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The Impact of Population Aging on the Balance of Medical Insurance Fund in Vietnam

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ABSTRACT: In recent years, Vietnam has made significant reforms to its health insurance system, resulting in great progress. However, changes in epidemiology and demographic shifts towards an aging population can impact the balance of the social medical insurance fund. Against this background, this paper aims to study the factors that affect the impact of population aging on the balance of the health insurance fund, by introducing seven mediating variables and subsequently analyzing the relationships between these variables to investigate the impact of population aging on the health insurance fund balance. The results indicate that population aging negatively affects the balance between revenue and expenditure of the medical insurance fund. Based on this analysis, we propose two corresponding recommendations to enhance fiscal sustainability: Enhancing healthcare resource efficiency and promoting economic development to increase income for workers.

KEYWORDS: Aging. balance, burden, health insurance fund, population aging.

I. INTRODUCTION

Vietnam has made significant progress in health outcomes in the past 15 years. Access to health services has also expanded rapidly, and the extent to which universal health coverage has been achieved (GSO Vietnam, 2019). However, demographic changes due to population aging are becoming a challenge for the health insurance system in Vietnam.

A country can be considered an aging society when the population aged 65 and older accounts for more than 7% of the total population (ILO, 2014a). The proportion of people over 65 years old in Vietnam reached 8% in 2020 (WHO, 2023) and has since been increasing, according to the estimates of GSO Vietnam (2019), the proportion of people over 65 years old will exceed 20% by 2055, implying that 1 out of every 5 people will be an older person which indicates that Vietnam must face the challenge of demographic aging. Furthermore, the aging situation in Vietnam occurs in the context of an economy with a low average income, meaning that Vietnam is entering a state of "aging before becoming rich". This can affect the economic and social security system, especially the balance of the health insurance fund.

Data from most countries show that, on average, older people spend more on health than younger people. In Vietnam, medical spending for the elderly is 4.8 times higher than other groups (WB, 2018). This means health spending will increase rapidly as the elderly make up an increasing proportion of the population, leading to challenges for the health insurance system, on the other hand, population aging causes declines in labor market participation and slowdowns in economic growth, as the elderly do not have to pay for health insurance, the aggravation of old aging will reduce the number of people who contribute to the fund.

Despite the rapidity of population aging in Vietnam, few researchers have studied its effects on the balance of health insurance funds. A notable exception is Tang and Li's (2022) research on *"The Fiscal Effect of Elderly Population Health: The Mediating Role of Healthcare Resources"*. This article used 45 countries' panel data from 2000 to 2019 (including Vietnam) to examine the fiscal effect of the elderly health burden and the mediating role of healthcare resources. The results show that the elderly health burden hurts fiscal balance, especially in aged societies and longevity countries. Moreover, the mediating effect of healthcare resources is significant, whereby various forms of healthcare resources such as funds, labor, and facilities all have significant effects. The analyses of the impact of population aging on health financing focus exclusively on the effects of population aging on health expenditures, while ignoring the impact of population aging on health revenues (Teo et al., 2019). However, the aging problem also reduces revenues and it affects the balance of the health insurance fund. Both of these effects may put pressure on the balance of medical insurance fund. In particular, in this study, from a new perspective on Healthy life expectancy (HALE), and Old age dependency ratio (OLD) it has been demonstrated that the number of healthy life years and the aging dependency index both

hurt the health insurance fund balance. Therefore, to achieve balance in the health insurance fund will be to reduce the health burden of the elderly and improve the efficiency of the use of health care resources.

Vietnam has made significant progress in health outcomes in the past 25 years. Access to health services has also expanded rapidly, leading to the achievement of universal health coverage. However, the aging population poses a challenge to Vietnam's health insurance system.

A country is considered an aging society when the population aged 65 and older accounts for more than 7% of the total population (ILO, 2014a). In Vietnam, the proportion of people over 65 years old reached 8% in 2020 (WHO, 2023) and according to the estimates of GSO Vietnam (2019), the proportion of people over 65 years old will exceed 20% by 2055, implying that 1 out of every 5 people will be an older person which indicates that Vietnam must face the challenge of demographic aging. Moreover, the aging situation in Vietnam occurs in the context of an economy with a low average income, which means Vietnam is experiencing "aging before becoming rich." This can impact the economic and social security system, particularly the balance of the health insurance fund.

