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# The relationship between income inequality and economic growth of Vietnam

This dissertation is submitted for the degree of
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**Declaration**

I declare that this is my research project supported by my supervisor, Ing. Irena Benešová, Ph.D. The research content and results are original and have not been previously published. The data in the tables for analysis, comments, and evaluation were collected from various sources listed in the reference section.

In Prague on July 30, 2024 _____

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# The Relationship between Income Inequality and Economic Growth in Vietnam


## Abstract

Vietnam, a Southeast Asian country, is undergoing economic reforms aimed at liberalization, opening up, and integration into the region and the global economy. It has not only significantly contributed to the recent prosperity and economic growth of Vietnam but also has given rise to negative aspects, hindering the sustainable development of the economy, such as income inequality and the gap between the rich and the poor. The Northern Midlands and Mountains is one of Vietnam's six economic regions containing 14 provinces. However, this is still the country's poorest and most challenging core area. Therefore, the systematic study of the relationship between income inequality and economic development helps to provide scientific support for proposing views and policy implications for economic development and equitable implementation of income equality in the Northern Midland and Mountainous area in the coming period. From this point of view, the dissertation is conducted with the **primary purpose is to evaluate the interrelationship between income inequality and economic growth in Vietnam's Northern Midlands and Mountains at both theoretical and practical levels**.

The author divides the thesis into three main parts. The first part evaluates the impact of economic growth, official development assistance, and unemployment on income inequality in Vietnam, considering the country's recent economic transformation, external financial resources, and the challenges posed by increasing unemployment rates from 1992 to 2022. The second part analyses the relationship between income inequality and economic growth in the Northern Midlands and Mountainous region. This part also identifies the interplay between fiscal policy factors and income disparity to tackle the research regions' income inequality. In the third part, the author analyses survey results from local people in the Northern Midlands and Mountainous region to identify which factors of income inequality and economic growth correlate.

The dissertation combines quantitative and qualitative methods in analysing the relationship between income inequality and economic growth. The author builds quantitative models to test and estimate the relationship between income inequality and economic growth

in the Northern Midlands and Mountainous region through GDP, Gini coefficient, and explanatory variables. The author also develops a questionnaire to get opinions from experts and local managers on the research issue. After that, the author conducts an analysis to describe the characteristics of the collected data, codes the data, and uses the Crosstab analysis method to find correlations between the collected data.

The dissertation's data is based on statistical yearbook data from the General Statistics Office's Vietnam Household Living Standards Survey (VHLSS) from 1992 to 2022. Some indicators are from the World Bank. In addition, primary data was collected from 319 survey samples.

The research results show that in Vietnam, Official Development Assistance (ODA) initially positively impacted income inequality but then gradually decreased over time. Besides, there is a one-way causal relationship between the unemployment rate and GDP but not a significant relationship between the employment rate and income inequality. The research indicates that income inequality and expenditure inequality negatively impact economic growth in Vietnam's Northern Midlands and Mountainous region. The research finding indicates that specific fiscal policy measures, such as spending on health, income taxes, and pensions, contribute to increased household income inequality. Conversely, social security measures have a positive impact by reducing inequality in household income. According to the opinions of local people, specific factors of income inequality are correlated with economic growth in the Northern Midlands and Mountainous region. Some factors contribute more to economic growth in these correlations, but others are more about income inequality.

**Keywords:** Vietnam, Northern Midlands and Mountains, economic growth, income inequality, ODA, unemployment rate, fiscal policy, GINI, GDP,

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# List of abbreviations

| | |
|---|---|
| ADF | Augmented Dickey-Fuller |
| ASEAN | Association of Southeast Asian Nations |
| AIC | Akaike Information Criterion (AIC) |
| DF | Dickey and Fuller test |
| DV | Dependent variable |
| FEM | Fixed effects model |
| GLS | Generalised Least Squares |
| GPD | Gross Domestic Product |
| GNP | Gross National Product |
| GMM | Generalised Method of Moments |
| GSO | General Statistics Office |
| GRDP | Gross Regional Domestic Products |
| HQIC | Hannan-Quinn Information Criterion |
| ICO | Increment Capital Output Ratio |
| ILO | International Labor Organisation |
| IV | Independent variable |
| LM | Lagrange-Mutiplier test |
| ODA | Official Development Assistance |
| OECD | Organisation for Economic Co-operation and Development |
| OLS | Ordinary Least Squares |
| PCI | Provincial Competitiveness Index |
| REM | Random effects model |
| SBIC | Schwarz's Bayesian information criterion |
| TFD | Total Factor Productivity |
| VAR | Vector Autoregression Model |
| VECM | Vector Error Correction Model |
| VHLSS | Vietnam Household Living Standards Survey |
| VIF | Variance Inflation Factor |
| VND | Vietnam Dong |

# 1 Introduction

Vietnam, a Southeast Asian country, is undergoing economic reforms aimed at liberalization, opening up, and integration into the region and the global economy. It has significantly contributed to the recent prosperity and economic growth of Vietnam. From 2016 to 2020, Vietnam's economy showed robust growth, averaging 6.78% annually from 2016 to 2019. Despite the adverse effect of the COVID-19 pandemic on socio-economic aspects in 2020, Vietnam recorded the world´s highest growth rate, experiencing a 2.91% increase (GSO, 2021).

Even though Vietnam has transformed from a predominantly agricultural-based economy, the process has not yet been finished. The rapid pace of technological advancement in developing countries tends to favour skilled labour, widening the income gap (Ocampo, 2000). Contemporary high-value-added activities and sectors essential to successful economic transformation will likely require more capital investment than similar sectors in the past (Salazar-Xirinachs et al., 2014). This trend favours those who own capital, often the wealthier segment of society (Harris, 1978; United Nations Conference on Trade and Development, 1998). Although the economic and digital transformation process has brought significant achievements (Krajčík et al., 2023), it has also given rise to negative aspects, hindering the sustainable development of the economy.

All these factors contribute to widening the income gap among the population, leading to increased income inequality in Vietnam. A notable concern is the growing income disparity between different population groups and regions (Hoang, 2015). According to the General Statistical Office of Vietnam (2021), the rate of income increase for lower-income groups lags behind that of higher-income groups, thereby expanding the economic disparity between the wealthy and the poor recently.

Infrastructure and investment often focus on more developed regions, leaving rural or less developed areas behind. As inhabitants migrate away from rural areas, a decline in available services and business closures occur, reducing community cohesion. This exacerbates regional disparities in income and opportunities (Li et al., 2019; Hoang & Dinh, 2010). According to Nguyen (2009), there is a serious potential risk if the disparities are not

addressed that growing regional inequality might harm the stability of Vietnam's economic reform process and slow down future growth.

Vietnam is geographically and ecologically segmented into six distinct regions with unique natural and socio-economic features. These variations influence the benefits and challenges for economic progress in each area. Additionally, resettlement locations impact household spending (Long, 2013). In particular, mountainous or remote regions are often less productive, with limited access to essential services like infrastructure, healthcare, and education. Consequently, these areas tend to have lower living standards than other regions, as Kang and Imai (2012) noted.

The Northern Midlands and Mountains is one of Vietnam's six economic regions containing 14 provinces. According to the General Statistics Office (2022), the top ten provinces and cities with the highest poverty rates consist of Dien Bien (34.5%), Son La (28.6%), Lai Chau (27.9%), Ha Giang (25%), Cao Bang (24.5%), Bac Kan (20.65%), Kon Tum (20.65%), Gia Lai (16.9%), Lao Cai (14.8%), and Yen Bai (14%) located in the Northern Midlands and Mountains. These regions also have the highest share of households engaged in agriculture, accounting for 21% in 2020 (World Bank, 2022, p. 9).

The connections within the region and between the Red River Delta and the Capital region remain underdeveloped and inefficient. The development space is fragmented along administrative lines, which hinders the full realization of the local potential and advantages within the region (Thanh, 2022). According to Thanh (2022), the policy recommendation for sustainable development in Vietnam´s Northern Midlands and Mountainous Region shall focus on several key areas, including investment in socio-economic infrastructure, attraction to investment, human resource development, science and technology advancement, and mobilization of community resources.

In Vietnam, in addition to promoting sustainable development, the government also sets an important goal in realizing social progress and equity, ensuring not just a few groups but all of society benefit from the country's economic growth, especially in the context of international economic integration with many challenges and opportunities. However, the reality shows that the Vietnamese economy is improving with a relatively high GDP growth

rate, which increases the income gap between population groups and regions (Hoang & Dinh, 2010)

The systematic study of the relationship between income inequality and economic development helps to provide scientific support for proposing views and policy implications for economic development and equitable implementation of income equality in the Northern Midland and Mountainous area in the coming period. It is necessary both in theory and in practice.

Based on the preceding information, the research question arises: **How does income inequality relate to economic growth in Vietnam's Northern Midlands and Mountains region?** What policy implications can be drawn to promote equitable economic development in this area, considering its unique socio-economic characteristics?

# 2 Hypotheses and Tasks of the Thesis

## 2.1 Objectives

The primary purpose of this dissertation is to **evaluate the interrelationship between income inequality and economic growth in Vietnam's Northern Midlands and Mountains** at both theoretical and practical levels.

There are five partial tasks in this dissertation.

- *Systematize an overview of theoretical research on the relationship between income inequality and economic growth*.
- *Analyse the impact of economic growth, official development assistance, and unemployment on income inequality in Vietnam, considering the country´s recent economic transformation.*
- *Analyse the situation of income inequality, economic growth, and the relationship between inequality and economic concentration in the Northern Midland and Mountains.*
- *Evaluate the influence of fiscal policy on income inequality in the Northern Midlands and Mountainous region of Vietnam.*
- *Survey, get opinions, and analyse perspectives on economic growth and income inequality from local people in Vietnam's Northern Midlands and Mountainous region.*
- *Propose policy implications to adequately address the relationship between income inequality and economic growth in the Northern Midland and Mountains*.

The partial objectives of this dissertation are crucial as they contribute to understanding the intricate relationship between income inequality and economic growth in Vietnam, specifically in the Northern Midlands and Mountainous region. Thus, they enable a comprehensive exploration of the relationship in the specific regional context. They guarantee the contribution to the theory, its empirical verification, and practical use to fulfill the main aim of the dissertation and contribute to both academic knowledge and practical policymaking in the region.

## 2.2 Hypothesis Development

The following research questions and hypotheses were created based on this dissertation's partial task.

Based on the above objectives, the dissertation poses the following research questions:

- What is the impact of economic growth, official development assistance, and unemployment on income inequality in Vietnam, considering the country's recent economic transformation, external financial resources, and the challenges posed by increasing unemployment rates from 1992 to 2022?
- How does income inequality affect economic growth in Vietnam from 2010 to 2020 in the Northern Midlands and Mountainous region?
- How can fiscal policy impact income inequality in Vietnam's Northern midlands and mountainous region, and what strategies can be employed to address income inequality and promote economic growth?
- According to the opinion of most local people, which factors in income inequality and which factors in economic growth are correlated in the Northern Midlands and Mountainous region?

Based on the research questions, here are the working hypotheses:

H1: Economic growth, ODA, and unemployment rates significantly impact income inequality in Vietnam.

H2: Income inequality negatively impacts economic growth in Vietnam's Northern Midlands and Mountains region from 2010 to 2020.

H3: Fiscal policy can significantly impact income inequality in Vietnam's Northern Midlands and Mountains region.

H4: According to the opinions of local people, specific factors of income inequality are correlated with economic growth in the Northern Midlands and Mountains region.

# 3 The Current State of Knowledge

This chapter delves into the present understanding of economic growth and income inequality, highlighting major theories that shape our comprehension of these phenomena and the interrelation between economic growth and income inequality.

## 3.1 Economic Growth

Adam Smith, David Ricardo, and Thomas Malthus are considered the founders of economic growth theory. However, their theories were limited to the times they were created, reflecting the economic and social changes in contemporary English society during the 18th and 19th centuries. They analysed economic growth using general economic principles, viewing the economy as an integrated system rather than developing a distinct theory of growth (Harris, 2007; Weil, 2016).

Lewis (1954) posits that economic growth should be understood as increased per capita output. However, it is crucial to note that the general population might still experience impoverishment even with rising output. According to Weil (2016, p. 34), countries exhibit variations for two primary reasons:

- Variances arise in the accumulation of inputs utilized for output production.
- Differences emerge in the productivity levels at which these inputs are employed.

In understanding the connection between factors of production and the quantity produced, production functions are employed. These functions serve as mathematical representations detailing the transformation of inputs utilized by a firm into its corresponding outputs. The differences in income among countries result from variations in the accumulation of factors of production and differences in the production function itself (Weil, 2016).

In discussions of economic growth, it is essential to differentiate between total output and output per capita or per labour hour, as these metrics may diverge based on changes in work hours or the labour force participation rate. The three proximate causes of economic growth are economic activity, increasing knowledge, and capital.

Kaldor (1963) defined typical characteristics of economic growth:

- Per capita output grows over time, and its growth rate does not tend to diminish.

- Physical capital per worker grows over time.
- The rate of return to physical capital is nearly constant.
- The ratio of physical capital to output is nearly constant.
- The shares of labour and physical capital in national income are nearly constant.
- The growth rate of output per worker differs substantially across countries. (Barro & Sala-I-Martin, 2003, p. 12)

Kuznets (1973) defines economic growth in a country as the sustained enhancement of its ability to provide a more varied range of economic goods to its citizens. This enhancement is grounded in the progress of technology and necessitates corresponding shifts in institutional frameworks and ideological approaches. Each aspect of this definition holds significant importance.

Several studies introduce the concept of economic growth in Vietnam. Authors Hoang and Dinh (2010) commented that economic growth is an economic concept used to refer to an increase in the scale of economic output in a certain period; the indicator often measuring economic growth is the increase in the gross domestic product (GDP); gross national product (GNP); GDP per capita and other general economic indicators. Bui (2012) believes that economic growth is an increase in the economic output (GDP) or economic output per capita (GDP/person) over a certain period and is reflected in the growth rate.

In general, economic growth is essentially a change in the economy in a positive direction, a driving force for social development and improvement of material and socio-cultural life. Economic growth research studies the increase in scale and output rate of the economy over time.

### 3.1.1 Factors Affecting Economic Growth

In studying the case of economic growth, growth in Vietnam depends on two main groups of factors. The first group is economic factors that directly affect the growth process, such as capital (K), labor (L), natural resources (R), and technology (T). The second group is non-economic factors that indirectly contribute to economic growth: socio-political institutions, socio-cultural characteristics, ethnic-religious characteristics, and community participation.

- **Economic factors**

In the production process, the economy needs a combination of input factors (production resources) to create outputs (gross domestic product - GDP or gross national product - GNP) according to society's demand. Here, the dissertation examines the input-based economic growth structure according to the relationship in the following function:

$$Y = f(x_i) \quad (1)$$

In which Y is the output function, Xi is the input factors such as capital (K), labor (L), natural resources (R), and science and technology (T).

- ***Capital*** is the value of all tangible assets (including factories, machinery, equipment) and intangible assets (inventions, trademarks) that the business invests and accumulates in the production and business process to create surplus value. Capital is a significant factor in the economic production process. Under the condition that other factors remain unchanged, an increase in total capital will lead to an increase in product output (Aghion & Howitt, 2007).

- ***The labor force*** is an indispensable input factor in the production process. All production activities are determined by human labor, especially if workers have high skills and experience, which will yield higher productivity. Therefore, the quality of labor determines the results and efficiency of the production process (Fleisher et al., 2010).

- ***Resources,*** including land and available natural resources, are essential for all sectors (agriculture, industry, and services). The land is a fixed factor and limited by scale (on a territory), so investing more labor or capital per area unit is necessary to improve land use efficiency. In addition, forest, marine, underground resources (minerals, groundwater), and other natural resources are all input factors in production (Cavalcanti et al., 2011).

- ***Science and technology*** significantly affect economic growth, determining labor productivity and product quality changes. New technological inventions applied in production have helped workers relieve heavy and harmful labor and create rapid growth, promoting modern society’s economic development.

- **Non – economics factors**

- ***Social and cultural factors*** include, for example, culture (Swank, 1996), literary knowledge (Jung & Thorbecke, 2003) , or customs (Manwa & Wijeweera, 2016). During the development process of a country, all human activities aim to improve and enhance the quality of life. The more developed a country is, the higher the cultural level of its people.

