption that older adults' mortality rates, life expectancies, and health statuses were comparable to their younger counterparts, we estimated the additional health capacities to work of these persons by applying the Milligan–Wise (MW) and Cutler–Meara–Richards-Shubik (CMR) methods to nationally representative datasets.

This paper is structured as follows. In section II, we provide descriptions of our analytical methods along with datasets and variables. Key findings for each method are presented in section III, while discussions and policy implications are presented in section IV. The final section concludes the paper.

II. Analytical Methods and Datasets

A. The Milligan–Wise Method

The MW method was discussed in detail in Milligan and Wise (2015). Health can be measured by different indicators, such as self-rated health (SRH) status, mortality rate, and life expectancy. With regard to the mortality rate, the MW method explores how much older adults with a given mortality rate today could work if they were to work as much as those with the same mortality rate worked in the past.

For the case of Viet Nam, we applied this method to data for mortality rates, life expectancies, and employment rates of male and female adults aged 50–69 in 2009 and 2019. As such, this paper answered the question of how much more older adults could work in 2019 if they worked as much as those with the same mortality or life expectancy rates in 2009.

In our calculations, we disaggregated the data by gender and applied the sample weights to make all results representative of specific groups as well as all Vietnamese older adults.

We used data for mortality rates and life expectancies of Vietnamese older adults aged 50–69 from the PHC in 2009 and 2019. The original data were curated by the GSO and disaggregated by 5-year age groups (i.e., 50–54, 55–59, 60–64, and 65–69). Needing data for single-age mortality rates and life expectancy for men and women aged 50–69, we applied the linear spline interpolation technique to get this information.

For the question on the employment status of older adults, the PHC in 2009 and 2019 had the same definition of an employed person: an individual aged 15 or above who reported that they participated in paid work or uncompensated work for a family business for at least 1 hour in the week prior to the survey.

B. The Cutler–Meara–Richards-Shubik Method

The CMR method was described in detail in Cutler, Meara, and Richards-Shubik (2013). This method examines how much people with a given level of health could work if they were to work as much as their younger counterparts in similar health. Using simulation exercises, the CMR method attempts to quantify the potential work capacity and likely disability level of the reference age group.

In this paper, we first run linear probability model regressions to identify factors associated with the employment status of older reference adults (i.e., men aged 50–59 and women aged 50–54). Variables that were considered are described in the section below. Second, we simulated employment rates for older groups (i.e., men aged 60–79 and women aged 55–79) with an assumption that the relationship between health status and an individual's capacity to work was the same as their younger counterparts. The capacity to work was calculated as the difference between actual and simulated employment rates.

To have comparable results with the same datasets, we also followed the same steps with logistic models. The results of simulations from both the linear probability models and the logistic models were compared to identify the trends and magnitudes of work capacities for male and female older adults in Viet Nam given their health status.

1. Data

To identify factors associated with the employment status of older adults and their health-related capacity to work over time, we used cross-sectional data from the Viet Nam Aging Survey in 2011 (hereafter the 2011 VNAS) (VWU 2012) and the

Survey on Older Persons and Social Health Insurance in 2019 (hereafter the 2019 OP and SHI) (MOH et al. 2021). Both were nationally representative surveys of Vietnamese older adults (defined as those aged 50 and over).

The 2011 VNAS was the first national survey of Vietnamese older adults. The sample of the VNAS was chosen through a multistage sampling framework based on data from the 2009 PHC. The sampling method used was probability proportional to size with four steps to choose representative provinces, districts (in each province), communes (in each district), villages (in each commune), and people aged 50 and over (from each village). The 2011 VNAS collected various pieces of information on the sociodemographic, economic, and health characteristics of the surveyed people, as well as their household situations (such as housing and assets). Data were collected by personal interviews, using a structured questionnaire. The final 2011 VNAS sample included 4,007 persons aged 50 and over.

The 2019 OP and SHI was the second national survey of Vietnamese older adults, conducted in 2019. Its sampling processes and content were similar to those in the 2011 VNAS. Personal interviews were used to collect data through structured questionnaires. The final 2019 OP and SHI sample included 4,333 persons aged 50 and over.

2. Variables

As the 2011 VNAS and the 2019 OP and SHI were quite similar in content, most of the variables used in our estimations from both surveys could be calculated and categorized in the same ways.

Dependent variable: Employment status of older adults

Employment status was indicated by asking: "During the past 7 days, have you worked to generate income for yourself and your family?" People were considered to be employed if they selected "Yes" and then were coded as 1 for the purpose of analysis. On the other hand, those who chose "No" were treated as nonemployed and coded as 0.

Explanatory variables

The exploratory variables for the sample of men aged 50–59 and women aged 50–54 are summarized in Table 1.

III. Key Findings

Figure 1 shows that for both men and women, employment rates in 2009 were generally higher than those in 2019. At all age groups and in both years, men had

Table 1. **List of Variables**

Variable	Definition in the Survey	Categories in This Research
Dependent variable		
Employment status	"During the past 7 days, have you worked to generate income for yourself and your family?" The response could be "Yes" or "No."	Not employed = 0; Employed = 1
SRH		
SRH	A surveyed person was asked "How would you rate your physical health at the present time? Would you say it is very good, good, fair, poor, or very poor?" He or she could choose each of "very good," "good," "fair," "poor," or "very poor." In this research, this variable was categorized into three statuses: (i) very good or good, (ii) fair, and (iii) bad or very bad.	This variable was categorized into three statuses: (i) very good or good, (ii) fair, and (iii) bad or very bad.
Had difficulties with ADL	A surveyed person was asked to self-assess his or her level of difficulty in performing ADL, including eating, getting dressed and undressed, bathing or washing yourself, getting up when you are lying down, and getting to and using the toilet. And there were four choices: "no," "mild," "severe," and "could not perform."	Two variables for this: adl_1: Had at least one difficulty (very difficult to perform, or could not perform) in ADL adl_2: Had at least two difficulties
Had difficulties with IADL	A surveyed person was asked to self-assess his or her level of difficulty in performing IADL, including the ability to use a telephone, shopping, food preparation, housekeeping, doing laundry, using transportation, self-medication, and handling finances.	No difficulty = 1; At least one difficulty in any IADL = 0
Eyesight	A surveyed person was asked "How well can you see without wearing glasses?" (2011 VNAS) and "How well can you see when wearing glasses?" (2019 OP and SHI). And there were four choices: "no," "mild," "severe," and "could not do at all."	A person was considered to have difficulty in visioning if he or she responded "severe" or "could not do at all."
Cognition	A surveyed person was asked "When use your language, do you have any difficulties in communication? (for example: understand other people or other people understand you)." And there were four choices "no," "mild," "severe," and "could not do at all."	A person was considered to have difficulty in cognition if he/she responded "severe" or "could not do at all."