Data from different countries indicates that older individuals have a tendency to allocate a higher portion of their expenses towards healthcare in comparison to younger people. In Vietnam, medical expenditure for the elderly is 4.8 times greater than that of other age groups (Teo et al., 2019). As the proportion of elderly individuals in the population rises, healthcare expenses are expected to increase as well, presenting challenges for the health insurance system. Furthermore, population aging results in reduced labor market involvement and slower economic development. Since the elderly are not required to pay for health insurance, this exacerbates the burden on the health insurance fund by reducing the number of contributors.

Despite the rapid aging of the population in Vietnam, there have been limited studies on its effects on the balance of health insurance fund. One notable study by Tang & Li (2022) examined the fiscal effect of the elderly population's health burden and the mediating role of healthcare resources using panel data from 45 countries, including Vietnam. The results showed that the health burden of the elderly negatively impacts the fiscal balance, especially in societies with a higher proportion of elderly individuals. Healthcare resources, such as funds, labor, and facilities, play a significant mediating role. Existing analyses on the impact of population aging on health financing primarily focus on health expenditures, disregarding the influence on health revenues. However, population aging also reduces revenues and affects the balance of the health insurance fund. Both of these factors can exert pressure on the fund's balance. This study highlights the detrimental effects of healthy life expectancy and the aging dependency index on the health insurance fund balance. Therefore, to achieve balance in the health insurance fund, it is crucial to reduce the health burden of the elderly and enhance the efficiency of healthcare resource utilization.

II. RESEARCH METHODS

In this paper, we used the following research methods:

Theoretical research method: We employ a theoretical research method to examine and construct a model for the balance of medical insurance fund. We consider two independent variables: the aged dependency ratio and the healthy life expectancy ratio which no study has mentioned. Then, we utilized SEM, a statistical technique that employs linear equations to depict the connections between variables. This method allows for the simultaneous testing of multiple regression equations, expanding its range of application beyond traditional regression analysis. Through the implementation of SEM, we investigate the impact of population aging on Vietnam's medical insurance fund balance. Through this approach, we have identified seven factors that fundamentally impact the balance of the health insurance fund due to population aging. We describe all variables considered in SEM in Table 2.

Data collection method: To construct the variables in the regression model, we collect and use datasets from reliable sources like the World Health Organization, the World Bank, the International Labour Organization, the annual report of Vietnam Social Security, the Vietnam Health Statistics Yearbook of the Ministry of Health, and the data from of General Statistics Office of Vietnam spanning the period from 2015 to 2022 of 63 provinces and cities across the country. During the process of data collation, the priority criterion was the data completeness of the indicators. Samples with abnormal indicators and serious missing data were excluded. Subsequently, interpolation was employed to fill in sporadic missing data for individual years.

III. RESEARCH MODEL AND VARIABLE DESCRIPTIONS

A. Research model

Regarding the relationship between the elderly population and the health insurance fund, as the proportion of elderly people in the population increases, the number of working-age individuals decreases. Consequently, the level of contribution to the health insurance fund decreases. Moreover, healthcare costs for the elderly group are typically much higher compared to the younger group. Hence, the proportion of the elderly population positively impacts the balance of the health insurance fund. There are

several indicators used to assess population aging, such as the proportion of elderly individuals, mortality rate, life expectancy, and disability-adjusted life years (Tang & Li, 2022). However, a person's medical expenses also depend on the duration of their healthy years, free from any significant health issues. Hence, in this paper, we introduce a new index that previous studies have not mentioned: The healthy life expectancy ratio (HALE), which aims to evaluate aging status. This addition is crucial as statistics indicate that while the average life expectancy of Vietnamese citizens is rising, the number of healthy years is dwindling. Additionally, the healthcare system in Vietnam is overly reliant on higher-level hospitals, neglecting primary healthcare (Teo et al., 2019). Thus, the basic path assumptions are displayed in Table 1. Utilizing these assumptions, we construct a model of the effect of population aging on the medical insurance fund balance. This model consists of seven intermediate variables, as depicted in Figure 1.