- ***Ethnic and religious factors**:* Countries like Vietnam have 54 ethnic groups with different cultural, economic, and production customs needs. The goal of economic growth must be to improve the quality of life so that all ethnic groups can enjoy the fruits of the growth process. Besides, in multi-ethnic countries, there are often many different religions. Religions have views, ideologies, and philosophies that greatly influence people's perceptions and thoughts. Generally, the more homogeneous a country is in terms of ethnic and religious composition, the more likely it is to achieve development goals than a country with many ethnic and religious compositions because it is more accessible to ethnic conflicts. (Barro & McCleary, 2003; Brum & Dudley, 2001)

- ***Institutional factor*** is an essential term in economics, referring to a set of structures, organisations, and rules that create the economic system of a specific country or territory. Economic, political, and sociocultural institutions are always linked to reality in socioeconomic life, so there will always be changes. Institutional change in a positive direction impacts awareness and action, making socioeconomic development thinkers face the need for innovation and the promotion of social development (Ahmed et al., 2021; Alexiou et al., 2020; Glaeser et al., 2004). Theoretical and practical research shows that income inequality affects economic growth in many directions (positive, negative, nonlinear) depending on the development period of the economy, with each region and country having distinct socio-economic characteristics. It's important to acknowledge that a significant rise in income inequality will widen the social divide, thereby making a part of the population with low-income levels unable to access the fruits of the economic growth process, causing conflicts, political instability, or using income redistribution measures that can hinder the economic growth process (Aiyar & Ebeke, 2020; Atems & Jones, 2015; Gyimah-Brempong, 2002; Hung et al., 2020).

### 3.1.2 Measurements of economic growth

- **Analyzing and evaluating trends and growth scale**

The focus of economic growth studies is on changes in national income. Two fundamental measures of national income are commonly used: gross national product (GNP) and gross domestic product (GDP) (Dinh & Luong, 2014). This study mainly uses GDP indicators to analyze economic growth.

Measuring the scale of economic growth (absolute scale)

$$\Delta Y_t = Y_t - Y_{t-1} \quad (2)$$

In which: $\Delta Y_t$: is the scale of GDP growth of the economy in year t compared to the base year of comparison; $Y_t$ is GDP in study year t; $Y_{t-1}$ is GDP in year t-1.

Measuring economic growth can use the economic growth rate, which is the difference in economic scale between two periods that must be compared.

$$g_y = \left(\frac{Y_t}{Y_{t-1}} - Y_{t-1}\right) \times 100 = \frac{\Delta Y_t}{Y_{t-1}} \times 100 \quad (3)$$

$g_y$ is the growth rate of period t

If the economic scale is measured by real GDP, then a real GDP growth rate exists. If the economic scale is measured by nominal GDP, there will be a nominal GDP growth rate. Typically, economic concentration uses accurate indicators rather than nominal indicators.

Economic concentration can also be calculated according to GDP per capita.

$$Y_{pc} = {}^{Y}/_{P} \quad (4)$$

Where $P$ is the population size; $Y$ is economic growth (calculated by GDP)

Then, the economic growth rate per capita is calculated as follows:

$$g_{ypc} = \frac{Y_{pct} - Y_{pct-1}}{Y_{pct-1}} \times 100 = \frac{\Delta Y_{pct}}{Y_{pct-1}} \times 100 \quad (5)$$

Where $g_{ypc}$ is the growth rate of GDP per capita in period t; $Y_{pct}$: gross domestic product per capita in period t; $Y_{pct-1}$: Gross domestic product per capita in period t-1.

The calculated annual and average growth results for each period can be used to evaluate changes in economic growth.

- **Assessing the quality of economic growth**

There are many different understandings of the quality of economic growth, but the most common concept of economic growth is sustainable development (Le & Ba, 2005).

Mlachila et al. (2014) researched and built an index called the growth quality index for developing countries and showed that the internal nature of growth influences the quality and social aspects of growth. According to them, good growth quality does not just stop at high levels of growth; more importantly, it includes better living standards, welfare, and employment opportunities.

To achieve this goal, it is essential to consider the factors that create growth. Factors that create economic growth include the efficiency of investment capital, labor, and general factors such as technology and management.

- **Assessing the role of capital in economic growth**

To reflect the capacity of investment capital, which depends on the technological nature of production capital, the efficiency of capital use and management, and the level of resource scarcity, we can use the ICOR (Increment Capital Output Ratio) coefficient according to the Harrod Domar model (Domar, 1946; Harrod, 1939); however, when calculating, it is important to note the assumption that only increased investment capital affects growth, leaving all other factors unchanged (Dinh & Luong, 2014).

ICOR calculated from absolute numbers shows how many units of investment capital are required to increase if one unit of GDP is increased to implement it.

$$ICOR = \frac{\Delta K}{\Delta Y} \quad (6)$$

In which $\Delta K$ is the additional investment capital; $\Delta Y$ is the increase in GDP in the study year compared to the previous year; Yt is GDP in the year of study; Yt-1 is the previous year's GDP.

Investment capital in the economy is formed from savings. According to the Harrod – Domar model, the growth rate depends on savings and the ICOR coefficient. Additional investment in production capital increases the economy's production capacity, so the investment (I) equals the capital increase ($\Delta K$). Investment capital is financial capital to carry out investment projects to build factories, machinery, equipment, and infrastructure. (With the assumption that when calculating the ICOR coefficient, only an increase in capital leads to an increase in output, and all other factors remain unchanged).

$$ICOR = \frac{\Delta K}{\Delta Y} = \frac{I}{\Delta Y} \quad (7)$$

Domar gives an equation that shows the relationship between output and investment:

$$I = s\,Y \quad (8)$$

s is the savings rate (according to the Keynesian model)

$$ICOR = \frac{s}{g} \quad (9)$$

g is the growing rate

- **Assessing the role of labor in economic growth**

In the research about the impact of labor quality on labor productivity and economic growth conducted in Malaysia in 2010, Idris Jajri and Rahmah Ismail reveal that the capital-labor ratio significantly contributed to Malaysian economic growth and labor productivity,

respectively. Effective labor did play a positive role in determining economic growth (Jajri & Ismail, 2010).

Mai (2012) states, "Labor productivity is the efficiency of useful human activities in a unit of time; it is expressed by the number of products produced in a unit of time or the cost of producing a product."

Let Y be GDP (or the output produced in a unit of time t), and L be the labor in the economy (or the amount of labor wasted to produce Y units of product). Labor productivity is y then:

$$y = \frac{Y}{L} \tag{10}$$

- **Assessing total factor productivity (TFP)**

TFP (Total Factor Productivity) is an indicator that measures the productivity of both labor and capital in a specific activity or for the whole economy (Solow, 1957; Tran, 2010). According to the definition of the General Statistics Office (2016), TFP is a production result brought about by improving the efficiency of using fixed assets and labor or tangible factors, thanks to the impact of intangible factors such as change, new technology, rationalization of production, improved management, and improved labor qualifications of workers.

Raising the TFP index is important for workers, businesses, and the economy. If, for workers, raising TFP will contribute to increased wages, improved working conditions, and stable work, then for businesses, high TFP allows for easy expansion of production capacity, thereby improving the competitiveness of businesses and the economy in the international arena.

To measure TFP, most studies rely on the Cobb-Douglas production function:

$$Y = A.K^{\alpha}L^{\beta} \tag{11}$$

In which $Y$ is GDP; $A$ is TFP; $K$ is capital; $L$ is working labor; $\alpha$: output elasticity coefficient of GDP according to production capital (with the assumption that $L$ is constant), $\beta$: output elasticity coefficient of GDP according to labor (with the assumption that $K$ is constant).

## 3.2 Income Inequality

According to Kuznets (1955), income inequality is when most people live below the average income while only a tiny fraction of the population has a relatively high income in a country or territory. Fletcher (2013) supposed that income inequality occurs when there

are disparities between individuals, groups in society, or between countries in wealth, richness, or income distribution. Hoang (2015), "income inequality refers to the phenomenon that income is unevenly distributed among individuals or households in the economy".

The studies mentioned above all focus on the uneven distribution of income among individuals or groups in the economy. Income inequality refers to the variation in income between individuals or households in the economy. It's important to consider two aspects when evaluating income inequality: the income and expenditure of different population groups in society. Inequality between the poorest and wealthiest groups is evident in their livelihood capabilities, quality of life, and spending habits (Hoang & Dinh, 2010).

### 3.2.1 Causes of Income Inequality

When considering the causes of income inequality, economists have proposed several viewpoints as follows:

- ***Income inequality due to changing agricultural to non-agricultural production models***

Viewpoints suggest that income inequality occurs due to the difference in labor quality between agricultural and industrial sectors and the difference in income between urban areas – where many industrial activities are concentrated, and rural areas – where there are many agricultural activities.

Ricardo (1817) advocated the "iron law of wages." He said that the agricultural sector has decreasing profit margins with scale, and labor in the agricultural sector continues to increase. At the same time, land tends to be depleted, leading to a labor surplus in agriculture. Meanwhile, increasing the proportion of investment in the industrial sector, there is a shift of labor from the agricultural sector to the industrial sector. Without increasing wages, an income gap and inequality appear here.

According to Lewis (1954), the industrial sector can absorb workers with very low or zero marginal product from agriculture. Because labor supply is perfectly elastic and wages are constant, industrial growth is accompanied by rising industry profits. Average income is low, so workers receive a small proportion of total income, increasing inequality.

Kuznets (1955) argued that inequality may initially increase when shifting from a purely agricultural economy to an industrial one. The primary mechanism that increases income inequality is the difference in returns from factors of production between the agricultural and industrial sectors. If a country goes through industrialization, especially with the mechanization of agriculture, the centre of that country's economy will move to the cities. Farmers seek better-paying jobs in urban centres when migrating, creating an income gap between urban and rural areas.

The process of world economic integration also affects income inequality. Research by Nguyen (2012) shows that the level of international integration affects the income gap between urban and rural areas; the less internationally integrated a province is, the change in urban-rural income disparity will not be affected by the integration process.

- ***Income inequality is due to differences in human capital***

Income is the motivation for workers to achieve high efficiency at work. However, each worker has different characteristics in terms of qualifications, professional capacity, physical ability, and work experience; this causes differences in the worker's income.

According to the International Labor Organisation (ILO) in Convention No. 111, equality of opportunity or treatment in employment or occupation will be prejudiced if discrimination, exclusion, or preference is based on race, skin color, gender, religion, political opinion, national origin, or social origin (ILO, 1984). Thus, when there is discrimination, inequality appears, and inequality in career opportunities is closely related to workers' income.

Castelló-Climent (2010) emphasizes the strong link between inequality of opportunity and income inequality, particularly in terms of unequal access to education. When a portion of the population lacks educational opportunities, it leads to lower levels of education and, subsequently, lower future income.

Le and Huynh (2021) analyzed the impact of human capital on income and gender income inequality in the Mekong Delta of Vietnam. Analysis results from 7,558 paid workers show that female workers only receive about 84% of the income compared to male workers in the labor market. Notably, measured gender income inequality is primarily

associated with discriminatory factors. Meanwhile, human capital and demographic factors do not influence gender income inequality.

Luu (2011) presents a pyramid of social stratification based on income and expenditure from 1990 to 1999. The factor that most impacts social stratification is the value of means of production; while age and gender have very little influence, the increase in educational level is most strongly proportional to wealth. The higher the level of education a worker has, the higher their income.

Oxford Committee for Famine Relief (2017) – Oxfam Vietnam, in its Policy Research Report (2017), surveyed 12 communes in three provinces of Dak Nong, Lao Cai, and Nghe An in 2016. The results showed that the income difference between 20% of the wealthiest and 20% of the poorest groups was 21 times. The level of income inequality at the village level is quite large and tends to increase, especially in remote areas. Agriculture is the primary source of income. In addition, research shows that income inequality and access to public services such as healthcare and education have become complicated, especially for immigrant workers and ethnic minorities.

Human capital is an essential factor affecting the income level that workers receive. Income motivates workers to try to achieve high efficiency at work.

Ability and effort at work create a difference in income. More intelligent and healthier people are often paid according to their natural abilities. Besides, those who work harder and more diligently than others enjoy income commensurate with their efforts.

Workers' access to education and training also dramatically affects the income of individuals in society. People may receive different levels of on-the-job training that contribute to income inequality. Some workers learn new skills on the job; therefore, they can increase their income over time. Others have little or no job training, so their income stays unchanged. On the other hand, companies often apply on-the-job training programs to workers with formal education. It contributes to widening income differences between less-educated and better-educated individuals (Chudgar & Luschei, 2009; Rehme, 2007; Sylwester, 2000). Opportunity also affects income (Aiyar & Ebeke, 2020). Rural areas often have limited access to high-quality education compared to urban areas. Consequently, the

quality of labor in rural areas is generally lower, resulting in lower income levels compared to urban areas. However, because technological change makes an individual's job unnecessary, the individual's education or experience becomes meaningless. Besides, for heavy, dull, and high-risk jobs, workers demand a higher salary, which is considered compensation for the non-monetary characteristics of the job.

- ***Income inequality from property ownership***

Resource funds and "past heritage" are essential in increasing individual and household income. According to the classical theory represented by Smith and Ricardo, the primary factors of economic growth are capital, land, and labor. Land is the most critical factor. The growth of the agricultural sector is being impacted by the equal distribution of land ownership. The research about land inequality and economic growth by Cipollina et al.(2018) has obtained evidence that land inequality does indeed hurt economic growth. Furthermore, such an impact is more substantial for developing countries.

Abubakar's research paper (2021) in Nigeria explores the predictors of inequalities in agricultural land ownership among Nigerian households. The results show that the households that own agricultural land are significantly more likely to be poor or middle class (76 %), rural dwellers (74 %), male-headed (86 %), living in northern regions (64 %), and not educated beyond primary school (63 %).

Hoang and Dinh (2010) have considered differences in geographical location, natural resources, and comparative advantages, showing differences in income and per capita expenditure between regions in Vietnam. The difference in average monthly income in the Southeast region is 3.2 times higher than that in the Northwest region.

Assets are a person's "reserve", reflecting all actual finances and assets that an individual accumulates over time. A portion of an individual's income is derived from the possession of resources (perhaps through past savings or inheritance). An individual who owns much real estate, equipment, machinery, farms, houses, stocks, and savings has a more significant income than people with few or no assets. The fact that individuals or households own different assets contributes to income inequality.

### 3.2.2 Measurements of Income Inequality

To assess income inequality, we also need to study income distribution to know how much individuals earn and the source of income. According to Mark (Dinh & Luong, 2014), income distribution has two forms:

- The first-time national income distribution (the functional income distribution) involves the distribution of income according to different factors of production, such as labour, machinery, equipment, and land. In this distribution, workers are entitled to wages (or wages) from the labour supply; business owners enjoy profits as a return on capital ownership and a reward for their labour and business talent. In addition, the right to capital and assets when participating in the production process is entitled to the corresponding profits or property rentals.
- Income redistribution is mainly related to the state's intervention in income distribution for the first time. Income redistribution is usually done through income taxation, subsidy programs, and government spending to reduce the rich's income and raise the poor's income.

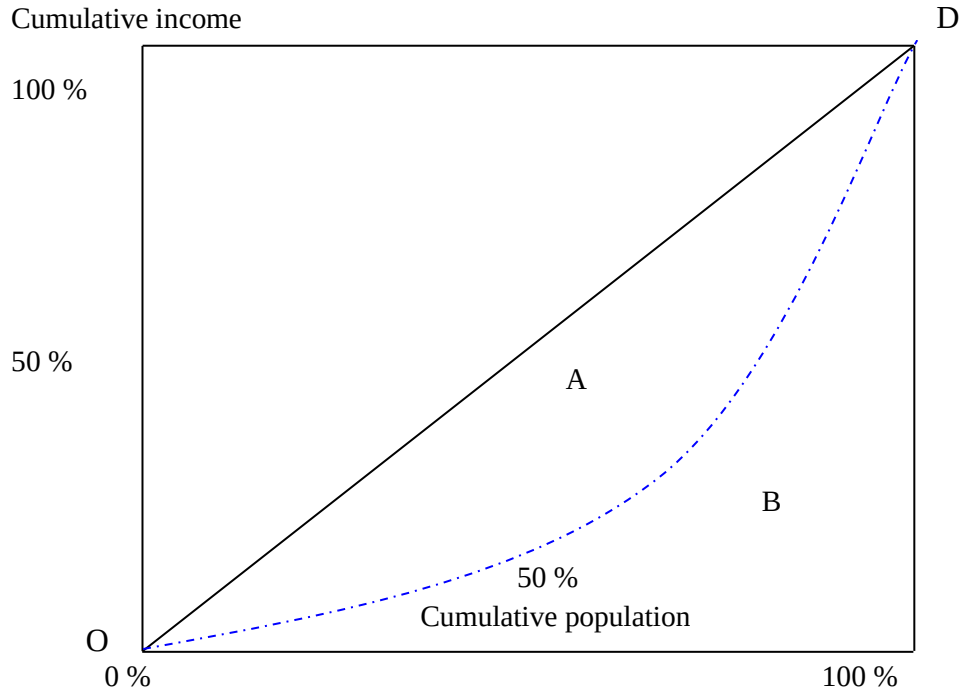
The size distribution indicates the share of income (or expenditure) received by different households, which is a more recognizable measure of the extent to which distributional inequality is shown (Dinh & Luong, 2014).