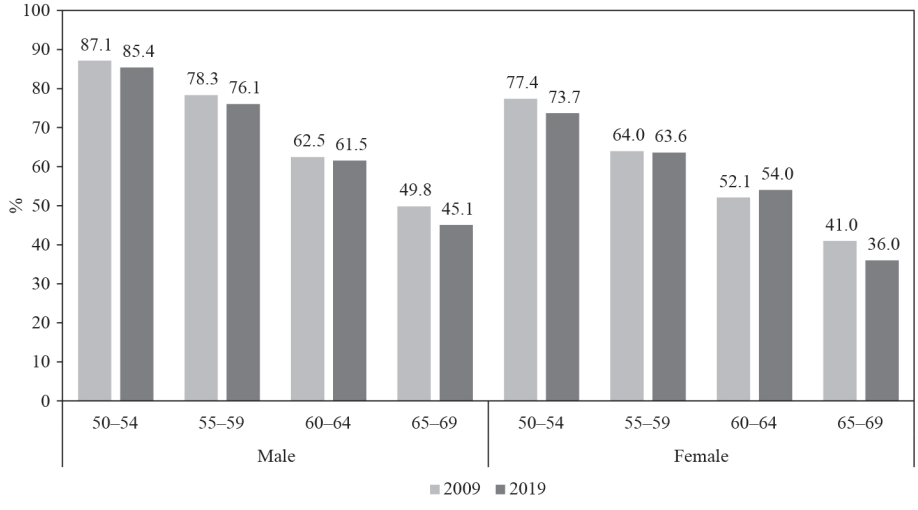
Continued.

Table 1. *Continued.*

Variable	Definition in the Survey	Categories in This Research
Noncommunicable diseases	A surveyed person was asked whether he or she was diagnosed with diabetes, hypertension, heart, cancer, asthma, and arthritis.	Yes = 1; No = 0
Risk factor (smoking)	A surveyed person was asked whether he or she was currently smoking.	Yes = 1; No = 0
Highest educational level	A surveyed person was asked to state the highest educational level that he or she attained. The answers included no schooling, incomplete primary education, primary school, lower secondary, upper secondary, professional secondary, college, university, masters, and doctorate.	For statistical description, answers will be categorized into one of five groups: No schooling and incomplete primary education (Edu_none); Primary school (Edu_elementary); Lower secondary (Edu_middle); Upper secondary (Edu_high); and College, University, Masters, and Doctor (Edu_college) For OLS regressions, there will be three groups: (i) up to elementary (Edu_none + Edu_elementary) = 1; (ii) from elementary to upper secondary (Edu_middle + Edu_high) = 2; and (iii) college and above (Edu_college) = 3
Marital status	A surveyed person was asked about his or her current marital status, and there are five answers: currently married, single, divorced, separated, and widowed.	Two groups: Currently married = 1; Currently unmarried (single divorced, separated, and widowed) = 0
Place of residence	A surveyed person was asked whether he or she was living in an urban or rural area.	Urban = 1; Rural = 0
Ethnicity	A surveyed person was asked about his or her ethnicity.	Kinh (ethnic majority) = 1; Other (ethnic minorities) = 0

ADL = activities of daily living, IADL = instrumental activities of daily living, OLS = ordinary least squares, OP and SHI = Survey on Older Persons and Social Health Insurance, SRH = self-rated health, VNAS = Viet Nam Aging Survey.
Source: Authors' compilation.

Figure 1. **Employment Rate of Older Adults (aged 50–69) by Gender and Age Group**



Source: Authors' calculations based on data from the Population Housing Census, 2009 and 2019.

higher employment rates than women. The employment rates of both men and women decreased significantly at higher ages, and the gap between men and women grew larger.

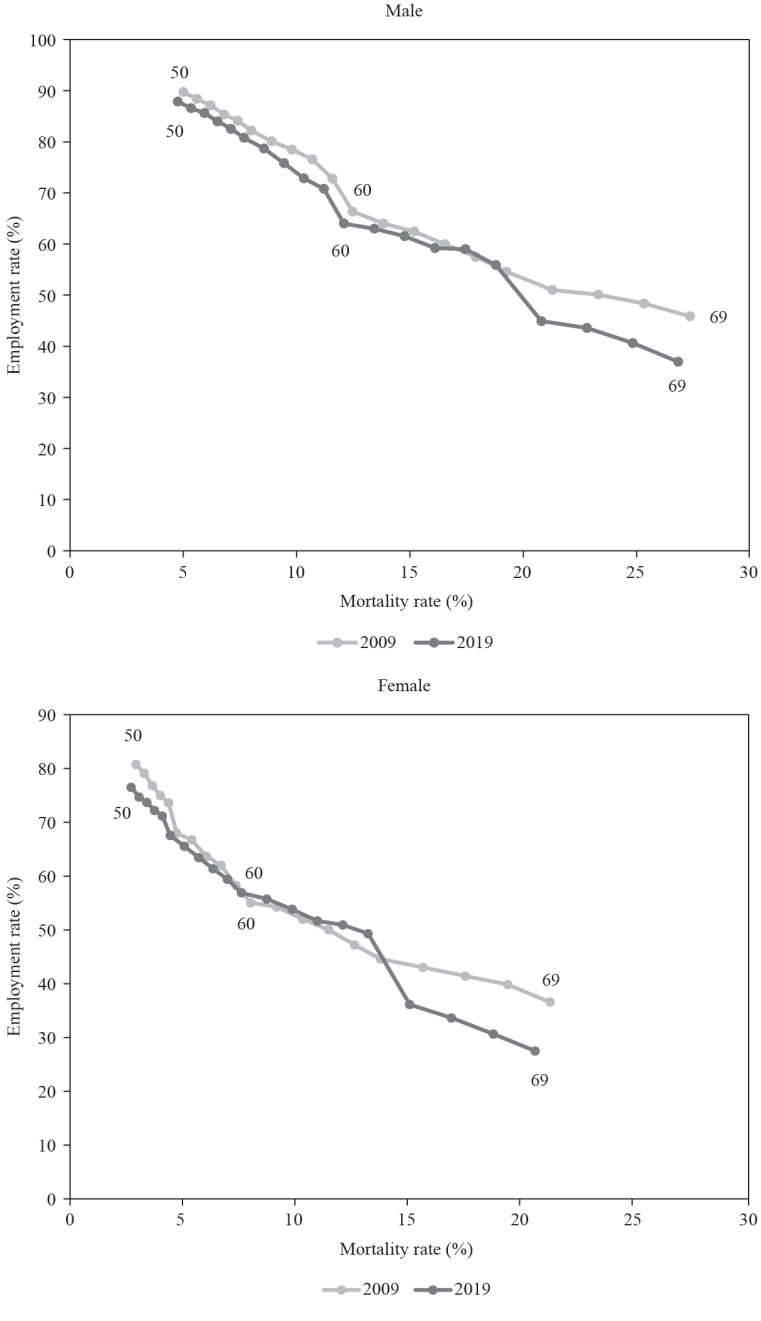
A. Results of the Milligan–Wise Method

The upper and lower panels of Figure 2, respectively, show employment rates in relation to mortality rates for older males and females. In both survey years and for both genders, higher mortality rates were accompanied by lower employment rates. More importantly, at the same mortality rate, employment rates in 2019 were higher than those in 2009.

These results were also consistent with those showing the estimated employment rates in relation to the life expectancies of men and women, as illustrated in Figure 3. In general, for both years and genders, higher life expectancies were accompanied by higher employment rates. More importantly, at the same life expectancy, employment rates in 2019 were higher than those in 2009.