Table 1. Basic path hypothesis of SEM

Hypothesis	Contents	Mode of Influence
H_1	OLD has a negative impact on the Fund Balance	Direct impact
H_2	HALE has a positive impact on the Fund Balance	Direct impact
H_3	OLD has a negative impact on the Fund Balance Indirect impact through CSS	Indirect impact
H_4	OLD has a negative impact on the Fund Balance Indirect impact through THE	Indirect impact
H_5	Population aging has an impact on the Fund Balance Indirect impact through PHY	Indirect impact
H_6	Population aging has an impact on the Fund Balance Indirect impact through BED	Indirect impact
H_7	HALE has a positive impact on the Fund Balance Indirect impact through HSD	Indirect impact
H_8	HALE has a positive impact on the Fund Balance Indirect impact through HCW	Indirect impact
H_9	HALE has a positive impact on the Fund Balance Indirect impact through HHT	Indirect impact

(**Source:** Summary of research results)

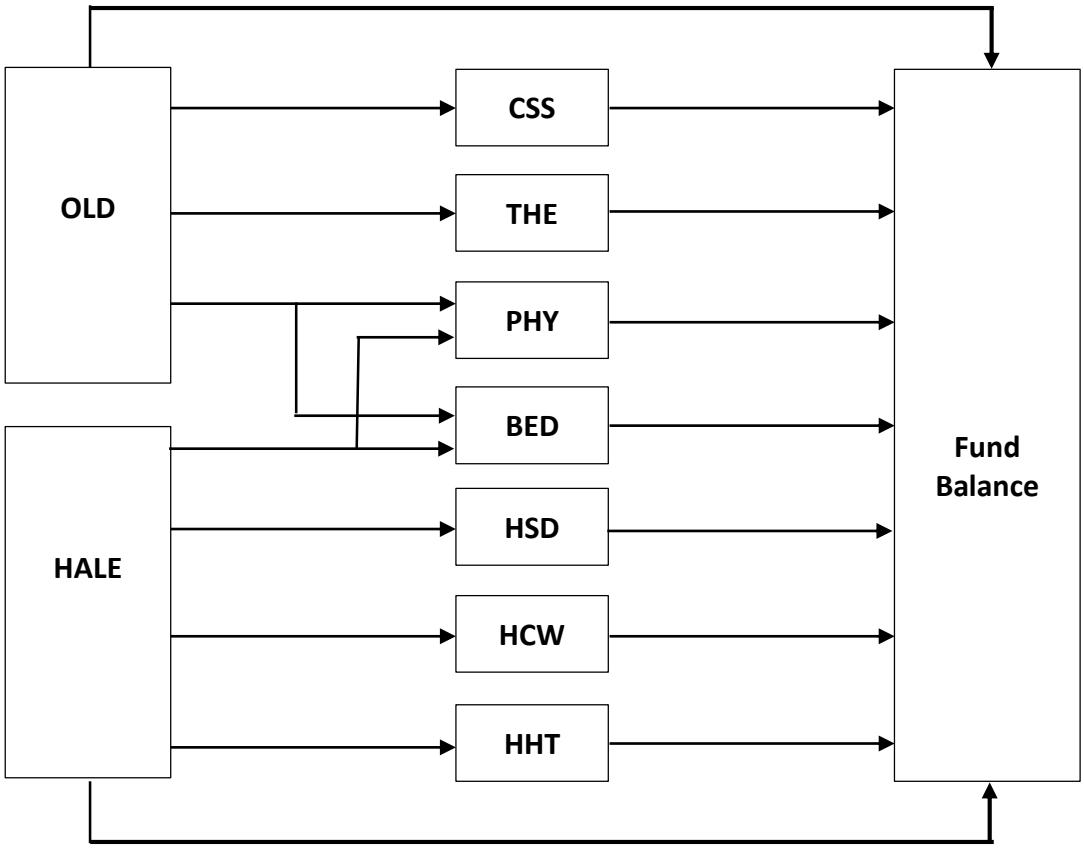

Figure 1: Model of the impact of population aging on the health insurance fund balance

B. Variable descriptions

The dependent variable was medical insurance fund balance *(Fund Balance)*, which was measured as a function of the ratio between the net operating balance and GDP. The net operating balance was calculated by subtracting health insurance fund expenses from revenue. A positive value of this indicator indicates a surplus in funds, while a negative value indicates a deficit.