**The income disparity coefficient between the richest and poorest population groups**

Kuznets (1955) introduced a coefficient known as the Kuznets ratio, which is based on the income proportion of the wealthiest 20% group compared to the poorest 20% group. The Kuznets ratio measures inequality, with a higher coefficient indicating greater inequality.

Lorenz (1905) constructed **the Lorenz curve** (figure 3-1.) by representing it on two axes: the vertical axis represents the percent of cumulative income sorted by the cumulative percentage.

**Figure 3-1 The Lorenz curve**




*(Source: Own processing)*

The horizontal axis represents the percent of the cumulative population sorted in ascending income. The line segment connecting the point with coordinates 0% population and 0% income with the issue with coordinates 100% population and 100% income forms the square's diagonal originating from the coordinate axis. This diagonal line is equal. Determine the intersection between the population percentage and percent according to the cumulative method. Then, connect these points by investing 0% of the population and 0% of income until the endpoint percentage of the population and 100% of income to determine the Lorenz curve. The more significant the inequality, the farther the Lorenz curve is from the "absolute justice curve."

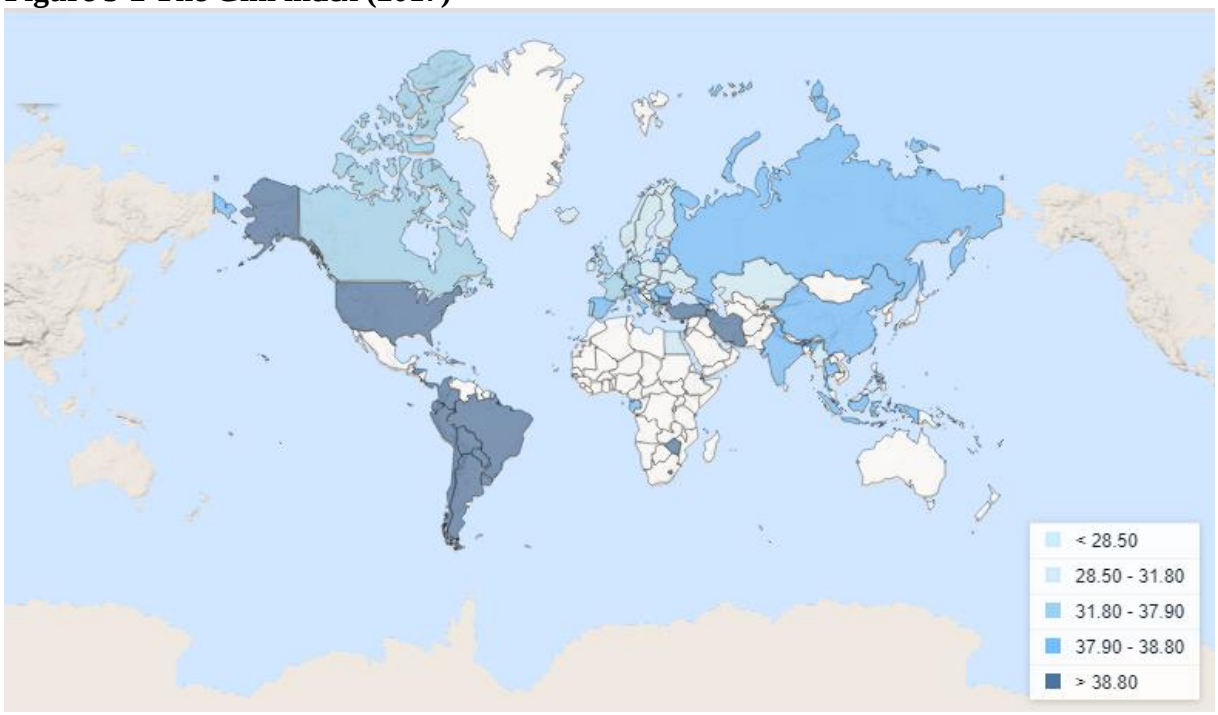
Corrado Gini inherits the results of the Lorenz curve study to give the **Gini coefficient** in 1912 (Ceriani & Verme, 2012). The Gini coefficient is determined geometrically by comparing the area of figure A, which is defined by the Lorenz curve, to the diagonal OD, and then dividing that by the area of the semi-square containing the Lorenz line, figure (A + B).

The Gini coefficient is always greater than 0 and less than 1. The smaller the Gini coefficient, the smaller the difference in income distribution between population groups. On

the contrary, the larger the Gini coefficient, the higher the disparity in income distribution between the population groups, the more unequal income distribution becomes.

The Gini coefficient is also referred to as the Gini index and is used as a measure of inequality (figure 3-2). According to the World Bank, countries are divided into three groups of income inequality: low-income inequality (Gini coefficient <0.4), medium inequality (Gini coefficient from 0.4 to 0.5), and high-income inequality (Gini coefficient >0.5).

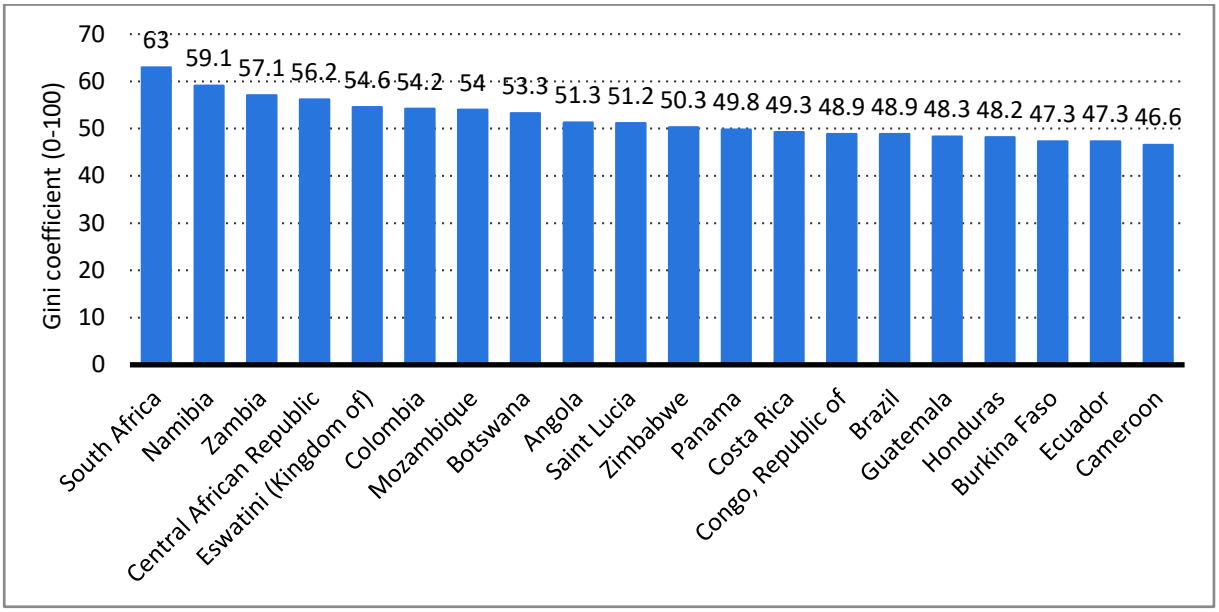
**Figure 3-2 The Gini index (2017)**




*(Source: World Bank, 2017)*

Figure 3-3 expresses 20 countries with the most significant inequality in income distribution worldwide in 2021, based on the Gini index.

**Figure 3-3 20 countries with the highest inequality in income distribution based on the Gini index**




*(Source: Statista, 2021)*

## 3.3 Relationship between Economic Growth and Income Inequality

The relationship between economic growth and income inequality is a topic that has attracted the attention and debate of many researchers and policymakers around the world (Aiyar & Ebeke, 2020b; Bjørnskov, 2008; Erman & Te Kaat, 2019; Glomm & Kaganovich, 2008; Sylwester, 2000).

Economic growth often refers to increasing the economy's income by mobilizing and allocating efficient resources. At the same time, income equality depends not only on the economy's total income but is also directly related to how income is distributed and the ability to access development opportunities (such as capital, land, health, and education) among population groups in society. Development policies that promote rapid growth can lead to social conflicts if income inequality, learning opportunities, access to social services, and poverty increase (Henn et al., 2020; Kojima, 2000). In contrast, a development policy favouring only the achievement of social equity can undermine growth drivers(Hoang, 2015).

**The Kuznets inverted U-shaped hypothesis** (Kuznets, 1955) is probably the first study to examine the relationship between inequality in income distribution and economic growth.

According to this model, countries are often not interested in income redistribution in the early stages of the development process. In this period, together with the achievement of economic growth (income per capita increases), inequality tends to increase because the results of growth focus on only a few groups of people. More policy measures will be taken to reduce inequality within and across sectors. As a result, the overall income inequality in the economy will decrease in the later stages of development.

Later, several papers were based on Kuznets' theory; some authors agreed that inequality tends to increase in less developed countries (Bigsten & Levin, 2001). However, many empirical studies have shown that Kuznets' viewpoint is not always accurate, and the main drawback is that Kuznets did not analyze the causes of inequality.

In recent decades, many other theories have been put in place to examine the relationship between growth and inequality. However, instead of focusing on Kuznets' hypothesis, researchers have produced other studies to explore the impact of inequality on economic growth.

Researchers Alesina and Rodrik (1994) and Persson and Tabellini (1994) formulated one of the theories to bridge **endogenous growth theory and political economic theory**. In a democratic society, tax rates are determined by the middle class. Taxes are assumed to be proportional to increasing income and public expenditure because tax revenue is distributed to all. However, the benefits of the poor will outweigh the rich. Therefore, people experiencing poverty will prefer a high level of tax distribution. However, in an unequal society, the income of the middle class is below the median income, while many people prefer a reallocation of income, which limits investment due to low returns. The negative impact of inequality is multiplied if the wealth discrepancy is not directed toward low-income people. This theory implies that the further society moves away from the democratic paradigm, the less chance to reduce inequality through redistribution.

The research on an **imperfect market** was done by Galor and Zeira (1993) and Aghion, Caroli, and Gacla-Pefialosa (1999) based on the role played by the imperfection of the capital market. In particular, in countries where capital is borrowed, inequality implies that a relatively large proportion of the population will be below the standard cost of education, so investment in human resources will be low, and if growth is based on investment in human

resources, growth will also be low. The reallocation will increase total output and growth, allowing low-income people to invest in their human capital. If the economy develops, the capital market will be perfected, and the effects of the capital market's imperfections will play a more important role in poor than rich countries. Consequently, the predictable effects of inequality on economic growth will be greater than in poor countries. The argument for the imperfection of the capital market is also well-suited to explain the relationship between economic growth and poverty rates. While inequality does not always mean that a large proportion of the population is too poor to access capital, a large proportion of poverty will result in many people being tied to capital. Inequality in an economy, for example, can still be high while the lives of all people in the country have improved. Thus, we can predict a negative relationship between economic growth and poverty.

Benabou's research (1996) provides a framework where the effect of redistribution on growth is not necessarily linear. There are two opposite effects. Redistribution is good if public spending is spent on education investments in a country with an imperfect capital market, and it is wrong if it only transfers income from the rich to the poor because it reduces the returns from the investment of the rich. Thus, growth has an inverted U-shape bonding for redistribution, and redistribution also has an inverted U-shape bonding for inequality.

The issue of **socio-political instability** as analyzed by Alesina and Perotti (1996), Benhabib and Rustichini (1996), Grossman and Kim (1996) underscores the impact of inequality on political and social stability. In particular, inequality is an essential factor in determining political and social instability, and it harms growth by reducing expectations for a return on investment. Inequality increases social conflict, resulting in less secure property rights and decreases growth. Furthermore, the participation of the poor in crime and anti-social actions are indications of a direct waste of resources because the time and material of the crime do not contribute to production. Potential crime prevention operations also represent another waste of resources as well.

According to the **education and fertility problems theory** developed by Perotti (1993), inequality harms economic growth through household decisions about education and childbirth. Parents can optimize the use of family resources by improving the quality of their education or the number of children. Social inequality is in a society where households cannot invest in human capital through education. Since education costs the same as the

earnings, they lose while in school. Low-income families will not invest in education; instead, they choose to increase the number of children. If growth is primarily from investment in human resources, this society will have a high fertility rate, leading to low growth, and income inequality will increase.

The **social comparative theory** Knell (1999) developed on Benabou's theory (1996). This theory is based on the assumption that maximizing the benefits of individuals depends not only on their consumption but also on the average consumption of some typical groups. This theory is based on the assumption that maximizing the benefits of individuals depends not only on their consumption but also on the average consumption of some typical groups. In an unequal society, low-income families are often tempted to abide by rules and expectations of social norms by engaging in higher consumption activities and by reducing investment in education to reduce the distance between wealthy families. Such activities will maximize current well-being but will reduce future growth and well-being.

It can be seen that theories have introduced many channels through which inequality can affect growth, and this effect can take place in many dimensions. Furthermore, it is also difficult to determine which channel will have a dominant role if only qualitative theories and analysis are used. Therefore, to study the relationship between growth and inequality, it is necessary to consider the channels that generate inequality and estimate their impact on economic growth.

## 3.4 The role of Official Development Assistance in Economic growth

In this thesis, the terms "ODA" (Official Development Assistance) " or "aid" are all used with the same meaning as "Official Development Assistance" as in the OECD (Organisation for Economic Co-operation and Development) definition (2004, 2006). According to this definition, ODA is considered the official budget capital flow of developed countries and international organisations supporting the development of poor and developing countries.

ODA began to appear after World War I to increase influence over poor allies; developed countries funded governments developing their allies. The officially declared goal is to promote socio-economic development and poverty reduction in world countries. However, industrial countries want to increase their influence over other Allied Government countries through ODA.

From a theoretical perspective, ODA is a part of capital, and capital determines economic growth in any growth model. Growth theories provide a basis for explaining global economic growth. They are a means to understand the factors that create economic growth in a country or locality by providing models, explanatory mechanisms, and predictive frameworks. Many theoretical and empirical studies have identified factors that promote economic growth to make proposals and policies, narrow the gap between developed and developing countries, and promote sustainable development (De Jager, 2004). Growth theories that emphasize the role of capital, including ODA, in growth include:

- Neoclassical growth theory,
- Endogenous growth model,
- New institutional economics theory.

Governments of developing countries that receive ODA will use ODA capital to invest in infrastructure projects. These projects contribute to institutional reform, public financial management, and other projects, as well as support education, health care, and the environment to create a premise for growth and poverty reduction. Most ODA projects have spillover effects on domestic investment and national development. It is clearly shown that when ODA capital is invested in transport infrastructure development, the economic analysis of the project brings positive results to increase the flow of goods, creating conditions for exports, reduce transportation costs, and reduce poverty, thereby creating trust, attracting and encouraging FDI capital, private capital sources, and overall social investment capital sources, creating an essential boost for growth and sustainable economic development (Benmamoun & Lehnert, 2013; Momita et al., 2019; Nam & Ryu, 2023; Siraj, 2012; Yiew & Lau, 2018)

ODA contributes to supplementing investment capital for the development of the entire society and increasing average investment capital per capita, thereby promoting economic growth (Dalgaard et al., 2004). It is an essential source of capital the state uses as public investment capital. Research by Levy (1987) and Dollar & Easterly (1999) shows the impact of ODA on total social investment. Levy points out that investing 1 USD in ODA increases total social investment by 1.26 USD in a sample of 22 low-income countries in the Sub-Saharan region, promoting economic growth in scale and quality of growth.

ODA has a significant impact on incremental capital output (ICOR). Research into the development of ODA capital flows has concluded that such flows effectively utilize ICOR, thereby impacting economic growth (Voivodas, 1973; White, 1992).

ODA creates a source of local state budget expenditure. The reality of attracting and using ODA in developing countries shows that localities with ODA capital make essential contributions to budget expenditures in countries and localities. Budget spending for socio-economic development creates money to increase budget revenue. Many empirical studies (Grier & Tullock, 1989; Kweka & Morrissey, 2000) show that the scale of public sector spending positively impacts economic growth. Thus, ODA has a positive impact, promoting economic growth through essential contributions to the state budget of the central government and local governments.

Imports should be promoted, and international markets should be expanded to attract FDI capital. One of ODA's outstanding roles is to help countries and localities integrate deeply with regional and world markets. ODA capital supplements foreign currency capital, compensating the trade balance and balancing the national budget. Most developing countries face deficits in payments due to increasing imports of equipment and goods. Jong-Wha Lee (1995), using cross-sectional data for the period 1960-1985, showed that the ratio between imported goods and domestically produced capital goods investment has a positive and significant effect on the growth rate of income per capita among countries, especially developing countries. Receiving ODA capital is not only an external resource to support domestic resources but also a source of foreign currency to compensate for trade deficits (Selaya & Sunesen, 2012). On the other hand, all direct and indirect impacts of ODA positively affect the investment environment to attract FDI capital and vice versa (Bacha, 1990; Solimano, 1990).