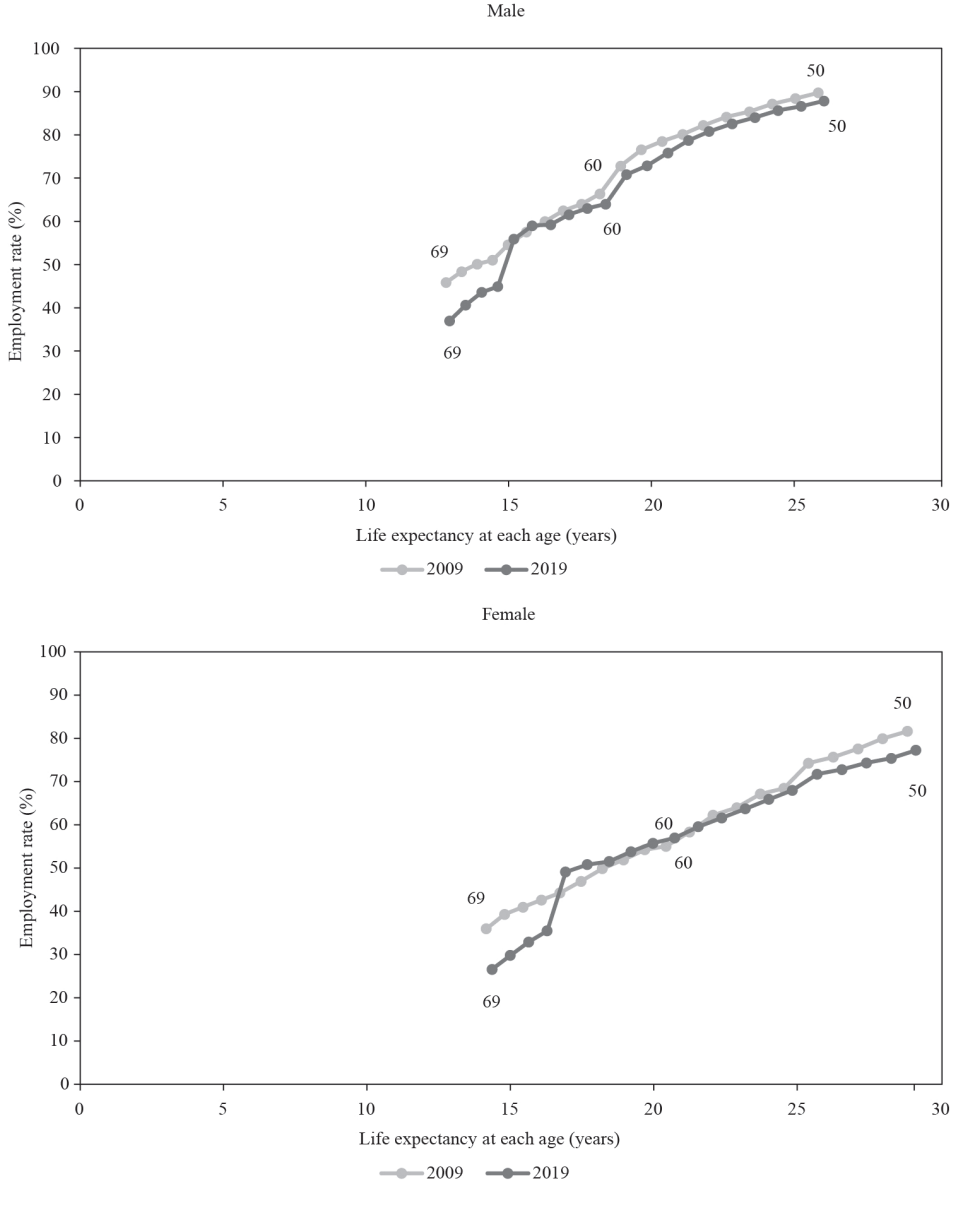
Figure 4 compares the employment rates of men and women with their respective mortality rates, showing clearly that their employment rates were lower at higher mortality rates. Noticeably, at the same mortality rates, women had significantly lower rates of employment than their male counterparts.

Figure 2. **Employment Rates versus Mortality Rates of Older Adults (aged 50–69) by Gender**



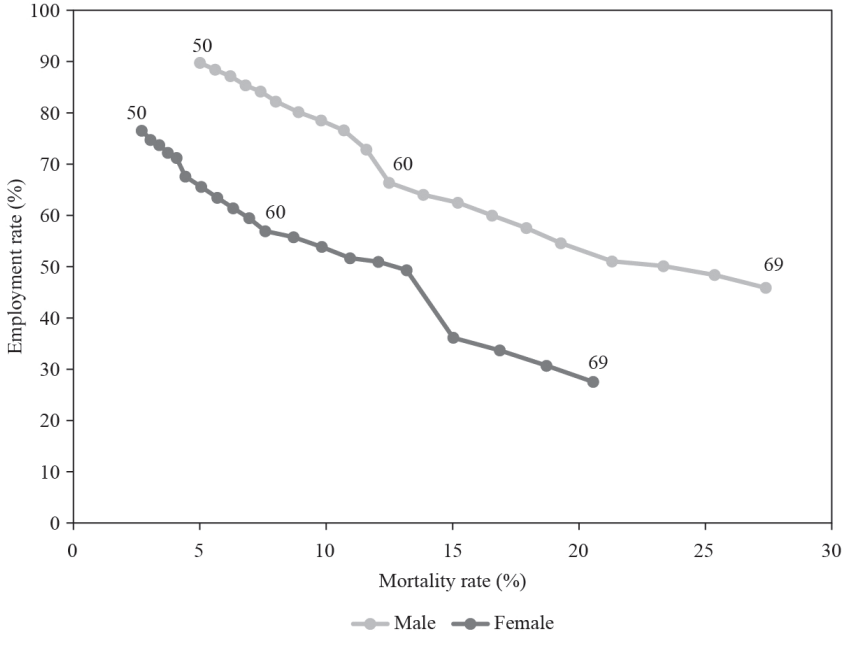
Note: The numbers 50, 60, and 69 refer to ages of older adults.
Source: Authors' calculations based on data from the Population Housing Census, 2009 and 2019.

Figure 3. **Employment Rates versus Life Expectancies of Older Adults (aged 50–69) by Gender**



Note: The numbers 50, 60, and 69 refer to ages of older adults.
Source: Authors' calculations based on data from the Population Housing Census, 2009 and 2019.

Figure 4. **Employment Rates versus Mortality Rates of Older Adults (aged 50–69) by Gender**



Note: The numbers 50, 60, and 69 refer to ages of older adults.
Source: Authors' calculations based on data from the 2019 Population Housing Census.

Table 2 presents the simulated employment rates for older male and female adults with the assumption that in 2009 they both had the same mortality rates as they did in 2019. Since the estimated results were based on mortality rates in 2019, which were lower than those in 2009 across all age groups, such an assumption implies that people in 2009 were as healthy as those in 2019 and, therefore, the people in 2009 under this assumption must be younger than they actually were. As a result, additional capacities to work for both men and women in all age groups are positive, albeit at varying magnitudes. Women, particularly those at preretirement ages (i.e., 50–54 years old), generally have significantly higher additional capacities to work than men at the same ages.

Table 3 presents the untapped capacity to work for older female adults if they had the same mortality rates as their male counterparts in 2019. The untapped capacities for female older adults throughout all ages from 56 to 69 would have been large.