The independent variable was population aging: In this study, we utilized two ratios, namely the old age dependency ratio (OLD) and the healthy life expectancy ratio (HALE), as measurable indicators of population aging. The OLD is the ratio between the number of elderly people per 100 people of working age. It is widely known that elderly populations require more health services, which may lead to higher health expenditures. Additionally, the current population aging rate in Vietnam is faster than predicted, making this variable useful in assessing the healthy life expectancy ratio. The HALE is measured by the average number of years a person can live in good health compared to the average life expectancy. Overall in Vietnam today, average life expectancy is increasing, but the number of healthy life years is decreasing.

The fund balance was influenced by various factors, including economic, social, and environmental perspectives. As the increase in the OLD leads to a decrease in the working-age population, resulting in a decline in revenue for the health insurance fund. In this paper, we introduce the variable that represents the impact of aging on health insurance revenue: (1) The rate of health insurance premium; in Vietnam, the level of health insurance premium is determined by factors such as the employee's monthly salary, pension or working capacity loss allowance, unemployment allowance, and civil servant salary. However, it is observed that health insurance premiums are calculated based on the civil servant's salary multiplied by a certain rate. In general, this rate is determined by the civil servant's salary to GDP per capita ratio (CSS).

Additionally, intermediate variables that represent health insurance expenses include accessibility of health services and facility resources invested in the healthcare domain, respectively, as a comprehensive measure of healthcare investment. Thus, it encompasses the subsequent variables: (2) The health expenditure ratio (THE) is measured by dividing the current health expenditure of the 65+ group by the GDP. (3) Physician ratio (PHY) is measured by the number of doctors per 10,000 inhabitants. (4) Hospital bed ratio (BED) is measured by the number of beds per 10,000 inhabitants. (5) The percentage of commune, ward, and town health stations with doctors (HSD) represents the investment of labor and facility resources in the healthcare domain. This serves as a comprehensive measure of healthcare investment. (6) The ratio of households with access to clean water to the total number of households in Vietnam (HCW); During the research phase, the number of households using hygienic water was very high (ranging from 78.8% in 2009 to 94.9% in 2022). However, according to clean water use standards in Vietnam (MOH, 2009; MOH, 2018), the HCW ratio is limited, so we used this ratio for research. (7) The ratio of households with access to hygienic toilets to the total number of households in Vietnam (HHT) is determined based on the standards of the National Technical Regulation on Hygienic Conditions for Latrines of the Ministry of Health (MOH, 2011).

In all, Table 2 reports the selection and description of variables, indicators, and data sources.

Table 2. Selection and description of variables, indicators, and data sources.

No.	Variables	Sign	Definition	Data Source
1.	Fund balance	Balance	Net operating balance of medical insurance fund /GDP	VSS Vietnam data, WB database
2.	Old age dependency ratio	OLD	Population aged 65+ years/population aged 15–64 years	ILO database, MOH Vietnam data
	Healthy life expectancy ratio	HALE	Average number of years a person can live in good health /Average life expectancy.	ILO database, MOH Vietnam data
3.	The rate of health insurance premium	CSS	Civil servant's salary / GDP per capita	GSO Vietnam data, WB database
	Health expenditure ratio	THE	Health expenditure of the 65+ group / GDP	WHO database WB database
	Physician ratio	PHY	Physicians per 1000 inhabitants	ILO database
	Hospital bed ratio	BED	Hospital beds per 1000 inhabitants	ILO database
	Percentage of commune, ward, and town health stations with doctors	HSD	Commune, ward, and town health stations with doctors / total number of commune, ward, and town health stations	MOH Vietnam data
	Ratio of households with access to clean water	HCW	The ratio of households with access to clean water / total number of household	GSO Vietnam data, MOH Vietnam data