ODA contributes to creating jobs and improving the quality of human resources. The characteristic of ODA capital is that it is closely associated with programs and projects of the ODA recipient country. ODA programs and projects often have good discipline, high professionalism, and modern technological know-how. According to empirical research by Crosswell (1998), Fayissa & Gill (2016), and Killick & Foster (2007), working in this environment contributes to the improvement of workers' skills and discipline, thus enhancing the quality of human resources.ODA contributes to improving the quality of governance

institutions through promoting the transfer of technology and management skills. Science, technology, and management skills are critical to promoting sustainable growth. Reality shows that ODA donor countries often come from developed countries with high technological levels and professional and practical management skills. With the governance effect of official development assistance capital, ODA from lending countries ODA often comes with governance and requirements for using capital, such as transparency and accountability for the use of capital ODA. It improves governance institutions' quality, promoting sustainable economic growth (Crosswell, 1998; Fayissa & Gill, 2016; Tarp, 2006).

ODA contributes to supplementing domestic savings and private investment. Developing countries need more sources of savings and investment. Therefore, ODA has replaced domestic savings, and ODA is used by the Government to maintain consumption levels (replacing domestic taxes, i.e., increasing Government spending). The Government's expansion of public investment has strongly stimulated the development of private investment, thereby positively affecting economic growth (Selaya & Sunesen, 2012; White, 1992).

However, there are also studies based on cross-national statistics (Amdt et al. 2010, 2011) or mentioning ODA's impact on economic growth (Crosswell, 1998; Tarp, 2006), and other factors (such as policies and institutions) are also confirmed to play a significant role in the success or failure of using ODA capital (Burnside & Dollar, 2000; Collier, 2006).

Empirical studies show that the effectiveness of ODA's impact on economic growth is not automatic; it depends on certain factors (institutions, human resources, comparative advantages, trade openness), trade, technology gap, financial market, cultural factors, and education. That helps explain why the impact of ODA capital flows is entirely different between countries with the same level of development.

The economic and political situation, management mechanism, and political stability will directly impact attracting and using national and local ODA. Because in countries and localities with sound economic management mechanisms, using ODA equivalent to 1% of GDP can lead to growth equivalent to 0.5%. Therefore, political and institutional stability is

a significant factor in mobilizing and attracting ODA for national and local economic growth.

Regarding Vietnamese institutional quality, studies by Nguyen et al. (2016) and Pham and Nguyen (2017) used part or all of the indicators of the Provincial Competitiveness Index (PCI) in Vietnam to measure the quality of economic institutions among Vietnamese provinces. Although the province does not have the function of promulgating significant laws and policies, the unit directly implements those policies. The differences between provinces in implementing these policies and laws allow the province to be used as a unit to measure the quality of economic institutions, thereby assessing economic growth.

For ODA project programs, the country and locality must have counterpart capital, usually at least 15% of counterpart capital, to receive ODA. Therefore, countries and localities must know how to promote and strengthen their financial capacity to attract and effectively use ODA capital. Oates's theory (1972) points out that the size of the public sector, including the size of the central government and local governments, impacts economic growth. The size of the public sector is represented by budget revenue or expenditure by the central government or local government. The larger the scale of the public sector, the greater the development of infrastructure, economic restructuring, the development of social services, the improvement of people's living standards, and economic restructuring, thereby promoting economic growth.

Many empirical studies exploring the relationship between fiscal policy size and economic growth have yet to reach consistent conclusions. Research results depend on the country/locality studied, the research period, research methods, and how government spending is classified into different categories. The Kweka and Morrissey (2000) study studied cross-sectional data from 96 countries (1961-1976), including developed and developing countries. Research results show a negative relationship between government spending and economic growth, meaning that the larger the government spending in GDP, the lower the per capita growth rate. Research by Fölster and Henrekson (1999) and Dar and Amir Khalkhali (2002) supports the view that government spending hinders the economy.

On the contrary, other studies, such as those of Rubinson (1977) and Devarajan et al. (1996), show a positive effect of government spending on economic growth. Rubinson

(1977) points out that increasing government size as measured by the government spending/GNP ratio will promote economic growth. Research by Devarajan et al. (1996) using cross-sectional data from 43 developing countries from 1970 to 1995 shows the positive role of the scale of government spending on economic growth. The study by Grier & Tullock (1989) used panel data covering 113 countries (1951-1980), divided into four subgroups: OECD, Africa, Americas, and Asia. The study shows that government size positively impacts economic growth in the first three groups of territories, OECD, Africa, and Americas, but negatively impacts the fourth group (Asia).

Empirical studies by Akai & Sakata (2002), Pham (2008), Su (2011), Mai (2015), and Bui (2017) use the scale of the public sector as the scale of local government representing local budget expenditures to continue to support public sector policy. This affirms that the size of local government affects economic growth.

The capacity of ODA project implementation staff is one factor that significantly affects the attraction, use, and effectiveness of ODA capital. Officials must have in-depth capabilities in law, economics, technology, and foreign languages. The project implementation must comply not only with the regulations and laws of the Vietnamese government but also with the regulations and instructions of the sponsor. In addition to professional capacity, project managers must have the ability to withstand high work pressure (Bui et al., 2022).

Procedures of countries and localities receiving ODA are essential factors because if the country and locality have open, transparent, clear, and convenient procedures for implementing ODA programs and projects in the country and locality smoothly and on schedule, promoting effective use, thereby affecting national and local economic growth (Nguyen, 2022).

Each donor has policies, requirements, and demands that countries and localities receiving aid must comply with and implement when using the Donor's ODA capital. These procedures vary by country, organisation, and investment sector, as do the procedures for pre-feasibility studies of bidding or disbursement and periodic reporting. These procedures can cause confusion and difficulties for many ODA recipient countries during project implementation (Nguyen & Tran, 2014). The progress of project programs is stagnant,

lasting longer than expected, reducing investment efficiency. Therefore, understanding and properly implementing each donor's policies, instructions, and regulations is extremely necessary for countries receiving ODA.

In recent times, due to the economic crisis, major economies have been facing financial difficulties, so the total amount of ODA in the world is declining (Karshenas, 2009; Mendoza et al., 2009), while the ODA demand of developing countries is increasing continuously, especially after the economic crisis and regional armed conflicts. Therefore, fierce competition exists between countries and localities worldwide to attract and use ODA capital. To attract and use ODA capital in the coming time, countries and localities must constantly improve their experience, management, coordination, implementation capacity, and ability to repay debt properly. They are limiting project programs using ODA capital.

## 3.5 The role of Fiscal policy in Income Inequality

Addressing economic inequality requires coordinating many policy tools, including fiscal policy. Income redistribution is also one of the three essential functions of fiscal policy, besides supporting macroeconomic stability and promoting growth.

Economic inequality is the difference in income or wealth between different social groups. More equitable income distribution is the desired goal of policymakers. Low inequality is an essential precondition for achieving greater equality in access to socio-economic and political resources. With economic growth, inequality can have positive and negative effects on growth, but studies show that the adverse effects are predominant (Bastagli et al., 2012). Inequality can positively affect growth by providing incentives for innovation and entrepreneurship, increasing savings and investment in the economy if the rich have a higher saving-to-income ratio, and allowing a small number of individuals in developing countries to accumulate the minimum amount needed to start a business and receive a good education (Ostry et al., 2014).

On the other hand, inequality can also harm growth because it limits the ability to accumulate human capital, creates political and economic instability, leads to a decline in investment, and hinders the society’s consensus to adjust the economy to sustain growth in the event of shocks. The study of Zungu et al. (2021) also shows that the relationship between inequality and growth can be non-linear. In particular, the increase in inequality

from a low level creates an impetus to promote growth but, to a certain extent, creates incentives for profiteering and leads to lower growth. Empirical results (Castells-Quintana & Royuela, 2014; Iradian, 2005) show that inequality hinders economic growth, at least in the medium term.

To deal with inequality in countries, relying on an overall system of many policies, including fiscal policy, is necessary. Fiscal policy can affect an individual's current and future income and access to health, education, and other social security services, affecting different aspects of inequality. Tools for direct fiscal policy to redistribute current income include taxes and progressive transfer payments. In addition, spending to promote growth towards infrastructure development, health care, and education also helps achieve equity goals. Such expenditures are the tools of fiscal policy that perform the redistribution function indirectly.

First, tax and progressive transfer payments immediately impact individuals' disposable income today. The government levies progressive taxes on the rich, higher than the poor, and implements transferable spending programs for social security activities that benefit the poor more than the rich. It will have income redistributive effects from rich to poor, thereby reducing income inequality. At the same time, such redistributive tax and spending policies also affect market returns (earnings before taxes and transfers) through effects on future earnings generation. Benabou (2000) emphasizes the impact of redistributive policy on the accumulation of human capital. In particular, progressive fiscal policies and measures to loosen credit constraints allow people with low incomes to invest more in human development, helping increase their relative income in the future. According to IMF (2014), spending on education is the expenditure that most obviously impacts future income ability. A higher level of education often results in more equality in income distribution (Cevik and Correa-Coro, 2015).

On the other hand, social justice can also be supported by realizing the remaining two fiscal policy objectives, macroeconomic stability and growth efficiency, thereby affecting the economic opportunities available to the public. People experience poverty and the distribution of market income (Goñi et al., 2008). Macroeconomic stability is one of the factors that determines the level of inequality (Ferreira et al., 2007). In the budget structure of countries, taxes, and budget expenditures can regulate income, such as personal income

taxes, unemployment benefits, and social benefits, adjust automatically to the business cycle, and limit output volatility in the economy. In addition, realizing the stabilization objective of fiscal policy can also contribute to ensuring social equity by preventing macro-financial crises in which people experiencing poverty are the most vulnerable.

Fiscal policy seeks growth efficiency by providing public goods, addressing market failures, and promoting overall economic growth. While there can be tension between efficiency and equity (Bastagli et al., 2012), recent studies suggest that the outcome depends on the specific policy instruments employed. Fiscal policies prioritizing infrastructure development, investment in human capital (e.g., health care, education, social insurance), and inclusion with improved access to resources have contributed positively to efficiency and equity (Muinelo & Roca-Sagalés, 2011).

## 3.6 Relationship between Economic Growth and Income Inequality in Vietnam

Nguyen and Le (2015) conducted an initial assessment of the growth quality of the Vietnamese economy. The analysis focuses on three issues related to the quality of growth: the patterns of investment in physical capital assets and human capital; identifying Vietnam's growth model in the period 1990 – 2003, paying particular attention to the contribution of human capital, and analysing the evolution of inequality in income distribution as well as the effects of growth and inequality to the poverty rate**.** Based on the results of the analysis, the study has proposed several recommendations. The study gives a picture of income inequality and economic growth in Vietnam, but when running the model, it only stops considering the impact of income inequality and economic growth on poverty in Vietnam. The results show that economic growth contributes significantly to poverty reduction, whereas inequality increases poverty at a lower level.

Research by Ngo (2005) shows that the relationship between economic growth and income inequality lies in three key issues: first, the primary causes of inequality change in development, as well as the source of economic growth is a sketchy understanding of the source of development inequality; second, both growth and inequality are the result of economic policy, institutional capacity, and dependence on development trends and external shocks; third, the socio-economic policy should consider the goal of promoting economic

growth and improving inequality as a common goal, should not have individual treatment, but also should pay attention to the economic growth and exclude the inequality can occur at different levels of development. However, the research is only based on qualitative research and statistical description.

Kimura (2006), in his study "The effects of growth and globalization on poverty and inequality in Vietnam (1993 – 2006)", has documented changes in wealth and structure of income equality in the 1990s and 2000s. The research examined the possible impact of policies such as intervention reduction, privatization, and free trade implemented as part of innovation and began to demonstrate effective results in the 1990s. However, the study has only pointed out the effects of growth and globalization on poverty and inequality in Vietnam but has not yet given specific recommendations and solutions to the problem.

A research paper titled "Economic growth and progress and social justice in Vietnam" (Hoang & Dinh, 2010) has shown that after nearly 25 years of reform, the Vietnamese economy is going through a profound transition period. Two decades of rapid economic growth under the renovation policy have changed production and trade. Economic growth has contributed to an impressive narrowing of poor households. The transition to a market economy has been completed, and Vietnam has joined the ranks of East Asian countries with high-speed growth economies. However, besides these outstanding achievements, Vietnam faces difficulties in the relationship between economic growth, progress, and social justice. However, this study mainly uses qualitative research methods and descriptive statistics.

Research on the relationship between economic growth and income inequality by Phan (2015) was carried out within a region of 5 provinces: Da Nang, Hue, Quang Nam, Quang Ngai, and Binh Dinh. He used household living standard survey data and statistical yearbooks for 2001 – 2013, combining qualitative and quantitative methods in their research. The study has shown that a cause-and-effect relationship exists in the short term between income inequality and economic growth in the key economic region of Vietnam – the Central, thereby proposing several policies to integrate economic growth and social policies in the area.

Most research in Vietnam mainly refers to relationship trends (positive or negative) through qualitative methods; later, some studies apply quantitative methods in research

about the relationship between the income inequality system and economic growth. The empirical studies on the impact of income inequality on economic growth in the world and Vietnam can now be divided into four groups:

(i) inequality harms growth;

(ii) inequality has a positive effect on growth;

(iii) here is a non-linear relationship between inequality and growth;

(iv) there is no relationship between the two factors. This article only aggregated empirical studies analyzing the effects of inequality on growth in individual countries using panel data at the province, state, or region level.

In recent years, economic growth and income inequality have been topics of research interest in Vietnam, but most of the new projects discuss either economic growth (Glewwe & Jacoby, 2004; Kikuchi et al., 2018; Nguyen et al., 2019) or income inequality (Nguyen et al., 2007; Pham & Vo, 2019). Therefore, the systematic study of the relationship between income inequality and economic growth helps to provide scientific arguments for proposing views and policy implications to ensure economic growth and income equality.

**Table 3.1 The impact of inequality on economic growth through empirical studíes**

| No. | Author | Year | Research's name | Data, Method | Dependent Variable | Independent Variable | Correlate |
|---|---|---|---|---|---|---|---|
| 1 | Ortega-Diaz, A. | 2003 | Assessment of the relationship between Income inequality and Economic Growth. | Panel data, 32 tables in Mehico, 1960-2002, GMM | lnGSP (Gross State Product) | GINI income<br>% of male population 10 years old and older who can read and write<br>% of female population 10 years and older who can read and write<br>Period (dummy variable) | (+)/(-)<br>(-)<br>(+)<br>(-)/Zero |
| 2 | Digdowiseiso, K. | 2009 | Education inequality, economic growth, and income inequality: Evidence from Indonesia. | Panel data, 23 provinces, period 1996-2005, linear regression | LogGDP per capita | Life expectancy<br>Average years of schooling<br>GINI income<br>The first difference of LnGDP real average | (+)<br>(+)<br>(+)<br>(+) |
| 3 | Pede, Valerien O., Adam H. Sparks, and Justin D. McKinley | 2012 | Regional income inequality and economic growth: a spatial econometrics analysis for provinces in the Philippines | 80 Provinces, Period 1991-2000, GWR (Geographically Weighted Regression) | Log GDP per capita | Log GDP per capita<br>The index of income inequality<br>Poverty rate<br>Education level<br>Urban | (-)<br>(+)<br>(-)<br>(+)<br>(+) |
| 4 | Oyama, Masako. | 2014 | How Does Income Distribution Affect Economic Growth?- Evidence from Japanese Prefectural Data | Provincial level, Period 1980-2010, FEM | Annual growth rate of income per capita | Natural log of income per capita<br>Income share of the 3rd quintile<br>GINI<br>Stock of human capital (HighSchool and College)<br>The degree of Urbanization (Urban)<br>The initial industrial mix of the prefecture<br>Age structure | (-)<br>(+)<br>(-)<br>(+)<br>Zero<br>Zero<br>(-) |
| 5 | Wahiba, Nasfi Fkili, and Malek El Weriemmi | 2014 | "The relationship between economic growth and income inequality." | The graphical approach<br>An econometric analysis | GR: Annual growth rate of gross domestic product. | GINI: Gini index of inequality of wage distribution between branches of economic activity<br>OP: Share of exports in gross domestic product.<br>FR: Fertility rates.<br>M2:M2 money supply divided by GDP<br>HK: Enrollment rates at the secondary level | (-)<br>(+)<br>(-)<br>(+)<br>(+)<br>(+) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | Coll, J.A.C. | 2014 | Inequality and growth in the context of the Mexican economy: Does inequality matter for growth. | Period 2000-2005, commune, regression | GDP growth rate | GINI income<br>GINI income squared<br>Rate of Government expenditure/GDP<br>Rate of investment<br>Log birth rate<br>Log GDP per capita<br>Average years of schooling<br>Role of law<br>Region dummy variable : North,<br>Middle, South East | (+)<br>(-)<br>(+)<br>(+)<br>(-)<br>(-)<br>(+)<br>(+)<br>(+)<br>(-)<br>Zero |
| 7 | Le, Quoc H. | 2008 | The relationship between growth, poverty and inequality in Vietnam | 61 provinces, period 1996-2004, OLS | GDP growth rate | GINI expenditure<br>The rate of poor household<br>Average years of schooling for the adult<br>GDP per capita<br>Average ratio of investment to GDP | Zero<br>(-)<br>(+)<br>(+)<br>(+) |
| 8 | Pham, Ngoc T. Hoang, Thanh N. | 2012 | The relationship between growth, poverty and inequality in Vietnam | 63 provinces, Period 2006-2010, FEM | Log GDP | Log ratio 35nalyses35t/GDP<br>Log of people in working age<br>GINI income<br>GINI squared income<br>Interaction between GINI and investment<br>Interaction between GINI and education | (+)<br>(+)<br>(-)<br>(+)<br>(+)<br>(+) |
| 9 | Hoang, Thuy Y. | 2015 | Impact of income inequality on economic growth in Vietnam | 63 provinces, Period 2004-2010, FEM | Log GDP | GINI income<br>GINI squared income<br>Log ratio investment in GDP<br>Log rato labour force in total population<br>Interaction between GINI and investment | (+)<br>(-)<br>(+)<br>(+)<br>(-) |

*(Source: Own processing)*

The combined empirical results in table 3.1 show that most studies use the GDP per capita growth rate to represent economic growth and income GINI coefficient to describe the level of inequality. Other local characteristics, such as education level, poverty rate, labour force, and urban-rural area, are also used as control variables when analyzing the impact of inequality on growth.