Table 2. **Additional Employment Capacity for Older Men and Women Aged 50–69**

Male					Female				
Age	MR in 2019 (%)	LFPR in 2009 at the Same MR (%)	LFPR in 2019 (%)	Additional Employment Capacity	Age	MR in 2019 (%)	LFPR in 2009 at the Same MR (%)	LFPR in 2019 (%)	Additional Employment Capacity
50	4.77	89.66	87.86	1.80	50	2.71	82.17	76.51	5.66
51	5.35	88.41	86.59	1.82	51	3.05	80.76	74.71	6.05
52	5.94	87.14	85.63	1.51	52	3.40	79.13	73.69	5.44
53	6.52	85.36	84.01	1.35	53	3.74	76.83	72.21	4.62
54	7.11	84.14	82.55	1.59	54	4.09	74.98	71.18	3.80
55	7.69	82.20	80.80	1.40	55	4.43	73.62	67.57	6.05
56	8.57	80.12	78.70	1.42	56	5.06	66.73	65.54	1.19
57	9.45	78.50	75.82	2.68	57	5.69	63.68	63.43	0.25
58	10.34	76.57	72.86	3.71	58	6.33	62.78	61.38	1.40
59	11.22	72.82	70.81	2.01	59	6.96	60.33	59.43	0.90
60	12.10	66.36	64.00	2.36	60	7.59	57.20	56.91	0.29
61	13.44	63.99	63.00	0.99	61	8.71	56.65	55.74	0.91
62	14.78	62.46	61.54	0.92	62	9.83	54.15	53.83	0.32
63	16.13	59.96	59.23	0.73	63	10.94	52.01	51.65	0.36
64	17.47	59.10	58.99	0.11	64	12.06	51.45	50.94	0.51
65	18.81	57.51	55.88	1.63	65	13.18	50.91	49.30	1.61
66	20.82	51.02	44.93	6.09	66	15.03	43.04	36.13	6.91
67	22.84	50.11	43.58	6.53	67	16.87	41.43	33.66	7.77
68	24.85	48.37	40.63	7.74	68	18.72	39.84	30.66	9.18
69	26.87	45.85	36.97	8.88	69	20.56	36.59	27.52	9.07

LFPR = labor force participation rate, MR = mortality rate.
Source: Authors' calculations based on data from the 2019 Population Housing Census.

Table 3. **Untapped Capacity to Work among Female Older Adults Aged 50–69 at the Same Mortality Rates as Their Male Counterparts, 2019**

Age	Mortality Rate in 2019 (%)	Approximate LFPR if Having the Same MR as Men (%)	Actual LFPR (%)	Gap (Untapped)
56	5.06	89.74	65.54	24.20
57	5.69	88.41	63.43	24.98
58	6.33	87.14	61.38	25.76
59	6.96	85.36	59.43	25.93
60	7.59	84.14	56.91	27.23
61	8.71	80.12	55.74	24.38
62	9.83	78.50	53.83	24.67
63	10.94	76.57	51.65	24.92
64	12.06	72.82	50.94	21.88
65	13.18	63.99	49.3	14.69
66	15.03	62.46	36.13	26.33
67	16.87	59.96	33.66	26.30
68	18.72	54.58	30.66	23.92
69	20.56	51.02	27.52	23.50

LFPR = labor force participation rate, MR = mortality rate.
Source: Authors' calculations based on data from the 2019 Population and Housing Census.

B. Results of the Cutler–Meara–Richards-Shubik Method

1. Descriptive Statistics

Table 4 presents background information for those aged 50–69, using the 2011 VNAS and 2019 OP and SHI datasets. Specifically, the reference group for men was those aged 50–59, while for women it was those aged 50–54 (assuming their normal retirement ages are 60 and 55, respectively). In general, the employment rates of both men and women at the same age ranges in 2019 were lower than in 2011. In both years and for both genders, the employment rates were significantly lower at higher age ranges.

In terms of SRH, the frequency of either "very good" or "good" status in 2019 for both men and women were higher than in 2011, while the opposite was observed for either "poor" or "very poor" status. For the functional limitations, significant differences were observed for both men and women in activities of daily living (ADL) and instrumental ADL (IADL). In terms of disability and physical limitations, both surveys showed that younger men and women had significantly lower rates than their respective counterparts of more advanced ages. For health conditions, for both years and genders, younger persons had fewer chronic diseases than older ones. High blood pressure and arthritis were the most common diseases for both men and women.

Table 4. **Statistical Description for Reference and Comparative Groups by Gender and Age**

Variable	2011 VNAS				2019 OP and SHI			
	Men 50–59 (*N* = 545)	Men 60–79 (*N* = 818)	Women 50–54 (*N* = 420)	Women 55–79 (*N* = 1,439)	Men 50–59 (*N* = 521)	Men 60–79 (*N* = 902)	Women 50–54 (*N* = 334)	Women 55–79 (*N* = 1,647)
Labor force status								
Employed	88.90	52.96	76.39	48.85	79.66	53.88	75.21	48.40
(i) Self-rated health								
Very good or good	13.91	7.11	8.06	5.02	17.93	10.47	9.58	11.20
Fair	48.89	35.99	43.36	30.26	48.86	45.26	55.99	42.04
Poor or very poor	37.19	56.90	48.58	64.72	33.21	44.27	34.43	46.77
(ii) Functional limitations								
(a) ADL difficulty								
1 (adl_1)	0.94	0.34	0.63	1.10	0.76	2.78	1.42	2.18
2 or more (adl_2)	99.06	99.66	99.37	98.90	1.61	5.81	4.31	4.14
(b) IADL difficulty								
Any	NA	NA	NA	NA	11.23	26.10	11.69	29.77
(c) Visual impairment[a]								
Yes	58.65	61.26	59.99	63.80	6.11	12.24	12.50	10.05
(d) Physical limitations								
Yes (any)	3.30	18.15	16.23	28.81	11.50	21.61	18.60	30.17
(e) Cognitive limitations								
Yes	NA	NA	NA	NA	3.30	8.73	2.72	5.60
(iii) Prevalence of health conditions								
(a) Number of diagnosed chronic diseases								
0	74.48	56.96	61.60	46.49	63.72	45.85	61.25	42.85
1+	25.52	43.04	38.40	53.51	36.28	54.15	38.75	57.15

Continued.

Table 4. *Continued.*

Variable	2011 VNAS				2019 OP and SHI			
	Men 50–59 (*N* = 545)	**Men 60–79 (*N* = 818)**	**Women 50–54 (*N* = 420)**	**Women 55–79 (*N* = 1,439)**	**Men 50–59 (*N* = 521)**	**Men 60–79 (*N* = 902)**	**Women 50–54 (*N* = 334)**	**Women 55–79 (*N* = 1,647)**
(a1) Diabetes?								
Yes	2.77	4.95	6.00	5.89	6.43	8.54	5.14	12.83
(a2) High blood pressure?								
Yes	22.27	36.48	33.30	47.00	31.75	48.14	35.12	48.4
(a3) Heart disease?								
Yes	6.40	12.32	13.03	19.75	8.78	12.24	10.77	21.22
(a4) Cancer?								
Yes	0.21	1.25	1.94	1.49	2.47	0.73	2.25	1.81
(a5) Asthma or lung disease?								
Yes	10.90	21.04	5.70	13.69	12.44	17.52	8.23	9.61
(a6) Arthritis or rheumatism?								
Yes	18.02	23.27	33.31	43.43	27.18	27.35	40.62	41.35
(b) Depression?								
Yes	1.42	0.55	0.24	0.45	0.00	1.04	0.27	0.92
(iv) Risk factors								
Currently smoking?								
Yes	62.26	44.59	2.41	6.06	53.99	45.94	0.57	2.47
(v) Individual characteristics								
(a) Education[b]								
No schooling or incomplete primary school	10.65	25.09	26.49	56.74	21.41	19.20	23.08	33.97

Continued.