	Ratio of households with access to hygienic toilets	HHT	The ratio of households with access to hygienic toilets / total number of households	GSO Vietnam data, MOH Vietnam data

(**Source:** Summary of research results)

IV. RESULT

A. Demographic characteristics in Vietnam

Table 3 data indicates that the burden of one elderly person in every 10.23 people aged 15-64 in 2015 reduced to 8.92 in 2018 and 7.66 in 2022. This has led to increased pressure on the workforce in Vietnam. The aging index is calculated as the ratio between the number of elderly people and 100 people under 15 years old. This index has increased by 11% from 2015 to 2022. The increasing aging index reflects increases in people's health and longevity, however, it also poses challenges in health care for the elderly as well as medical spending.

Table 3. Age structure and The aging index.

Years / Targets	**2015**	**2018**	**2022**
1. Age Structure (%)			
1.1. From 0 to 14	23.51	23.02	22.45
1.2. From 15 to 64	69.70	69.22	68.60
1.3. 65+	6.79	7.76	8.95
2. Aging Index (%)	28.88	33.71	39.87

(**Source:** Compiled from data provided by the General Statistics Office of Vietnam)

B. The correlation between the old age dependency, the healthy life expectancy and intermediate variables

The relationships between the old age dependency ratio and the four intermediate variables, as well as the healthy life ratio and the five intermediate variables, exhibit distinct characteristics in Table 4.

Table 4. ***Correlation between the old age dependency, the healthy life expectancy and intermediate variables***

The Intermediate Variables / The Independent Variables	CSS	THE	PHY	BED	HSD	HCW	HHT
OLD	0.316	0.782	0.243	0.228	-	-	-
HALE	-	-	0.266	0.257	0.645	0.557	0.504

(Source: Calculated from research results)

Table 4 shows that 7 intermediate variables are all correlated with population aging. Therefore, the choice of intermediate boundaries is reasonable. Changes in the old age dependency ratio and the healthy life expectancy ratio will lead to various social impacts. These include changes in the rate of health expenditure among the elderly, availability of health resources, and demand for medical services. Moreover, as social wealth is typically generated by the working population and economic growth is influenced by the old age dependency ratio, aging can also have an impact on economic levels to a certain extent.

Interestingly, aging dependency and healthy life expectancy are not found to have a significant impact on physicians per 1,000 inhabitants and hospital beds per 1,000 inhabitants, although the relations are considered positive in other studies. In addition, the old age dependency has a relative impact on the rate of health insurance premiums. We hypothesize that the Vietnamese economy has considerable development during the study period, and continued rise in the number of working-age health insurance participants. However, in the future, as Vietnam attains universal health coverage and its population enters the aging phase, the number of individuals in the working-age bracket will decline significantly, thereby significantly impacting the fund revenue.

The old age dependency ratio and health expenditure ratio of the elderly population have the highest path coefficient at (0.782), indicating an increased need for medical care as aging progresses. Secondly, the healthy life expectancy is significantly influenced by the number of commune, ward, and town health stations with doctors (0.645), the households with access to clean water (0.557), and the households with access to hygienic toilets (0.504), highlighting the crucial role of primary healthcare in Vietnam's health system.

C. The results of SEM

After normalizing the data, the model is solved by AMOS23. The path coefficient map is shown in Figure 2. The size of the path coefficient reflects the extent to which one variable affects the other, and the sign reflects whether the effect is positive or negative. The impact of the old age dependency ratio and the healthy life expectancy ratio on the medical insurance fund balance is significant, (approving H_1 và H_2). In addition, this paper analyzes how population aging affects the medical insurance fund balance through inter-mediating variables. First, the variables of physicians per 1,000 inhabitants, and hospital beds per 1,000 inhabitants prove to have no significant effect on the balance of medical insurance fund (disapproving H_5 and H_6). This is explained, by the present situation in Vietnam shows a movement of the 65 to 79-year-old group from rural to urban areas, while the 80+ (super elderly) group is relocating from urban to rural areas. Demonstrates that, for the aging population, the requirement for medical care at home is more essential than hospital care, except in instances of severe illnesses.