All three studies on the relationship between inequality and growth in Vietnam summarised in table 3.1, use the Vietnam Household Living Standards Survey data at the provincial level. Still, the variables representing inequality and the study period are very different. Le's study (2008) uses GINI expenditure, while the other uses GINI income to describe inequality. Regarding time, Le (2008) studied this relationship from 1996 to 2004, Pham anh Hoang (2012) studied from 2006 -2010, and Hoang (2015) studied the period 2004-2010. The experimental results of these three studies are also very different. Le (2008) found no relationship between expenditure inequality and growth. In contrast, Pham and Hoang (2012) show a nonlinear relationship between income inequality and growth. However, the threshold for determining the direction of the impact of inequality on growth in the study of Hoang (2015) is higher than that of Pham and Hoang (2012).

Based on theoretical and empirical synthesis, we can see that the impact of inequality on growth is assessed by these elements such as:

- Inequality in spending and income
- Academic level
- Poverty rate
- Labor force
- Degree of urbanization

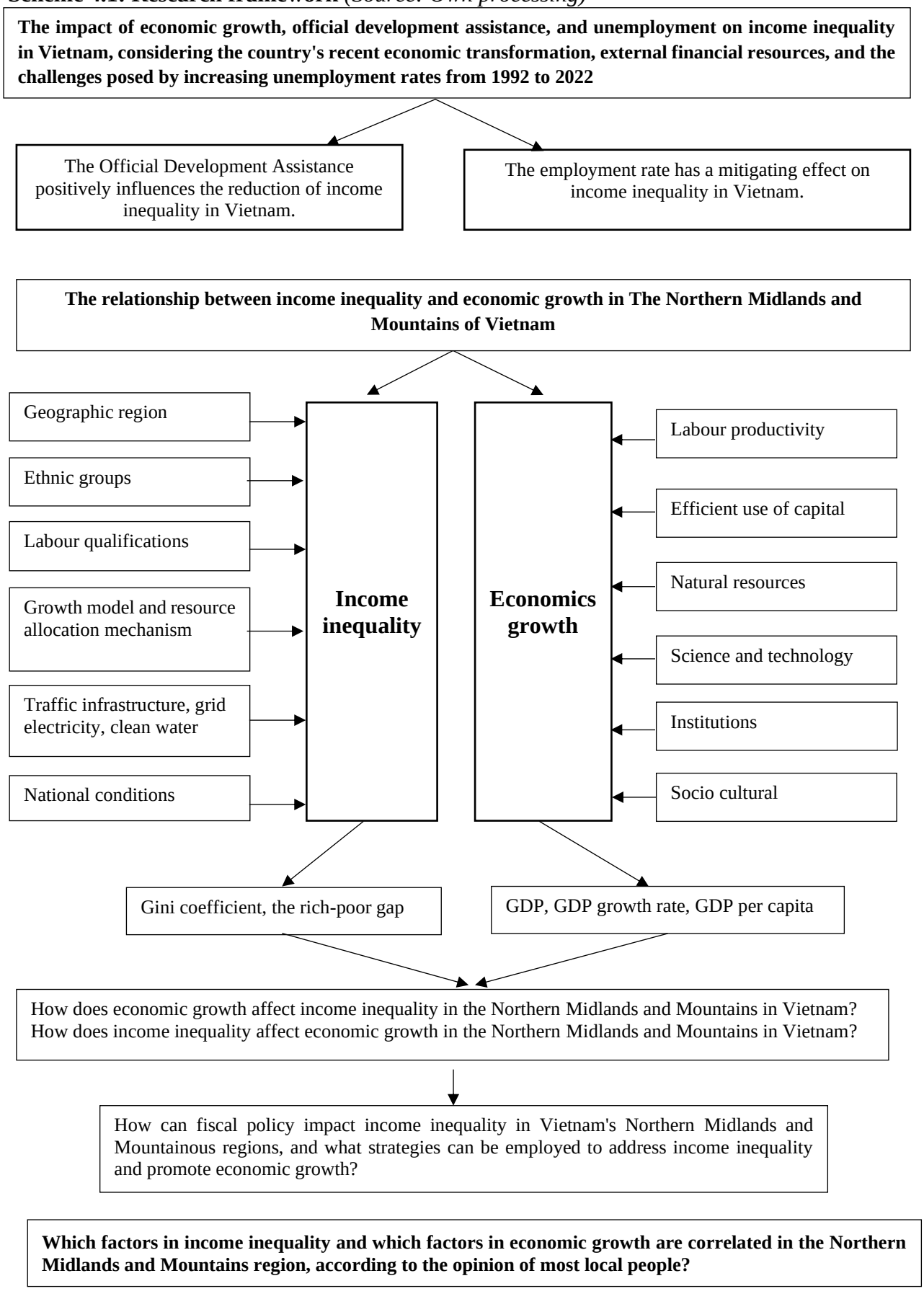
# 4 Methodology

## 4.1 Research design

The author divides the thesis into three main parts. The first part evaluates the impact of economic growth, official development assistance, and unemployment on income inequality in Vietnam, considering the country's recent economic transformation, external financial resources, and the challenges posed by increasing unemployment rates from 1992 to 2022. The second part analyses the relationship between income inequality and economic growth in the Northern Midlands and Mountains regions. This part also identifies the interplay between fiscal policy factors and income disparity to tackle the research regions' income inequality. In the third part, the author analyses survey results from local people in the Northern Midlands and Mountain regions to identify which factors of income inequality and economic growth correlate.

The study is conducted according to the following framework:

**Scheme 4.1: Research framework** *(Source: Own processing)*



## 4.2 Econometric procedure

This chapter will describe the data and methods used by the author to carry out the research topic. The thesis combines qualitative and quantitative research to analyse the relationship between income inequality and economic growth, focusing on the Northern Midlands and Mountains regions.

### 4.2.1 Estimated methods used in the research

The most straightforward approach in previous studies is ordinary least squares (OLS) regression estimation. The most significant limitation of OLS is that this method cannot see the changes in each province when there are different characteristics. Too tight constraints on cross-units are unlikely to happen in practice. Misidentification of the Durbin-Watson statistic shows that there is autocorrelation in the data. The research employs panel data regression methods to address this limitation of OLS.

**Vector autoregression model (VAR)**

In the traditional approach, VAR (the vector autoregressive model) is widely used; each variable depends linearly on this variable's lagged values and other variables' lagged values (Gujarati, 2021).

General VAR model:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \cdots + A_p Y_{t-p+s_t} + u_t \quad (12)$$

This model has some advantages. First, this is a simple equation; there is no need to determine which variables are endogenous or exogenous. All variables in the VAR model are endogenous variables. Secondly, in VAR modeling, the value of a variable is represented as a linear function of the past or lagged values of that variable with all other variables in the model. The last, if each equation contains the same number of lag variables in the system, it can be estimated using the OLS method.

Abrigo and Love (2015) selected the model, estimated and inferred the vector autoregressive model when executing commands on the Stata (Pvar), syntax, and the output results were closely simulated after the VAR commands built into Stata are easy to use in converting between tables and times.

Pvar estimates autoregressive vector models by fitting a multivariate panel regression of each dependent variable on its lag, the lag of the dependent variable, and the exogenous variable (if any), estimated using the GMM regression/estimation method. Commands are implemented using the interactive GMM in Stata.

However, Pvar also has some things to keep in mind. That is, Pvar only applies to stationary series, so it is necessary to check the stationarity of the series (in case the variable is not stationary, take the difference) (Seetanah & Teeroovengadum, 2019). Besides, it is necessary to test the Granger (Lopez & Weber, 2017) to consider the cause-and-effect relationship between variables. In addition, with Pvar only evaluating the interaction effect at a lag without assessing the immediate impact, it is necessary to use other tests (REM, FIX) to evaluate the immediate impact of the series.

- **Fixed effects model (FEM) and Random effects model (REM)**

Fixed effects model (FEM) and Random effects model (REM) are two models commonly used in the estimation of panel data (Gujarati, 2021).

Consider a regression model with the dependent variable $Y$, the explanatory variable $X_{it}$, or many unobserved variables. The regression model is determined:

$$Y_{it} = \alpha_i + \beta_i X_{it} + \varepsilon_{it} \quad (13)$$

In which $\alpha$ is the intercept coefficient, $i$ is space ($i$ = 1,2,…n), $t$ is time ($t$ = 1,2,…$T$)

$\varepsilon$ is a random factor, random error, or noise - a factor included in the model to represent unknown, unobservable factors that impact the dependent variable.

With the assumption that each unit has unique characteristics that can affect the explanatory variables, FEM analyzes this correlation between the residuals of each unit and the explanatory variables, thereby controlling and separating the effects of specific characteristics (constant over time) from the explanatory variables to be able to estimate the net effects of the explanatory variable on the dependent variable.

Model (13) intercept coefficient $\alpha_i$ distinguishes the intercept coefficient of each research unit, which may be different due to the different characteristics of each research unit or differences in management and operational policies.

The main limitation of fixed effects estimate is that it cannot determine the coefficient of the explanatory variable that does not change over time; for example, in the model, variables such as gender, skin color, and race of an individual are variables that do not change over time. According to this approach, it is impossible to identify the effects of variables that do not change over time.

The difference between the fixed and random effects estimates is reflected in the unit variations. If, in the FEM, the variation between units is correlated with the independent variable (explanatory variable), then in the REM, the variation between units is assumed to be random and uncorrelated with the explanatory variables.

The basic idea of the random effects model also starts from the model (13). However, instead of αi being fixed, in REM, it is assumed that it is a random variable with mean $\alpha_i$, and the intercept coefficient value is described as follows: $\alpha_i = \alpha + \varepsilon_i$ ($i$ = 1,…n) vhere $u_i$ is the random error which, its mean is 0, and the variance is $\sigma^2$.

Replace them in a model (13); we have a new model:

$$Y_{it} = \alpha + \beta X_{it} + w_{it} \quad (14)$$

Where ($w_{it} = \varepsilon_{it} + u_i$), $u_i$ is the component error of different objects (different characteristics of each business); $\varepsilon_{it}$ is the other combined component error of both the individual characteristics of each subject and over time.

Choosing which estimation model is appropriate for panel data depends on the data characteristics and the economic theory studied. Usually, in previous studies, Hausman tests are used to determine fixed or random effect estimates during the analysis process.

- **Hausman test**

The Hausman test is used to choose whether the fixed or random effects estimation method is appropriate, according to Baltagi (2021), to consider whether autocorrelation exists between the error $\varepsilon_i$ and the independent variables.

Hypothesis:

*Ho:* $\varepsilon_i$ *and the independent variables are not correlated*

*H1:* $\varepsilon_i$ *and independent variables are correlated*

The conclusion principle of the Hausman test is as follows: When the p_value <0.05 rejects Ho, the independent variables are correlated using a fixed effects model. On the contrary, if p_value > 0.05, the random effects model will be used.

- **The Logarithmic transformation**

Logarimth is one of two main ways a log transformation can help sample observations better meet the assumptions of some statistical analysis (Curran-Everett, 2018). According to Benoit (2011), logarithmically transforming independent variables can improve the stability and performance of the regression models, especially when the variables have a non-normal distribution. A logarithm can help reduce error variance, improving the stability of regression estimates. There are four types of logarithmic models (table 4.1): the linear case with no transformations, the linear-log model, the log-linear model, and the log-log model.

**Table 4.1. Four varieties of logarithmic transformations**

| | X | |
|---|---|---|
| Y | X | logX |
| Y | *Linear*<br>$\hat{Y}_i = \alpha + \beta X_i$ | *Linear-log*<br>$\hat{Y}_i = \alpha + \beta log X_i$ |
| logY | *Log-linear*<br>$log\hat{Y}_i = \alpha + \beta X_i$ | *Log-log*<br>$log\hat{Y}_i = \alpha + \beta log X_i$ |

*(Source: Benoit (2011))*

The research uses the log-log model because the logarithmic model is suitable for data in many fields, especially related to macroeconomic variables. In addition, this model is used when the values of the variables are tremendous to reduce the absolute values of the variables, making it more convenient when processing data and drawing graphs.

At the same time, the author also chooses the log-linear and the linear-log model when observing changes in economic growth through income inequality in the Northern Midlands and Mountains region because this model is often applied when we are interested in the growth rate (or decline rate) over time of an economic variable (usually this variable is at the macro level such as population growth rate, GNP, money supply, unemployment, production).

### 4.2.2 Examining the influence of ODA and unemployment rate on income inequality

The influence of ODA and the unemployment rate on income inequality is examined using a multivariate time series analysis (from 1992 to 2022). Based on theoretical and empirical synthesis, the author builds the variables and models as follows:

$$\mathrm{LogGINI_t} = \beta_0 + \beta_1 \mathrm{LogGDP_t} + \beta_2 \mathrm{LogUNEMPLOY_t} + \beta_3 \mathrm{LogODA_t} + \varepsilon_t \qquad (15)$$

In there:

*Dependent variable:*

*LogGINIt:* Natural logarithm of income inequality in Vietnam (index)

*Independent variables:*

*LogGDPt:* Natural logarithm of total income per capita (USD/Year);

*LogUNEMPLOY:* Logarithm of the unemployment rate (%/Year);

*LogODA:* Logarithm of official development assistance (USD/Year).

*εt* is the error;

*t* represents for years

The empirical analysis is based on the following steps:

***Step 1:*** Detection of stationarity/non-stationarity of the time series using the Augmented Dickey-Fuller test (ADF). ADF test examines the null hypothesis that the time series contains a unit root and is non-stationary.

***Step 2:*** Selection of maximal lag using the information criteria, concretely Akaike Information Criterion (AIC), Schwarz Bayesian Information Criterion (SBIC), and Hannan-Quinn Information Criterion (HQIC).

***Step 3:*** Detection of long-run relationship among the selected variables using Johansen test.

***Step 4:*** Decision about employing Vector Autoregressive Model (VAR) or Vector Error Correction Model (VECM). The VAR model can be successfully used when the time series are stationary or if the time series are non-stationary but the Johansen test does not confirm the long-term relationship. Otherwise, the VECM is more appropriate.

***Step 5:*** Diagnostic checking of the model for autocorrelation of residuals, normality of residuals, and model stability using the Lagrange-Multiplier test (LM), Jarque-Bera test, and Eigenvalue, respectively.

***Step 6:*** Detection of the causal relationship among the selected variables using the Granger test.

***Step 7:*** Estimating the Impulse-response function to detect the impact of the unitary shock on the analysed system.

More details about the multivariate analysis can be found, e.g., in Kočenda, Černý (2016), Juselius (2006), or Chatfield (2004).