Table 4. *Continued.*

Variable	2011 VNAS				2019 OP and SHI			
	Men 50–59 (*N* = 545)	Men 60–79 (*N* = 818)	Women 50–54 (*N* = 420)	Women 55–79 (*N* = 1,439)	Men 50–59 (*N* = 521)	Men 60–79 (*N* = 902)	Women 50–54 (*N* = 334)	Women 55–79 (*N* = 1,647)
Elementary	15.13	19.42	17.35	16.30	20.14	26.40	24.68	22.02
Middle school	41.65	25.97	33.34	16.52	39.35	31.30	29.88	26.24
High school	25.57	17.88	15.64	5.53	15.38	15.17	14.02	10.60
College	7.00	11.64	7.18	4.91	3.71	7.92	8.34	7.18
(b) Marital status								
Currently married (Yes)	95.66	88.98	83.30	53.49	95.04	92.14	79.37	58.67
(c) Residential area								
Urban (Yes)	37.80	31.88	37.90	30.86	18.57	28.61	29.56	38.10
(d) Ethnicity								
Kinh (majority—Yes)	89.39	90.40	91.21	87.94	94.61	96.33	91.88	95.09

ADL = activities of daily living, IADL = instrumental activities of daily living, NA = data not available, OP and SHI = Survey on Older Persons and Social Health Insurance, VNAS = Viet Nam Aging Survey.

Notes:

[a]In the 2011 VNAS, the response for the visual impairment was "without glasses," while that for the 2019 OP and SHI was "with glasses."

[b]In the 2011 VNAS, edu_college included "professional secondary education," while the 2019 OP and SHI did not include this category as it was considered part of the vocational education system.

Source: Authors' calculations based on data from the 2011 VNAS and the 2019 OP and SHI.

For health-risk behaviors, there were vast differences between men and women at all age groups in smoking rates: Men had much higher rates than women. In both surveys, younger men had higher rates of smoking than older ones, while younger women had lower rates of smoking than older ones.

Between 2011 and 2019, the average level of educational attainment improved for both men and women at all age ranges. Noticeably, the share of persons having either no schooling or an incomplete primary education was much lower in 2011 than in 2019 for both men and women, while the respective share of persons with a college education or above was higher in the latter year, particularly for women.

Regarding marital status, there were large differences in both surveys between men and women at all age groups, partly due to older women having higher rates of widowhood than men. This is a persistent situation in Viet Nam, as shown in UNFPA (2011) and GSO (2020a).

Finally, most of the older adults in the sample were a member of the Kinh ethnic majority.

2. Results of the Regression Models

Table 5 presents the results of the linear probability models—which are ordinary least squares (OLS) regressions for a binary variable showing the employment status of older persons—using data from both the 2011 VNAS and the 2019 OP and SHI. In both models and datasets, where the estimated coefficients were statistically significant, the results show that male and female older adults having SRH status of "poor" or "very poor" had a lower probability of being employed than those having "very good" or "good" status. There was no statistically significant difference between those with "fair" health status and those with "very good" or "good" status in both models and both years.

For functional limitations, where the estimated coefficients were statistically significant, the results also implied that both men and women with at least one ADL or IADL difficulty had a lower probability of being employed than those without any such difficulties. For disability, eyesight was a statistically significant factor in reducing the probability to be employed for men, while it was not a significant factor for women in any of the models. Cognitive function was not a statistically significant factor influencing the probability to be employed for either men or women in both years. In terms of health conditions (chronic and noncommunicable diseases), the statistically significant coefficients for diabetes, hypertension, heart disease, and cancer show that these diseases reduced the probability of being employed for both men and women. In contrast, in both years, where the estimated coefficients are statistically

Table 5. **Results of Ordinary Least Squares Regressions for the Reference Groups of Men and Women in 2011 and 2019**

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
SRH									
	Very good or good (ref.)								
	Fair	−0.012	−0.007	−0.120	−0.121	0.080	0.083	−0.105	−0.134
		(0.046)	(0.044)	(0.089)	(0.084)	(0.070)	(0.061)	(0.126)	(0.133)
	Poor or very poor	−0.073	0.066	−0.157*	−0.173*	−0.171**	−0.126*	−0.101	−0.125
		(0.049)	(0.049)	(0.086)	(0.089)	(0.073)	(0.067)	(0.139)	(0.147)
Function									
	No difficulty in ADL (ref.)								
	Had 1 ADL difficulty	0.152	0.223	−0.254***	−0.243**	−0.553***		0.006	
		(0.268)	(0.241)	(0.093)	(0.096)	(0.144)		(0.185)	
	Had 2+ ADL difficulty						−0.448***		0.005
							(0.128)		(0.108)
	No difficulty in IADL (ref.)								
	Had IADL difficulty		NA		NA		−0.174*		−0.174*
			(NA)		(NA)		(0.982)		(0.089)
	No problem with eyesight (ref.)								
	Had eyesight problem		−0.028*		0.001		−0.170*		0.087
			(0.033)		(0.053)		(0.090)		(0.087)

Continued.

Table 5. *Continued.*

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	No difficulty in cognitive function (ref.)								
	Had difficulty in cognitive function		NA (NA)		NA (NA)		0.149 (0.104)		0.012 (0.138)
Health condition									
	No diabetes (ref.)								
	Had diabetes	−0.153	−0.146	−0.326**	−0.323*	−0.175	−0.181*	−0.081	−0.062
		(0.201)	(0.194)	(0.149)	(0.148)	(0.112)	(0.109)	(0.133)	(0.135)
	No hypertension (ref.)								
	Had hypertension	0.000	0.007	−0.038	−0.045	0.061	0.054	0.076	0.084
		(0.038)	(0.041)	(0.058)	(0.053)	(0.051)	(0.047)	(0.074)	(0.073)
	No heart problem (ref.)								
	Had a heart problem	−0.031	−0.030	−0.174*	−0.173*	0.004	0.011	−0.122	−0.155
		(0.082)	(0.086)	(0.093)	(0.091)	(0.070)	(0.064)	(0.104)	(0.100)
	No cancer (ref.)								
	Had a cancer	−0.798***	−0.794***	0.016	−0.003	0.251	0.217	−0.133	−0.130
		(0.104)	(0.111)	(0.096)	(0.096)	(0.180)	(0.180)	(0.166)	(0.166)
	No asthma (ref.)								
	Had asthma		0.081**		0.056		−0.095		0.227***
			(0.033)		(0.057)		(0.081)		(0.057)

Continued.