Secondly, the rate of health insurance premium has a relative impact on the balance of medical insurance fund (supporting H_3). This explanation can be attributed to the rapid growth of Vietnam's economy, therefore, while the expenditure of medical insurance funds is increasing, the revenue shows similar growth, which partially conceals the challenges posed by an aging population.

Thirdly, the old age dependency ratio has a negative impact on the medical insurance fund balance through health expenditure of the group of elderly people (supporting H_4). Data analysis indicates a significant rise in health spending per capita among the elderly population across all provinces in Vietnam in recent years. This surge may be attributed to the shift in the disease structure of the elderly population towards chronic and non-communicable diseases, coupled with an increasing demand for medical checkups and treatments.

Finally, the healthy life expectancy has a positive impact on the medical insurance fund balance through the number of commune, ward, and town health stations with doctors, the households with access to clean water, the households with access to hygienic toilets (supporting H_7, H_8, H_9).

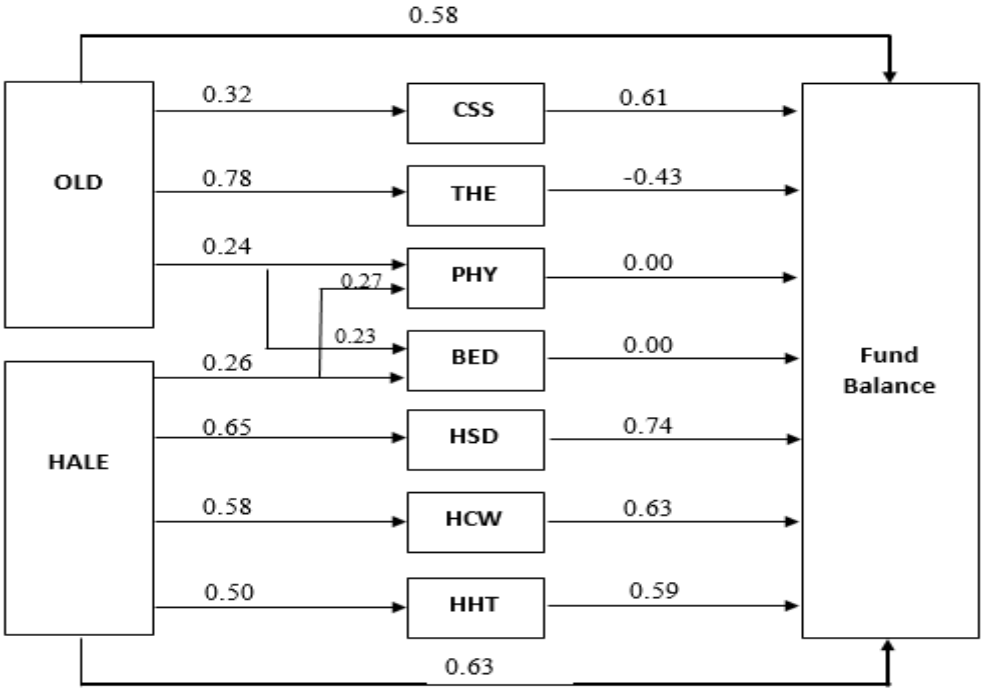

Figure 2: Path coefficient diagram of SEM.

V. CONCLUSION

A. Key findings

The impact of the old age dependency ratio and the healthy life expectancy ratio on the fund balance is evident. Medical spending of the elderly group, the number of commune, ward, and town health stations with doctors, the households with access to clean water, the households with access to hygienic toilets, and the rate of health insurance premiums are intermediate variables that can affect the relationship between population aging and the medical insurance fund balance. The aging trend in Vietnam indicates that population aging is growing faster than forecast. Although the fund balance remains positive each year, annual medical expenses for the elderly are gradually rising while medical insurance revenue shows signs of decreasing. Consequently, population aging could potentially jeopardize the equilibrium between health insurance fund revenue and expenditure.