### 4.2.3 Identifying the relationship between economic growth and income inequality in the Northern Midlands and Mountains

The author identifies the effects of income inequality on economic growth in the Northern Midlands and Mountains of Vietnam, based on theoretical and empirical synthesis as follow (table 4.2):

**Table 4.2 Summary of variables, the basis of variable selection, expected sign in the research model**

| Name of variables | Description | Basis to choose variables | Expectations | Hypothesis |
|---|---|---|---|---|
| | | ***Dependent variables*** | | |
| **Economic growth $GDPpc_{it}$** | Logarithmic of GDP per capita of province i at time t | Waynyagathi (2006) | | |
| | | ***Independent variables*** | | |
| **Inequality $G\_inc/exp_{it}$** | Gini coefficient follow Income/Expenditure of province i at time t | Pham, Ngoc T. Hoang, Thanh N.(2012) | +/- | To a certain extent, increasing inequality will promote growth, but to a certain extent, rising inequality will reduce growth. |
| **Inequality squared $(G\_inc/exp_{it})^2$** | Gini coefficient follow Income/Expenditure of province i at time t squared | Pham, Ngoc T. Hoang, Thanh N.(2012); Hoang, Thuy Y.(2015) | -/+ | There is a nonlinear relationship between inequality and growth |
| **Education $EDU_{it}$** | Average years of schooling of household members aged 15 and over (years) | Digdowiseiso (2009); Coll(2014) | + | Education has a positive relationship with economic growth |
| **Poverty rate $POV_{it}$** | Poverty rate of province i at time t (%) | Pede, Valerien O., Adam H. Sparks, and Justin D. McKinley (2012) Le, Quoc H.(2008) | - | Poverty rate has a negative relationship with economic growth |
| **Labour force $LAB_{it}$** | Labour force rate per total population of province i at time t (%) | Digdowiseiso (2009); | + | Labour force rate has a positive effect on economic growth. |
| **Urbanization $URB_{it}$** | Level urbanization of province I at time t (%) | Pede, Valerien O., Adam H. Sparks, and Justin D. McKinley (2012) | + | Level of urbanization has a positive effect on economic growth. |

*(Source: Own processing)*

The impact of inequality on growth is analyzed based on the following two research models:

Model (16): **Effects of income inequality on economic growth**

$$\text{Log GPD}_t = \beta_0 + \beta_1 \text{G\_inc}_{it} + \beta_2 \text{G\_inc}_{it}^{\ 2} + \beta_3 \text{EDU}_{it} + \beta_4 \text{POV}_{it} + \beta_5 \text{URBi}_t + \beta_6 \text{LAB}_{it} + \mu \quad (16)$$

Model (17): **Effects of expenditure inequality on economic growth**

$$\text{Log GDP}_t = \beta_0 + \beta_1 \text{G\_exp}_{it} + \beta_2 \text{G\_exp}_{it}^{\ 2} + \beta_3 \text{EDU}_{it} + \beta_4 \text{POV}_{it} + \beta_5 \text{URB}_{it} + \beta_6 \text{LAB}_{it} + \mu \quad (17)$$

In which:

i: provinces

t: time (year)

μ: error in the model

To determine the impact of factors: inequality, education, poverty rate, labor, and urbanization on economic growth, the authors used panel data regression for three models: Ordinary least squares – OLS (Craven & Islam, 2011), Fixed Effects Model – FEM (Petersen, 2004), Random Effects Model – REM (Petersen, 2004). Because the study uses panel data of provinces with very different socio-economic characteristics, there are some outliers. To overcome this drawback of the data, the authors used the robust option when performing the regression to reduce the weights of the values located far from the regression line without removing them (Bramati & Croux, 2007). The study also uses F-test and Hausman-test (Le & Nguyen, 2016) to choose between OLS, REM, and FEM models. However, after checking for heteroskedasticity and autocorrelation, these phenomena occur in the FEM model. Therefore, the author decides to use the generalized least squares - GLS model (Menke, 2015) to fix and conclude the final model for the study.

### 4.2.4 Finding the interplay between fiscal policy factors and income disparity

To identify the interplay between fiscal policy factors and income disparity to tackle the research regions' income inequality, the author builds the model as follows:

$$\text{G}_{\text{INC}_{it}} = \beta_1 \text{LogINVEST}_{it} + \beta_2 \text{LogHEALTHEXP}_{it} + \beta_3 \text{LogTAX}_{it} + \beta_4 \text{LogEXPENSION}_{it} + \beta_5 \text{LogSOCIAL}_{it} + \beta_6 \text{EDU}_{it} + \mu \quad (18)$$

and the variables are shown in table 4.3:

**Table 4.3 Summary of variables in the model**

| Name of Variables | Symbols of variables in the model | Description | Unit |
|---|---|---|---|
| | ***Dependent variable*** | | |
| **Inequality** | $G_{INC_{it}}$ | The Gini coefficient follows the income of province i at the time t | Unit |
| | ***Independent variables*** | | |
| **Household investment** | $INVEST_{it}$ | The investment in production and business of each household in province i at the time t | VND[1] |
| **Household income tax** | $TAX_{it}$ | The income tax of each household in province i at the time t | VND |
| **Household health expenditure** | $HEALTHEXP_{it}$ | The expenditure for medical of each household in province i at the time t | VND |
| **Household pension** | $PENSION_{it}$ | The pension of each household in province i at the time t | VND |
| **State social security** | $SOCIAL_{it}$ | Social security from the Government for each household in province i at the time t | VND |
| **Education** | $EDU_{it}$ | Number of years of schooling of the head of the household in province t at the time t | Year |

*(Source: Own processing)*

In the period from 2010 to 2020, the author used six sets of VHLSS data to process the research model data. The income GINI coefficient (G_inc) is calculated directly at the website http://www.wessa.net/co.wasp using the Lorenz curve GINI method based on each household's income and expenditure data in each province.

Since the VHLSS data are not representative of the provincial level, the absolute value of the impact of the independent variables extracted from this dataset (including household investment (INVEST), household income tax (TAX), household health expenditure (HEALTHEXP), household pension (PENSION), State social security (SOCIAL), and education of the head of

[1] 1 USD = 25,000 VND; 1 CZK = 1,092 VND (July 2024)

household (EDU)) on discontent the income equality in the regression function may not be accurate, which is the main limitation of the study.

Therefore, the research only focuses on understanding the direction of impact between social security variables and demographic characteristics in the relationship with income inequality, but the impact of these variables in the model needs to be analysed. Variables include INVEST, TAX, HEALTHEXP, PENSION. SOCIAL, performed on base ten logarithms to help control high values in the research.

### 4.2.5 Analyzing the connection between economic growth and income inequality from the regional perspective

In the Northern Midlands and Mountains region, the author conducted a questionnaire survey among the local managers and experts from June 2022 to September 2022. The questionnaire is included in Appendix No.1. The aim was to reach out to selected local experts and managers based on their knowledge of the local environment, familiarity with the situation in the given area, and willingness to complete the questionnaire with the researcher.

The aim was to identify the factors in income inequality and economic growth correlated in the Northern Midlands and Mountains region, based on the opinion of the local people. The author creates a questionnaire comprising 26 questions divided into three parts: general information about the surveyed people, economic growth, and income inequality. The survey was conducted in 14 provinces and cities in the Northern Midland and Mountainous region between June and September 2022. The author was presented in person in the research area to get the most accurate results, met directly with local people, and conducted surveys. As a result, the number of samples collected was 319 samples. After collecting data, the author enters the survey data into SPSS software and runs a correlation test to select pairs of questions that may be correlated and used for the analysis. After finding groups of correlated questions and grouping them, the author uses Crosstab analysis for the above pairs of questions. Based on Crosstabs results from SPSS software, synthesized and presented into detailed analysis tables. Then, the author provides explanations, analyses the numbers and ratios in the correlation

between pairs of questions, and compares them with practice to make appropriate comments and conclusions.

## 4.3 Data

The thesis's data is based on statistical yearbook data from the General Statistics Office's Vietnam Household Living Standards Survey (VHLSS) from 1992 to 2022. Some indicators are from the World Bank.

The study builds on the collection of the GINI Index (the indicator of income inequality) at the World Bank in the period 1992 to 2020 and additionally updated in 2021 and 2022 according to the report from the General Statistics Office of Vietnam (GSO); GDP per capita is also collected at the World Bank in the period from 1992 to 2021, in 2022 is collected according to the report from the General Statistics Office of Vietnam (GSO). Unemployment rates (UNEMPLOY) and foreign development assistance (ODA) are also fully collected at the World Bank from 1992 to 2022.

This part of the thesis is conducted to find the effects of the ODA and unemployment rate on income inequality in Vietnam from 1992 to 2022. The analysis is based on the variables shown in the table 4.4:

**Table 4.4 Declaration of the variables**

| | Variable | Description | Unit | Source |
|---|---|---|---|---|
| **1** | GINI | Income inequality | Index | WorldBank |
| **2** | GDP | Total income per capita | Thousands USD | WorldBank |
| **3** | UNEMPLOY | Unemployment rate | % | WorldBank |
| **4** | ODA | Official development assistance | Billions USD | WorldBank |

*(Source: Own processing)*

From Table 4.5, Vietnam's average GINI index from 1992 to 2022 is 36.09, so Vietnam belongs to countries with relatively medium inequality (World Map Gini index). The GINI index was highest in 2010 at 39.9 and lowest four years later, at 34.8 in 2014. In general, Vietnam's level of control for income inequality has been relatively good in recent years from 2010 onwards.

Vietnam's average GDP per capita from 1992 to 2022 is 1,503 USD per year; the highest is 4,110 USD in 2022, and the lowest is 141.3 USD in 1992. Such development shows an excellent growth signal in Vietnam's total GDP per capita from 1992 until now.

**Table 4.5 Descriptive statistics for GINI, GDP, UNEMPLOYMENT, ODA**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **GINI** | 31 | 36.09 | 0.98 | 34.80 | 39.30 |
| **GDP** | 31 | 1.50 | 1.29 | 0.14 | 4.10 |
| **UNEMPLOY** | 31 | 1.90 | 0.47 | 1.00 | 2.87 |
| **ODA** | 31 | 1.83 | 1.15 | 2.49 | 4.22 |

*(Source: Own processing)*

Table 4.5 also shows the average unemployment rate of 1.9%, with a standard deviation of 0.47. The highest unemployment rate was 2.87%, and the lowest was 1% during the stated period. Unemployment was relatively stable and low during this period, indicating the stability and reliability of the labour market in Vietnam.

ODA (Official Development Assistance) is a variable that measures the amount of official development aid to Vietnam from countries and international organisations between 1992 and 2022. The average total ODA is 1,834 billion USD, with a standard deviation of 1,150 billion USD. The highest amount of ODA aid was 4,216 billion USD, and the lowest was 249.8 USD million during the stated period. Receiving official development aid from the international community plays an essential role in supporting Vietnam's economic and social development.

In Vietnam, the General Statistics Office has published data on the income of provinces calculated from VHLSS datasets for 2002-2020. However, the expenditure data of the regions collected from this research have yet to be published. Besides, according to published income, the GINI coefficient is also not uniform. Therefore, to ensure compatibility when comparing the effects of inequality by revenue and expenditure, the author uses raw data from the results of the VHLSS to calculate the system. GINI number by income and expenditure of 14 Northern Midland and Mountainous provinces in 2002-2020. Because there is no data on the expenditure and income of provinces in the Northern Midland and Mountainous area from 2002 to 2008, the author uses the VHLSS dataset from 2010 to 2020 to conduct research. The GINI coefficients of income (G_inc) and expenditure (G_exp) are calculated directly at the website

http://www.wessa.net/co.wasp using the Lorenz curve GINI calculation method based on data about income and expenditure of each household in each province.

**Table 4.6 Descriptive statistics for GDP, Education, Gini expenditure, Gini Income, Poverty rate, Labor force, and Urbanization**

| Variable | Obs | Mean | Std. Dev. | Min | Median | Max |
|---|---|---|---|---|---|---|
| **logGDP** | 132792 | 3.38 | 0.44 | 2.42 | 3.41 | 4.49 |
| **EDU** | 101833 | 6.66 | 5.46 | 0.00 | 7.00 | 99.00 |
| **G_inc** | 132792 | 0.64 | 0.21 | 0.40 | 0.84 | 0.90 |
| **G_exp** | 132792 | 0.64 | 0.09 | 0.48 | 0.69 | 0.73 |
| **$G\_inc^2$** | 132792 | 0.46 | 0.27 | 0.16 | 0.70 | 0.81 |
| **$G\_exp^2$** | 132792 | 0.42 | 0.11 | 0.23 | 0.48 | 0.53 |
| **POV** | 132792 | 24.81 | 12.57 | 2.80 | 24.30 | 53.90 |
| **LAB** | 132792 | 61.89 | 2.80 | 54.20 | 61.35 | 71.30 |
| **URB** | 132792 | 17.95 | 5.39 | 9.66 | 16.96 | 34.31 |

*(Source: Own processing)*

The results from Table 4.6 show that most of the mean values of the variables are consistent with the actual situation and developments in Vietnam from 2010 to 2020. Accordingly, the standard deviations of all variables in the above table are minor in their average values. The deviation of the variables is not more than 10; only the poverty rate variable (POV) is about 12.57. The values of the variables are all skewed to the right, which is consistent with reality because the values of all variables are more significant than 0.

The logarithmic value of total economic growth (logGDP) averages 3.38 and ranges from 3.41 to 4.49 from 2010 to 2020. The GINI coefficients of income (G_inc) and expenditure (G_exp) both have an average value of 0.64, which shows that the inequality difference in income and spending in the Northern Midland and Mountainous provinces is unusually high compared to the alarming inequality threshold of 0.4 previously set by the General Statistics Office. The author adds the mean value of two variables, squared income inequality, and squared expenditure inequality, to find the nonlinear relationship between inequality and growth with values of 0.46 and 0.42, respectively, smaller than their base value.

The average educational attainment (EDU) variable is 6.66, showing that the basic education level of the Northern Midland and Mountainous provinces has an average of $7^{th}$ grade and lower secondary school level. The average poverty rate of the Northern Midland and Mountainous area is 24.81%. The labour force ratio to the total population in the Northern Midland and

Mountainous region accounts for about 61.89%, and the urbanization rate in these provinces is 17.95%, a relatively modest pace compared to other urban areas in Vietnam.

Variables, including income, production and business investment, health expenditure, income tax, pension, social security, and education level, are described and extracted explicitly from the VHLSS period data set from 2010 to 2020.

Table 4.7 shows that most of the mean values of the variables are consistent with the actual situation and developments in Vietnam in 6 datasets of the household living standard survey (VHLSS) from 2010 to 2020.

**Table. 4.7: Descriptive statistics of the variables in the model**

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| **G_inc** | 7,980 | 0.6121 | 0.2262 | 0.3984 | 0.8876 |
| **LogINVEST** | 7,980 | 6.9191 | 4.5175 | 0 | 12.9967 |
| **LogHEALTHEXP** | 7,980 | 6.3097 | 2.4801 | 0 | 12.6280 |
| **EDU** | 7,980 | 6.2165 | 4.3363 | 0 | 12 |
| **LogTAX** | 7,980 | 3.6915 | 3.1662 | 0 | 11.5129 |
| **LogPENSION** | 7,980 | 0.7598 | 2.6841 | 0 | 12.1914 |
| **LogSOCIAL** | 7,980 | 2.6731 | 3.5450 | 0 | 13.1223 |

*(Source: Own processing)*

The variable representing income inequality in Vietnam in the Northern Midlands and Mountains (G_inc) has an average of 0.61, indicating that the inequality in expenditure in this region is higher than the alarming level of 0.4 from the General Statistics Office. The variables represent, respectively, the natural logarithm of household investment (LogINVEST), household health expenditure (LogHEALTHEXP); household income tax (LogTAX), household pension (LogPENSION), and State social security (LogSOCIAL) averaged 6.91; 6.3; 3.69; 0.75 and 2.67. Finally, the variable that represents the education of the head of household (EDU) has an average of 6.2, which means that the average has completed lower secondary school.

The last part of the dissertation focuses on questionnaire results. After running SPSS, the author discovered 13 correlations that show the factors contributing to economic growth and income inequality. Table 4.8 shows possible correlated pairs of questions.