Table 5. *Continued.*

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	No arthritis (ref.)								
	Had arthritis		−0.021		0.052		−0.015		−0.069
			(0.064)		(0.059)		(0.052)		(0.073)
Risk factor	Currently nonsmoking (ref.)								
	Currently smoking	0.018	0.020	0.088	0.074	0.036	0.033	−0.319	−0.240
		(0.035)	(0.035)	(0.145)	(0.140)	(0.047)	(0.045)	(0.335)	(0.295)
Individual characteristics									
	No schooling or incomplete primary (ref.)								
	Elementary to high school	0.009	0.018	0.037	0.044	0.024	0.012	0.133	0.104
		(0.038)	(0.040)	(0.070)	(0.069)	(0.056)	(0.054)	(0.085)	(0.083)
	College	−0.086	−0.073	0.149	0.152	0.064	0.029	0.117	0.070
		(0.066)	(0.070)	(0.137)	(0.137)	(0.124)	(0.123)	(0.148)	(0.146)
	Currently unmarried (widow, divorced…) (ref.)								
	Currently married	−0.135**	−0.130**	0.030	0.025	−0.020	−0.014	−0.104	−0.084
		(0.056)	(0.057)	(0.083)	(0.081)	(0.115)	(0.116)	(0.066)	(0.083)
	Rural (ref.)								
	Urban	−0.176***	−0.171***	−0.303***	−0.298***	−0.132	−0.129*	−0.156	−0.156
		(0.053)	(0.053)	(0.057)	(0.057)	(0.086)	(0.078)	(0.099)	(0.099)

Continued.

Table 5. *Continued.*

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	Ethnic minority (ref.)								
	Kinh (ethnic majority)	−0.108*	−0.112*	0.221	0.224	−0.013	−0.0004	−0.086	−0.083
		(0.065)	(0.064)	(0.157)	(0.158)	(0.071)	(0.070)	(0.085)	(0.084)
	Constant	1.058***	0.983***	1.049***	1.023***	0.820***	0.844***	0.948***	0.995***
		(0.306)	(0.273)	(0.194)	(0.190)	(0.136)	(0.133)	(0.168)	(0.170)
	R^2	0.1420	0.1512	0.2549	0.2585	0.1195	0.1661	0.0546	0.0944

NA = data not available, OLS = ordinary least squares, OP and SHI = Survey on Older Persons and Social Health Insurance, ref. = reference, SRH = self-rated health, VNAS = Viet Nam Aging Survey.

Notes: Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors are in parentheses. Using OLS for the 2011 VNAS data, the variable "adl_2" was automatically omitted due to correlation in both models for men and women, so we replaced it with "adl_1."

Source: Authors' calculations based on data from the 2011 VNAS and the 2019 OP and SHI.

significant, the results show that asthma was associated with a higher probability to be employed for both men and women. In addition, health-risk behavior (i.e., smoking) had no statistically significant difference on the probability of being employed for either men or women in both years.

In terms of individual characteristics, for both men and women and in both years, a higher level of educational attainment had no statistically significant impact on the probability to be employed when compared with no schooling or an incomplete primary education.

Where the estimated coefficients were statistically significant, the results indicate that both men and women who were married, living in urban areas, and members of the majority Kinh ethnic group had a lower probability of being employed than their counterparts (i.e., nonmarried men and women, those living in rural areas, and members of ethnic minorities).

To compare with results from the linear probability models, we conducted logistic regression models for the same samples of male and female older adults, with the results presented in Table A1 of the Appendix. In general, the results from both models for men and women with data from the 2011 VNAS and the 2019 OP and SHI show consistency with the results from the OLS regressions in Table 5. For example, with regard to SRH, no statistically significant differences were found among women aged 50–54, while in both models for men, those with "poor" or "very poor" SRH generally had a lower probability to work than those with "good" or "very good" SRH status. In contrast with the results from the OLS regressions, however, no differences in the probability to work between Kinh and ethnic minority men and women were found in this model.

3. Results from Simulations of the Capacity to Work

Using the OLS results from Table 5, Table 6 presents the results from simulations of the capacity to work for men and women at different age ranges with an assumption that they have similar characteristics as the respective reference groups (i.e., men aged 50–69 and women aged 50–54). For both men and women at all age ranges and in both survey years, the simulated results imply that predicted employment rates are significantly higher than the actual ones. This is due to our assumption for simulations, but it also means that, all other things being equal, if older persons could have maintained or improved their health status then they would have been able to work more.

Table A2 of the Appendix presents the simulation results, which used the results from logistic models. In both 2011 and 2019, the simulated results indicate that the

Table 6. **Simulated Capacity to Work from Ordinary Least Squares Regressions with Two Datasets**

OLS (2011 VNAS)			Model 1		Model 2	
Age Group	Obs.	Actual Working Rate (%)	Predicted Working Rate (%)	Estimated Additional Capacity to Work (%)	Predicted Working Rate (%)	Estimated Capacity to Work (%)
Men						
60–64	302	69.61	86.82	17.21	87.54	17.93
65–69	193	60.43	90.25	29.82	90.62	30.19
70–74	211	35.54	86.19	50.65	86.91	51.37
75–79	112	28.53	89.77	61.24	90.41	61.88
Women						
55–59	253	70.23	77.10	6.87	77.33	7.10
60–64	476	58.01	75.65	17.64	75.95	17.94
65–69	216	39.75	72.30	32.55	72.78	33.03
70–74	312	28.37	72.55	44.18	72.84	44.47
75–79	182	23.76	72.24	48.48	72.58	48.82
2019 OP and SHI			**Model 1**		**Model 2**	
Age Group	Obs.	Actual Working Rate (%)	Predicted Working Rate (%)	Estimated Additional Capacity to Work (%)	Predicted Working Rate (%)	Estimated Capacity to Work (%)
Men						
60–64	325	70.08	77.76	7.68	75.78	5.70
65–69	261	51.99	76.48	24.49	72.07	20.08
70–74	179	33.87	74.43	40.56	68.70	34.83
75–79	137	26.34	73.34	47.00	63.88	37.54
Women						
55–59	418	65.35	75.64	10.29	74.37	9.02
60–64	382	54.87	76.25	21.38	72.89	18.02
65–69	319	35.42	74.11	38.69	69.38	33.96
70–74	291	23.23	75.36	52.13	69.36	46.13
75–79	237	15.64	75.40	59.76	67.99	52.35

Obs. = observations, OLS = ordinary least squares, OP and SHI = Survey on Older Persons and Social Health Insurance, VNAS = Viet Nam Aging Survey.
Source: Authors' calculations based on data from the 2011 VNAS and the 2019 OP and SHI.

predicted employment rates of men and women at all age ranges are significantly higher than their respective actual employment rates. Specifically, the estimated additional capacity to work, which is the gap between the predicted and actual employment rates, is significantly higher at older age ranges.

IV. Discussion

This study aimed to quantify the health-related capacity to work among Vietnamese older adults by applying the MW and CMR methods using data from various sets of national surveys. While the main objectives and approaches of these two methods were different, the results of our analyses generally showed similar results for both methods—particularly there are significant differences in employment and its associated factors between male and female older adults. In general, as health worsens at more advanced ages, the employment rates for both men and women decrease significantly. The findings are consistent with previous studies on the Vietnamese older adults such as Friedman et al. (2001), Knodel and Truong (2002), Giang and Le (2015), and Giang and Le (2018).