The limitation of this study is mainly that it lacks a detailed analysis of healthcare resources. As the group of socio-cultural factors, behavior, lifestyle, natural environment, advances in medical science, essential drugs, medical equipment, and geographical accessibility.

B. Policy implications

Improve the efficiency of healthcare resources to address population aging: Focus on enhancing the qualifications of doctors at local health stations to boost healthcare services at the grassroots level, thereby alleviating the burden on higher-level hospitals. This solution is considered stable due to the current overreliance on hospitals in the Vietnamese health system, which overlooks the importance of medical care at home and at the grassroots level. The medical staff at these medical stations is insufficient and lacks expertise, leading to a lack of trust in the prescriptions provided by doctors at this level. Furthermore, ensuring health safety requires addressing the issue of clean water, which is particularly critical in Vietnam today. Water sources are gradually becoming polluted, and only half of rural households have access to clean water. Therefore, the primary objective is to gradually implement and fulfill the target of providing clean water to households, as outlined in Conclusion No. 36-KL/TW (2022). Simultaneously, Promote propaganda and encourage construction to increase the number of households with hygienic latrines in areas experiencing low rates of HHT, such as the Mekong Delta and the Northern mountainous provinces.

Promote economic development to raise workers' income: Increasing wages for workers will result in higher revenue for the health insurance fund, thereby ensuring the stability of its balance.

REFERENCES

1) GSO (General Statistics Office) Vietnam (2019). Completed Results of the 2019 Vietnam Population and Housing Census. Statistics Publishing House. Hanoi.
2) GSO (General Statistics Office) Vietnam. Statistics Yearbook of Vietnam for the years 2015, 2019, 2022. Statistics Publishing House. Hanoi.
3) ILO (International Labour Organization) (2014a). Maternity and Paternity at Work: Law and Practice across the World. Geneva: ILO.
4) ILO (International Labour Organization) (2023). ILO databases and resources. Accessed on Sep 28th, 2023. https://www.ilo.org/inform/online-information-resources/databases/lang--en/index.htm.
5) MOH (Ministry of Health) Vietnam. Vietnam Health Statistics Yearbook from 2015 to 2022. Medicine Publishing House. Hanoi.
6) MOH (Ministry of Health) Vietnam (2009). Standard No QCVN 02-2009/BYT. *National technical regulation on Domestic Water Quality.*
7) MOH (Ministry of Health) Vietnam (2011). Standard No QCVN 01:2011/BYT. *National technical regulation on Hygienic conditions for Latrines.*
8) MOH (Ministry of Health) Vietnam (2018). Standard No QCVN 01-1:2018/BYT. *National technical regulation on Domestic Water Quality.*
9) Tang, B. & Li, Z. (2022). A Country-Level Empirical Study on the Fiscal Effect of Elderly Population Health: The Mediating Role of Healthcare Resources. *Healthcare 2022,10,30. MDPI.* Basel, Switzerland. https://doi.org/ 10.3390/healthcare10010030
10) Teo, H.S., Bales, S., Bredenkamp, C., & Cain, J. S. (2019). The Future of Health Financing in Vietnam: Ensuring Sufficiency, Efficiency, and Sustainability. The World Bank. Washington DC. URI: http://hdl.handle.net/10986/32187.
11) Vietnam, Conclusion of the Politburo. No. 36-KL/TW. (2022). *On ensuring water source security and safety of dams and reservoirs until 2030 with a vision to 2045*. June 23, 2022. Hanoi.
12) VSS (Vietnam Social Security). Annual Reports on Work Results from 2015 to 2022.
13) WHO (World Health Organization) (2023). Health Expenditure Profile Vietnam. Accessed on Sep 2nd, 2023. https://apps.who.int/nha/database/country_profile/Index/en.
14) WB (World Bank) (2023). Global Health Expenditure Database. Accessed form Sep 2nd to Sep 30th, 2023. https://apps.who.int/nha/database/Select/Indicators/en.
15) WHO (World Health Organization) (2023). Health Expenditure Profile Vietnam. Accessed on Sep 2nd, 2023. https://apps.who.int/nha/database/country_profile/Index/en.