**Table 4.8 Groups of correlated questions**

| | Code | Description |
|---|---|---|
| 1 | s2.Q1.2 * s3.Q1.9 | "There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period.„ * "The poorest group has had much lower spending on education and health care than the rich.„ |
| 2 | s2.Q1.5 * s3.Q1.10 | "All the pupils attend primary school„ * "There is an increase in income inequality among ethnic groups in my province.„ |
| 3 | s2.Q1.5 * s3.Q3.2 | "All the pupils attend primary school„ * "The source of income for the poorest group during the monitoring period is farming/fishing.„ |
| 4 | s2.Q1.2 * s3.Q5.4 | "There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period„ * "Assess the contribution of the following social services to improving income equality in the province. - Access to clean water„ |
| 5 | s2.Q1.1 * s3.Q6.4 | "The GDP per capita of the province is growing„ * "The impact of the following factors on people's income – Illegal business„ |
| 6 | s2.Q1.1 * s3.Q6.6 | "The GDP per capita of the province is growing„ * "The impact of the following factors on people's income - Land ownership„ |
| 7 | s2.Q1.2 * s3.Q6.2 | "There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period.„ * "The impact of the following factors on people's income - Good at business.„ |
| 8 | s2.Q1.2 * s3.Q6.3 | "There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period.„ * "The impact of the following factors on people's income - Being a public servant.„ |
| 9 | s2.Q2 * s3.Q3.2 | "Overall, from your experience, how would you rate the growth of GDP in your province„ * "The source of income for the poorest group during the monitoring period is Farming/Fishing„ |
| 10 | s2.Q2 * s3.Q3.4 | "Overall, from your experience, how would you rate the growth of GDP in your province„ * "The source of income for the poorest group during the monitoring period is Construction„ |
| 11 | s2.Q2 * s3.Q3.6 | "Overall, from your experience, how would you rate the growth of GDP in your province„ * "The source of income for the poorest group during the monitoring period is Retail„ |
| 12 | s2.Q2 * s3.Q3.9 | "Overall, from your experience, how would you rate the growth of GDP in your province„ * "The source of income for the poorest group during the monitoring period is Public Sector„ |
| 13 | s2.Q2 * s3.Q4.1 | "Overall, from your experience, how would you rate the growth of GDP in your province„ * "The source of income for the richest group of people in recent years is Extraction of raw materials.„ |

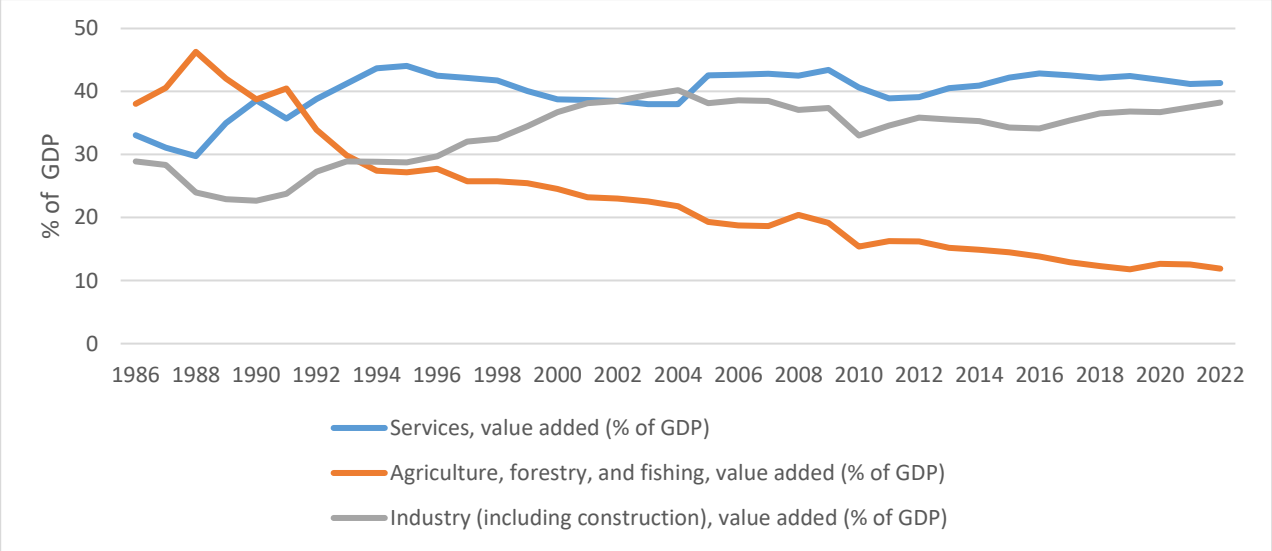
*(Source: Own processing)*

# 5 The Vietnam Economy: A Short Overview

## 5.1 Structure of the Economy and Economic Growth

Vietnam´s economy is characterized by its dynamic transition from a primarily agrarian society to a more industrial and market-oriented economy. The share of agriculture has fallen during the last three decades from 46% in 1988 to 11,8% in 2022 (figure 5-1). This trend was already evident in the previous decade of the 20th century; however, the decline in agriculture has accelerated since the turn of the millennium. The industrial sector´s share in the economy has increased since the 1990s but has stabilised or even declined in the last two decades. Around 1995, services began to play a crucial role in the economy. The services sector still maintains the highest share, and its development has been stable over the past decade.

**Figure 5-1 The Development of the GDP structure**



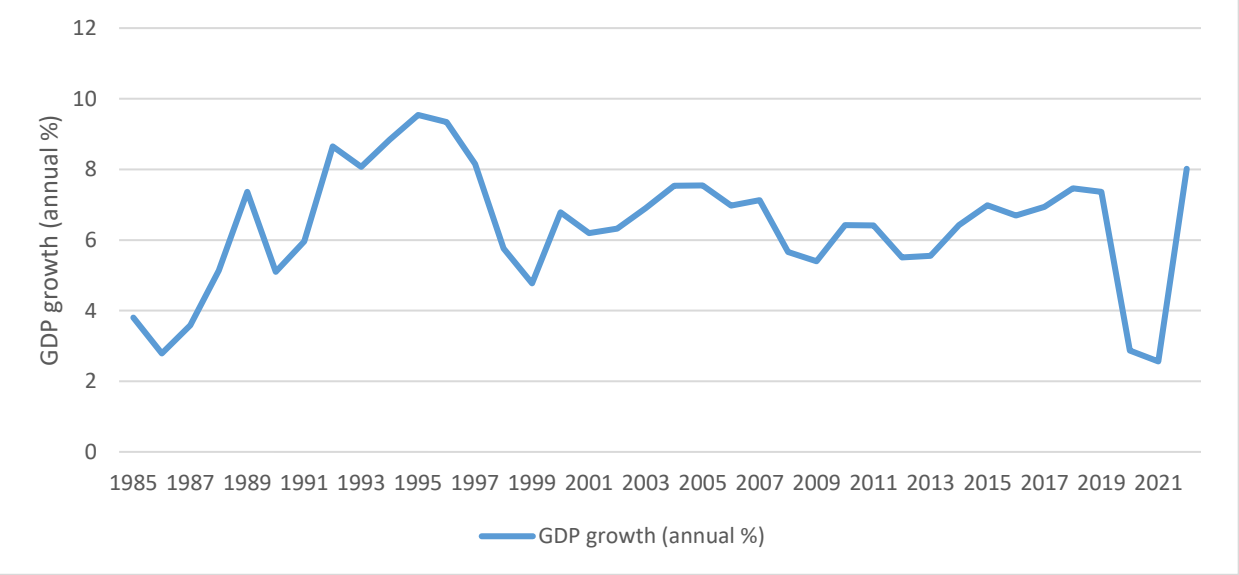

*(Source: Own processing based on World Bank,2023)*

After over 20 years of implementing renovation, transforming the economic mechanism from central planning to a market mechanism with state regulation, restructuring the economy, developing a multi-sector economy, opening the economy, and expanding cooperation relations with foreign countries, Vietnam's economy has achieved remarkable growth achievements. Vietnam has experienced robust economic growth, consistently ranking among the fastest-

growing economies in the world. This growth has been propelled by strong manufacturing and export performance, alongside growing domestic consumption.

The following analysis is about some salient indicators to evaluate the growth achievements. Since reforming the economic policy in 1986, Vietnam's economy has undergone many changes, but it is worth mentioning here that Vietnam has overcome the difficult situation and achieved a high growth rate for many years in a row (figure 5-2).

**Figure 5-2 GDP growth (annual, %)**




*(Source: Own processing based on World Bank, 2023)*

In 1986-1990, this was the first stage of the renovation process; the economy faced many difficulties, and the growth rate was still low - only 4.9 % per year. However, this was also the stage for economic structural change, opening up a new stage for the country with many achievements.

From 1991 to 1995, the driving force of economic growth was industry. The economic growth rate has constantly been improved and is high. Especially in 1995, the economic growth rate peaked at 9.5%, the highest achieved growth rate ever. This period also marks the first steps of economic restructuring.

From 1996 to 2000, despite being affected by the Asian financial crisis (1997-1999), the economic growth rate maintained an average increase of 7% per year.

In the period from 2001 up to now, Vietnam's economic growth has achieved new strides. From 2000 to 2007, after the subsiding of the Asian financial currency crisis, various programs aimed at reforming the economic structure were implemented, including promoting the development of the non-state sector and mobilizing savings resources in the population. The average GDP growth rate in this period reached 7.55% per year. In 2008, despite being affected by the global economic crisis, the GDP growth rate still reached 6.23%.

Along with high economic growth, the income of the Vietnamese has also improved. From 2002 to 2018, GDP per capita increased 2.7 times, reaching over 2,700$ in 2019, with more than 45 million people escaping poverty (World Bank 2021). Vietnam has gone from one of the poorest countries in the world to a lower-middle-income country.

In 2020, Vietnam's economy was heavily affected by the COVID-19 pandemic but showed considerable resilience. Vietnam is one of the few countries with positive economic growth, and its GDP growth is estimated at 2.9% in 2020 (World Bank 2021).

Although Vietnam's economy has achieved positive changes, it is still too slow to shorten the development gap with other countries in the region and worldwide. In 2008, Vietnam had to cope with a new economic crisis and high inflation. The economy showed signs of decline in 2009. This proves that Vietnam's economy still has many weaknesses, making it easy to fall into crisis and depression.

Most Vietnamese products' competitiveness in the world market still needs to improve. Especially in the context of international economic integration, Vietnam faces many challenges. While the competitiveness of domestic enterprises is still low, the quality of goods is still poor. Vietnam´s producers still have to continuously meet the increasing demand from the world market and compete with foreign products of good quality that are entering the domestic market.

## 5.2 Development of Income Inequality

After over 20 years of implementing the renovation policy, Vietnam's economy has remarkably improved. Continuous and high growth has brought benefits to all regions and all population classes, which is a decisive factor in raising people's living standards and rapidly

reducing poverty rates. According to Ngo Truong Thi - Former Director - Chief of the National Office for Poverty Reduction (Ministry of Labour, Invalids and Social Affairs, 2016), in the period from 2011 to 2015, the poverty rate in Vietnam decreased from 14.2% in 2010 to 4.25% in 2015. The poverty rate in poor towns has decreased from 58.33% at the end of 2010 to 50.97% at the end of 2011, 43.89% at the end of 2012, 38.2% at the end of 2013, 32.59% at the end of the year 2014 and 28% at the end of 2015; the average decrease of over 6% per year.

The income per capita of poor households increased 1.6 times compared to the end of 2011, particularly poor households in poor districts, poor communes, villages, and villages with special difficulties in ethnic minorities and mountainous areas increased 2.5 times. In the 2016-2020 period, the national poverty rate decreased from 9.88 (2015) to 5.23% (2018), an average annual decrease of 1.55%, reaching and exceeding the target set by the National Assembly; the poverty rate in poor districts decreased by 5.5%/year on average, exceeding the target (by 4%); especially difficult communes reduce by 3-4% or more per year, reaching the target.[2] However, along with growth, inequality reflected in the GINI coefficient by consumption of Vietnam has increased (though not too large) in recent years. The GINI coefficient of Vietnam from 2006 to 2018 shows that income inequality in Vietnam does not fluctuate much (in the range of 0.424 to 0.436) in which the urban area tends to decrease, the rural area tends to increase and is always higher than in urban areas.

**Table 5.1 Income Inequality through the GINI coefficient in Vietnam (2006 -2018)**

| Year | 2006 | 2008 | 2010 | 2012 | 2014 | 2016 | 2018 |
|---|---|---|---|---|---|---|---|
| Whole country | 0.424 | 0.434 | 0.433 | 0.424 | 0.431 | 0.436 | 0.424 |
| Urban area | 0.393 | 0.404 | 0.402 | 0.385 | 0.397 | 0.391 | 0.372 |
| Rural area | 0.378 | 0.385 | 0.395 | 0.399 | 0.398 | 0.408 | 0.407 |

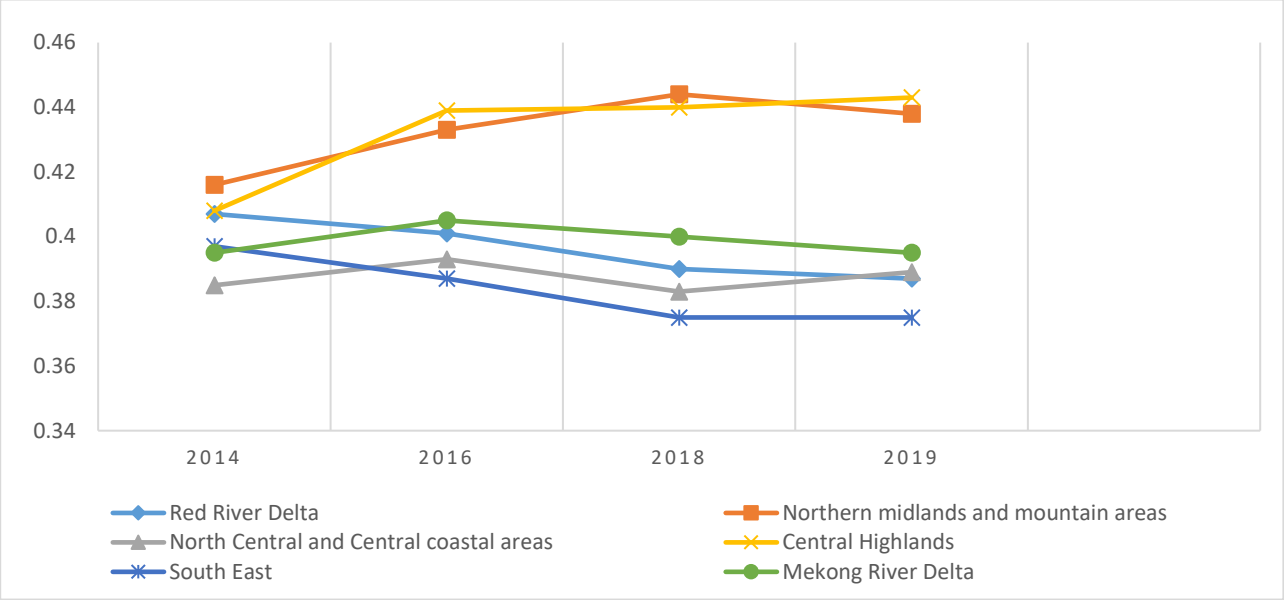
*(Source: General Statistics Office (2021))*

Following the data in table 5.1, before 2010, the GINI coefficient in urban areas is higher than in rural areas. After 2010, the GINI coefficient in rural areas was higher than in urban areas. It shows a trend that income inequality in urban areas tends to decrease while in rural areas, it tends to increase. According to the report "Wealth Distribution and Income Inequality by

[2] https://www.moha.gov.vn/danh-muc/bo-lao-dong-thuong-binh-va-xa-hoi-thanh-tuu-trong-cong-tac-giam-ngheo-o-nong-thon-giai-doan-2010-2020-dinh-huong-giai-phap-trong-giai-45619.html

Country 2018", the GINI coefficient of Vietnam is 0.424, which is average compared to other countries in the region. According to Cornia and Court (2001), the GINI coefficient between 0.30 - 0.45 is within the safe, effective threshold and suitable for high growth. Therefore, it can be affirmed that Vietnam's income inequality is still within a safe range at present, but in the long term, it tends to increase if Vietnam does not take effective solutions to solve this problem.

**Figure 5-3 Index of Income Inequality Distribution (GINI index) by region (2012-2019)**




*(Source: Own processing based on General Statistics Office 2021)*

Figure 5-3 shows that GINI coefficients in economic regions in Vietnam have changed in different years, but they all tend to decrease. The Southeast, the fastest-growing economic development region, has the most robust decreasing GINI coefficient compared to other regions, so income inequality in this area is increasingly narrowing. The Central Highlands, Northern Midlands, and Mountainous areas are the regions with the lowest average income in the top 3 of Vietnam and the two most unequal regions.

**Table 5.2 The Income per capita and Income Gap (thousand VND)**

| Year | The 20% highest income group | The 20% lowest income group | The ratio between the two groups |
|---|---|---|---|
| 2010 | 3,410 | 369 | 9.24 |
| 2012 | 4,784 | 512 | 9.34 |
| 2014 | 6,413 | 660 | 9.72 |
| 2016 | 7,547 | 771 | 9.79 |
| 2018 | 9,175 | 931 | 9.86 |
| 2020 | 9,108 | 1,139 | 7.99 |

*(Source: GSO 2010, 2020)*

When evaluating inequality in Vietnam, one important factor is comparing the spending and income gaps between the rich and the poor. This comparison involves looking at the 20% of the most affluent and 20% of the poorest groups. According to table 5.2, the disparity continuously and significantly increased from 9.24 to 9.86 between 2010 and 2018.

However, due to the significant impact of the COVID-19 pandemic on workers' income and food consumption, as well as the implementation of various policies to address hunger, this difference decreased to 7.99 in 2020. The average income of the 20% richest group was 9.1 million VND, which is eight times higher than the income of the 20% poorest group, standing at only 1.1 million VND. While the absolute income disparity between the richest and poorest groups has increased, it remains substantial.