Given the fact that in Viet Nam, employment is still an important source of income for the daily living expenses of older adults and social protection benefits (including retirement and social assistance) remain limited (VWU 2012, MOH et al. 2021), a lower employment rate for people at more advanced ages would significantly impact their income security. Less financial support from children for a variety of reasons can also exacerbate the situation. Therefore, social protection benefits should be adequate to compensate older adults' possible losses of income from either reduced employment or lower children's support. Further, since at all age ranges, women always have lower employment rates than men of the same age, social protection policies should be gender sensitive. Women should be prioritized through such policies, since over the course of their lifetimes, they earn less income from employment and have lower rates of participation in social protection programs than men (Giang and Nguyen 2017, Do 2021).

At the same mortality rates, women have significantly lower employment rates than men, indicating that unleashing women's capacity to work could significantly contribute to economic growth and a strengthened social protection system. Labor market policies, especially for persons at postretirement ages, should be adaptive—given the aging labor force in Viet Nam and the relatively higher productivity of younger workers—to tap their capacity to work as much as possible.

Similar to Giang and Le (2018), the estimations for various health variables in this study clearly indicated that those with poor health status and functional difficulties (either ADL or IADL) had a lower probability to be employed than their respective reference groups. Similarly, both men and women with at least one noncommunicable disease generally had a lower probability to be employed than those without any disease. Such functional limitations, disabilities, and noncommunicable diseases therefore prevent older adults from being employed. However, statistics from both the 2011 VNAS and the 2019 OP and SHI showed that some older persons with these health-related limitations were still employed, which suggests they should be supported with both social and health protection policies at workplaces to avoid ageism and maintain the dignity of labor.

Data from the 2011 VNAS and the 2019 OP and SHI also showed significant differences between the employment rates of older men and women with regard to their highest level of educational attainment: Women had much higher employment rates than men at lower education levels, while they had much lower employment rates than men at higher education levels. Older adults in general, and older female adults in particular, with little or no education—defined as either no schooling or an incomplete primary education—were more likely to be employed in jobs without labor contracts or other types of vulnerable jobs (UNFPA and HelpAge International 2016). Such a situation thus implies a need to protect older adults in labor markets, especially those who work in the informal sector. Various policy measures can be considered, formulated, and implemented such as (i) providing lifelong and specific-skills training programs for older persons; (ii) promoting employment services for older persons; (iii) arranging special working facilities; and (iv) amending related laws and regulations such as the Labor Code, the Social Insurance Law, and the Social Health Insurance Law.

As with previous studies—see, for instance, Friedman et al. (2001), Giang and Le (2015), Giang and Le (2018)—the results of this study clearly show that for urban older men and women, the likelihood of being employed was lower than for their respective rural counterparts. There are various underlying reasons for this urban–rural employment gap, including that urban older adults usually have more education and better jobs than their rural counterparts, and thus they can reach retirement and receive benefits from income-generating social protection programs, which in turn makes it more likely for them to enjoy not working later in life compared with rural older adults. As such, extending retirement benefits and social assistance programs to older rural adults should be a key strategy in expanding the coverage of social protection programs and ensuring income security for those who typically have limited access to

these benefits. Similar findings and policy recommendations can also be applied for older adults who are members of ethnic minorities, who face various challenges in finding employment in the formal sector, accessing social protection programs, and attaining income security.

V. Concluding Remarks

This study added to the literature on aging, health, and employment among older adults in Viet Nam by confirming that health conditions are strongly associated with their employment status. Older women, when their health allows, should participate more in labor markets so that they can maximize their working capacities. Flexible labor market policies, especially for retired persons, that adapt to the aging population will help older Vietnamese, particularly women, fully realize their productive potential.

This study also has some key limitations. First, it is quite difficult to find appropriate reference groups due to differences in legal regulations with regard to gender (e.g., normal retirement ages), social protection coverage gaps (e.g., urban versus rural), and job position (e.g., whether vulnerable workers account for a large proportion in the labor market). Second, the estimated results depend largely on the share of population groups that are chosen as the reference or comparative group. Third, although some diseases can directly and seriously affect employment status (e.g., cancer), the presence of such diseases was either not available in the datasets or accounted for a negligible share of the observations so we could not analyze their impact.

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References

Cutler, David M., Meara Ellen, and Seth Richards-Shubik. 2013. “Health and Work Capacity of Older Adults: Estimates and Implications for Social Security Policy.” https://ssrn.com/abstract=2577858.

Do, Thi-Thu. 2021. *An Analysis on the Determinants of Participation in the Voluntary Social Insurance in Viet Nam* (in Vietnamese). Hanoi: National Economics University Publishing House.

Friedman, Jed, Daniel Goodkind, The-Cuong Bui, and Sy-Anh Truong. 2001. "Work and Retirement among the Elderly in Viet Nam." *Research on Aging* 23 (2): 209–32.

General Statistics Office of Viet Nam (GSO). 2020a. *The Population and Housing Census 2019: Key Findings*. Hanoi.

———. 2020b. *Population Projections for Viet Nam in 2019–2069*. Hanoi.

———. 2021. *Population and Housing Census 2019: Population Ageing and Older Persons in Viet Nam*. Hanoi: Youth Publishing House.

Giang, Thanh-Long, and Duc-Dung Le. 2018. "Working beyond the Traditional Retirement Ages: How Does Chronic Health Condition Influence Older Workers in Viet Nam?" *Ageing International* 43: 158–13.

Giang, Thanh-Long, and Thi-Ly Le. 2015. "Determinants of Labor Force Participation of Older People in Viet Nam." *Journal of Economics and Development* 17 (2): 28–52.

Giang, Thanh-Long, and Viet-Cuong Nguyen. 2017. "Aging Population and the Sustainability of the Pension Scheme: Simulations of Policy Options for Vietnam." *Journal of Economics and Development* 19 (3): 40–51.

Giang, Thanh-Long, and Wade D. Pfau. 2007. "The Elderly Population in Viet Nam during Economic Transformation: An Overview." In *Social Issues under Economic Transformation and Integration in Viet Nam*, Volume 1, edited by Giang Thanh Long and Duong Kim Hong, 185–210. Hanoi: Viet Nam Development Forum.

Knodel, John, and Sy-Anh Truong. 2002. "Viet Nam's Older Population: The View from the Census." *Asia-Pacific Population Journal* 17 (3): 5–22.

Milligan, Kevin, and David A. Wise. 2015. "Health and Work and Older Ages: Using Mortality to Assess the Capacity to Work across Countries." *Journal of Population Ageing* 8: 27–50.

Ministry of Health of Viet Nam (MOH), Asian Development Bank (ADB), Japan Fund for Poverty Reduction, Japan International Cooperation Agency (JICA), and Institute of Social and Medical Studies (ISMS). 2021. *Survey on Older Person and Social Health Insurance in Viet Nam in 2019*. Hanoi: MOH.

United Nations. 2019. *World Population Prospects: The 2019 Revision. Volume 1—Comprehensive Tables.* New York.

United Nations Population Fund (UNFPA). 2011. *The Aging Population in Viet Nam: Current Status, Prognosis, and Possible Policy Responses*. Hanoi.

United Nations Population Fund (UNFPA) and HelpAge International. 2012. *Ageing in the Twenty-First Century: A Celebration and a Challenge.* London: HelpAge International.

———. 2016. *Work, Family and Social Protection: Old Age Income Security in Bangladesh, Nepal, the Philippines, Thailand, and Viet Nam.* London: HelpAge International.

Viet Nam Women's Union (VWU). 2012. *Viet Nam Aging Survey 2011: Key Findings*. Hanoi: Women Publishing House.

Appendix

Table A1. **Results of Logistic Regressions for the Reference Groups of Men and Women with Two Datasets**

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
SRH									
	srh_fair	0.892	0.999	0.432	0.419	1.94	1.98	0.551	0.491
		(0.669)	(0.729)	(0.315)	(0.318)	(1.031)	(0.986)	(0.425)	(0.408)
	srh_poor and very poor	0.429	0.484	0.341	0.301	0.376**	0.479*	0.58	0.515
		(0.3082)	(0.335)	(0.270)	(0.246)	(0.166)	(0.204)	(0.494)	(0.469)
Function									
	adl_1	5.854	14.19**	NA		0.061***		0.989	
		(8.987)	(17.675)	(NA)		(0.066)		(1.088)	
	adl_2				NA		0.111***		1.102
					(NA)		(0.081)		(0.868)
	iadl	NA	NA	NA	NA		0.396**		0.371**
		(NA)	(NA)	(NA)	(NA)		(0.182)		(0.160)
	eyesight		0.675	0.995	0.995		0.382*		1.763
			(0.304)		(0.399)		(0.186)		(0.985)
	cognition		NA		NA		2.517		1.031
			(NA)		(NA)		(0.187)		(0.742)
Health condition									
	diabetes	0.326	0.329	0.211**	0.210**	0.340*	0.327*	0.621	0.682
		(0.316)	(0.294)	(0.151)	(0.150)	(0.199)	(0.199)	(0.416)	(0.480)

Continued.

Table A1. *Continued.*

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	hypertension	0.969	1.114	0.762	0.731	1.574	1.491	1.582	1.613
		(0.400)	(0.489)	(0.328)	(0.301)	(0.610)	(0.569)	(0.744)	(0.750)
	heart problems	0.862	0.797	0.343*	0.342*	1.011	0.998	0.508	0.428
		(0.866)	(0.841)	(0.196)	(0.197)	(0.453)	(0.434)	(0.262)	(0.224)
	cancer		NA	1.002	0.855	5.109	4.237	0.490	0.479
			(NA)	(0.801)	(0.679)	(8.101)	(6.899)	(0.381)	(0.390)
	asthma		4.212**		1.612		0.536		8.492**
			(2.411)		(0.810)		(0.261)		(7.216)
	arthritis		0.978		1.510		0.954		0.630
			(0.618)		(0.663)		(0.334)		(0.257)
Risk factor	smoking	1.242	1.248	1.434	1.271	1.243	1.222	0.201	0.299
		(0.484)	(0.491)	(1.439)	(1.213)	(0.408)	(0.412)	(0.297)	(0.370)
Individual characteristics									
	edu_element to high	1.067	1.281	1.199	1.282	1.173	1.081	2.147*	1.884
		(0.655)	(0.787)	(0.586)	(0.624)	(0.401)	(0.378)	(0.948)	(0.865)
	edu_college	0.490	0.603	2.012	2.028	1.591	1.256	1.979	1.466
		(0.339)	(0.429)	(1.788)	(1.801)	(1.526)	(1.209)	(1.711)	(1.287)
	married	0.167*	0.161*	1.281	1.233	0.862	0.985	0.532	0.615
		(0.153)	(0.157)	(0.605)	(0.566)	(0.530)	(0.605)	(0.225)	(0.292)

Continued.

Table A1. *Continued.*

		2011 VNAS				2019 OP and SHI			
		Men 50–59 (*N* = 545)		Women 50–54 (*N* = 420)		Men 50–59 (*N* = 521)		Women 50–54 (*N* = 334)	
Variable	**Categories**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	urban	0.153***	0.152***	0.156***	0.159***	0.422*	0.415*	0.424*	0.424*
		(0.067)	(0.074)	(0.060)	(0.061)	(0.202)	(0.189)	(0.205)	(0.207)
	kinh (ethnic majority)	0.230	0.231	3.260	3.344	0.931	1.046	0.567	0.548
		(0.279)	(0.255)	(2.388)	(2.476)	(0.483)	(0.577)	(0.323)	(0.317)
	_cons	122.167**	45.351**	6.775*	6.116	4.884*	5.188*	10.646**	14.309**
		(252.607)	(87.433)	(7.534)	(6.992)	(4.236)	(4.460)	(11.169)	(15.607)

NA = data not available, OLS = ordinary least squares, OP and SHI = Survey on Older Persons and Social Health Insurance, ref. = reference, SRH = self-rated health, VNAS = Viet Nam Aging Survey.

Notes: Significance level: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors are in parentheses. Using OLS for 2011 VNAS data, the variables "cancer" and "adl_2" were automatically omitted due to correlation in both models for men and women, so we remove "cancer" and replaced "adl_2" with "adl_1." In the model for women aged 50–54, both "adl_1" and "adl_2" were correlated with other variables, so they were removed.

Source: Authors' calculations based on the 2019 OP and SHI.

Table A2. **Simulated Capacity to Work from Logistic Regressions with Two Datasets**

Logistic (2011 VNAS)			Model 1		Model 2	
Age Group	Obs.	Actual Working Rate (%)	Predicted Working Rate (%)	Estimated Additional Capacity to Work (%)	Predicted Working Rate (%)	Estimated Capacity to Work (%)
Men						
60–64	302	69.61	88.39	18.78	89.60	19.99
65–69	193	60.43	89.59	29.16	90.65	30.22
70–74	211	35.54	86.87	51.33	88.18	52.64
75–79	112	28.53	90.78	62.25	91.59	63.06
Women						
55–59	253	70.23	77.63	7.40	77.96	7.73
60–64	476	58.01	76.13	18.12	76.40	18.39
65–69	216	39.75	72.39	32.64	72.96	33.21
70–74	312	28.37	72.70	44.33	73.07	44.70
75–79	182	23.76	71.93	48.17	72.22	48.46
Logistic (2019 OP and SHI)			**Model 1**		**Model 2**	
Age Group	Obs.	Actual Working Rate (%)	Predicted Working Rate (%)	Estimated Additional Capacity to Work (%)	Predicted Working Rate (%)	Estimated Capacity to Work (%)
Men						
60–64	325	70.08	77.83	7.75	76.11	6.03
65–69	261	51.99	76.38	24.39	72.18	20.19
70–74	179	33.87	74.29	40.42	68.37	34.50
75–79	137	26.34	73.26	46.92	64.42	38.08
Women						
55–59	418	65.35	75.34	9.99	74.03	8.68
60–64	382	54.87	75.70	20.83	72.52	17.65
65–69	319	35.42	73.36	37.94	68.26	32.84
70–74	291	23.23	75.00	51.77	68.37	45.14
75–79	237	15.64	75.04	59.40	67.66	52.02

Obs. = observations, OP and SHI = Survey on Older Persons and Social Health Insurance, VNAS = Viet Nam Aging Survey.
Source: Authors' calculations based on data from the 2011 VNAS and the 2019 OP and SHI.