**Table 5.3 Monthly consumption expenditure for living per capita (thousand VND)**

| Year | The 20% richest groups | The 20% near-richest groups | The 20% medium groups | The 20% near-poorest group | The 20% poorest group |
|---|---|---|---|---|---|
| 2010 | 2,311 | 1,247 | 914 | 720 | 499 |
| 2012 | 2,733 | 1,713 | 1,327 | 1,030 | 710 |
| 2014 | 3,134 | 2,019 | 1,580 | 1,251 | 827 |
| 2016 | 3,533 | 2,204 | 1,684 | 1,318 | 896 |
| 2018 | 4,231 | 2,682 | 2,078 | 1,708 | 1,135 |
| 2020 | 4,795 | 3,239 | 2,598 | 2,075 | 1,366 |

*(Source: GSO 2018, 2020)*

The monthly consumption expenditure data in Table 5.3 also reflect a similar situation. The inequality in expenditure per capita per month observed between the 20% richest group and the 20% poorest group is up to 3.5 times in 2020, with expenditure per capita per month in the 20% richest group being approximately 4,8 million VND/person/month while the 20% poorest group is nearly 1,4 million VND/person/month. However, it is also important to recognize that this inequality in Vietnam is not a phenomenon that the rich get richer, the poor get poorer, but the rich get richer faster than the poor, as reality shows even in the context of the gap between the rich and the poor widening, the per capita income of the poor has increased and the poverty rate has decreased sharply in recent years.

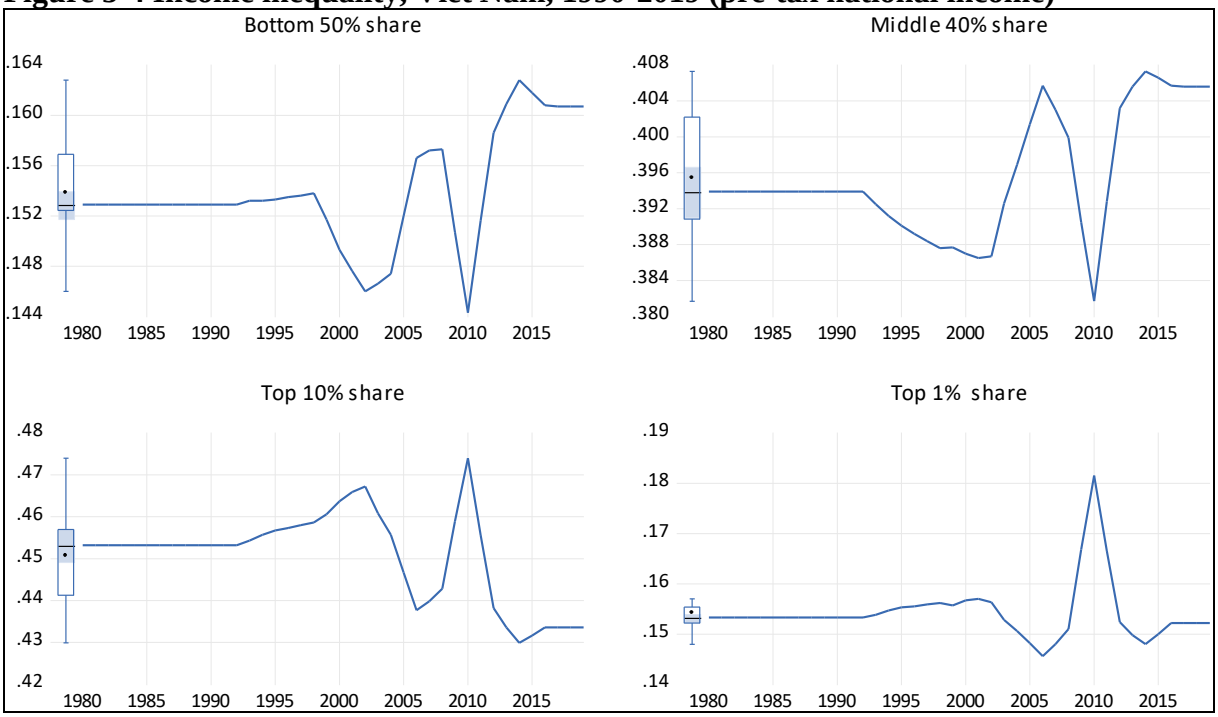
**Table 5.4 Poverty rates by regions in Vietnam in the period 2006 - 2018 (%)**

| | 2006 | 2008 | 2010 | 2012 | 2014 | 2016 | 2018 |
|---|---|---|---|---|---|---|---|
| **Whole country** | 15.5 | 13.4 | 14.2 | 11.1 | 8.4 | 5.8 | 5.4 |
| **Rural area** | 18.0 | 16.1 | 17.4 | 14.1 | 10.8 | 7.5 | 6.9 |
| **Urban area** | 7.7 | 6.7 | 6.9 | 4.3 | 3 | 2 | 1.88 |

*(Source: GSO 2006, 2020)*

Considering the urban and rural poverty rates in Table 5.4, the rate of poor households has decreased rapidly over the years. In 2006, Vietnam had 15.5% poor households, but by 2018, it had decreased to 5.35%. In urban areas, the proportion of poor households has decreased faster than in rural areas, showing that income inequality between rural and urban areas is quite large.

**Figure 5-4 Income inequality, Viet Nam, 1990-2019 (pre-tax national income)**



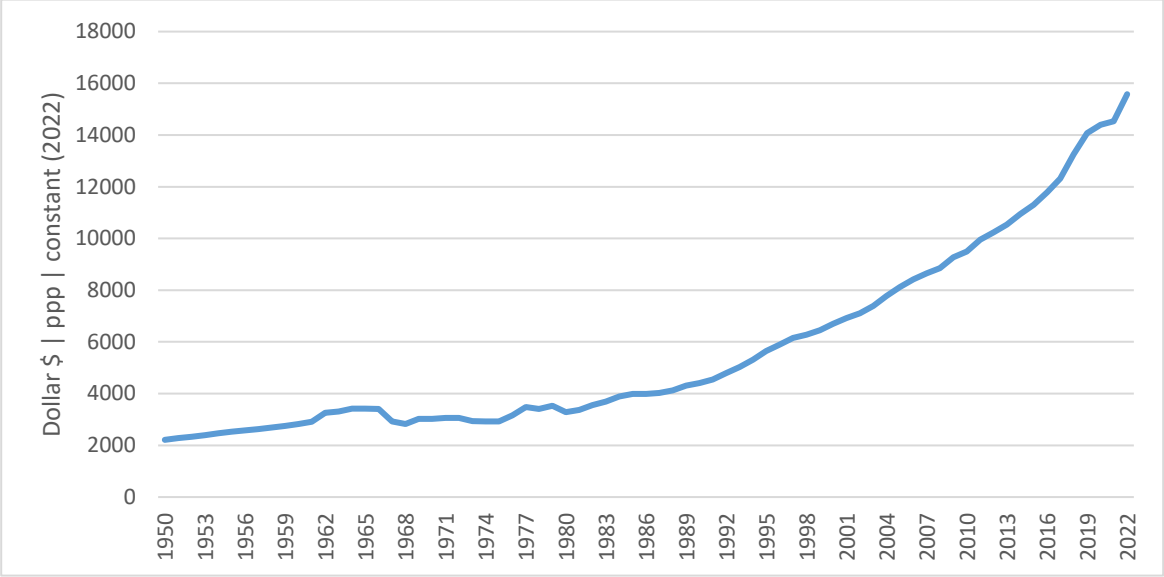

*(Source: World Inequality Database (2021))*

The development of income inequality from 1993 to 2019 is displayed in figure 5-4. It is evident that during the economic crises after 2009, the share of the richest 1 and 10% increased. Simultaneously, the middle 40% share and the bottom 50% decrease. In general, the situation of the middle 40% share is improving.

Based on the above indicators, we can see that the inequality of income distribution in the country is still serious. This is a highly pressing issue, and it is necessary to take measures to solve it to ensure the goals of economic growth, income inequality, and social justice are met.

Vietnam´s strong economic growth before the COVID-19 pandemic faced disruption due to the virus. Nevertheless, the economy achieved a 2.9% growth rate in 2020, marking the highest recorded rate in the world. Economic achievements have spread to the lives of all classes of people in society. The income of population groups increased from 3.1 million VND/month/person in 2016 to 4.2 million in 2020. Expressed in American dollars (PPP) at constant 2022 prices, average income increased from 2000 USD in the 1950s to nearly USD 16 000 in 2022 (see figure 5-5).

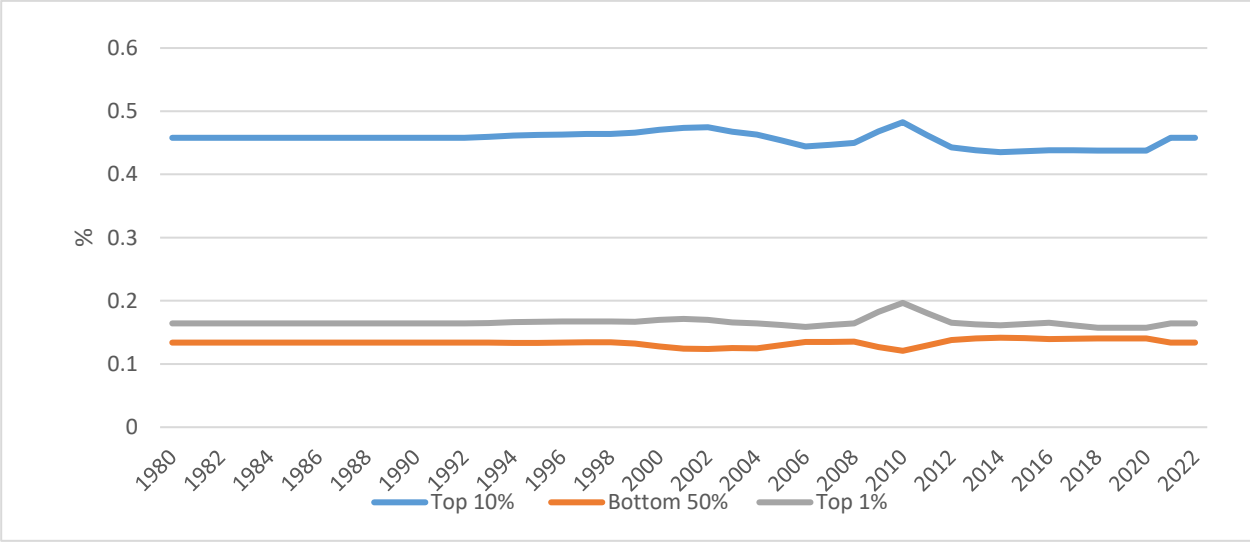
**Figure 5-5 Average income individual | Dollar $ | ppp | constant (2022)**




*(Source: World Bank, 2022)*

Still, the income growth rate of the poorest group is always lower than that of the wealthiest group (figure 5-6). However, income inequality among population classes decreases as the GINI coefficient decreases from 0.431 in 2016 to 0.373 in 2020.

**Figure 5-6 The share of the Top 1%, Top 10% and Bottom 50% of income**

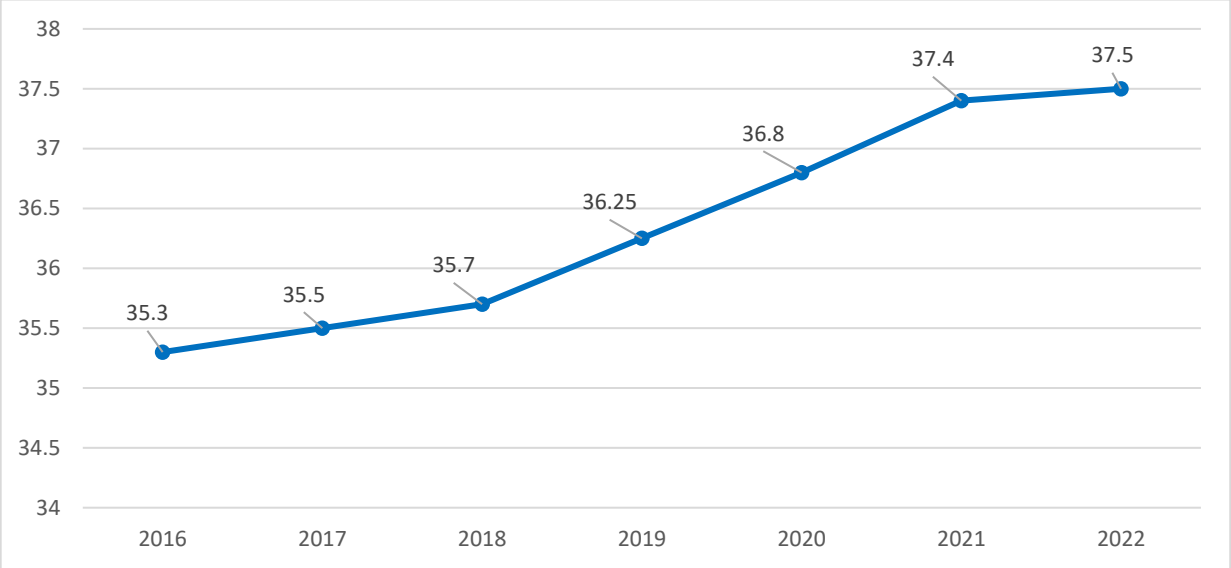



*(Source: World Bank, 2022)*

The GINI coefficient for 2016-2020 shows that income inequality in Vietnam tends to increase from 35.3 in 2016 to 37.5 in 2022 (figure 5-7); however, this increase is still within the

safe, effective threshold suitable for high growth. In urban areas, people are more equal and have easier access to development opportunities in education and work skills education. Therefore, income inequality is always lower in rural areas. In 2016, the GINI coefficient in urban areas was 0.391, decreasing to 0.325 in 2020. This index in rural areas is 0.408 and 0.373, respectively (GSO, 2021).

**Figure 5-7 GINI index in Vietnam (2016 – 2020)**




*(Source: Own processing based on GSO, 2021)*

The differences in natural conditions, cultural level, production level, infrastructure, educational level, and comparative advantage among regions contribute to varying levels of development. As a result, income disparity and inequality between population groups in these areas become significantly distinct. The two major economic zones of the country, the Red River Delta and the Southeast, are developed economic regions with high growth rates compared to other areas.

In Vietnam, the government and researchers employ the division into five income groups to assess people's living standards and formulate appropriate policies. Based on this classification, the government can develop and adjust different tax, education, health, and social policies to suit each income group. Income groups are classified based on income level and access to essential social services as set out by the Prime Minister in Decision 59/2015/QD-TTG (2016)

including Group 1 - poor group, Group 2 - near-poor group, Group 3 - middle-income group, Group 4 - good income group, Group 5 - stable and high-income group.

In 2016, the per capita income of the lowest income group was 791 thousand VND (table 5.5), experiencing an average increase of 5.7% from 2016 to 2019. In contrast, the highest income group recorded 7.8 million VND, marking a growth of 6.8%. The income growth rate of the low-income group is slower than that of the high-income group, widening the gap between the rich and the poor. In 2016, the income of the highest-income group was 9.8 times higher than that of the lowest-income group, and in 2019, it was 10.2 times higher. However, by 2020, due to the negative impact of the COVID-19 epidemic and the effectiveness of social security policies on people with low incomes and policy families, the low-income group increased by 7.6% in the period 2016-2020, much faster than the 3.3% increase of the highest-income group, which led to the income difference between these two groups being only eight times.

**Table 5.5 The difference between the lowest income group and the highest income group 2016-2020**

| | Monthly income per capita (thousands of VND) | | Highest income group compared to the lowest income group (times) |
|---|---|---|---|
| | Low-income group | High-income group | |
| **The whole country** | | | |
| **2016** | 791 | 7,755 | 9.8 |
| **2019** | 988 | 10,103 | 10.2 |
| **2023** | 1,139 | 9,108 | 8.9 |
| **Urban area** | | | |
| **2016** | 1,489 | 11,376 | 7.6 |
| **2019** | 1,843 | 13,195 | 7.2 |
| **2020** | 2,108 | 11,192 | 5.3 |
| **Rural area** | | | |
| **2016** | 676 | 5,669 | 8.4 |
| **2019** | 827 | 7.898 | 9.6 |
| **2020** | 932 | 7.440 | 8.0 |

*(Source: GSO, 2021)*

*Notes: (1) Income gap between group 5 and group 1; (2) Number of times the income gap between group 5 (richest) and group 1 (poorest)*

In urban areas, the rich-poor divide between the lowest and highest income groups tends to decrease from 7.6 times in 2016 to 7.2 times in 2019 and only 5.3 times in 2020 due to the impact of the Covid-19 epidemic, which caused the high-income group to decrease while the low-income group tends to increase. Rural areas tend to be opposite to urban areas when the

income gap between the two lowest and highest groups increased from 8.4 times in 2016 to 9.6 times in 2019, but in 2020, it will decrease to only eight times due to the overall impact of the Covid-19 epidemic on the entire economy.

Vietnam has deeply and widely integrated with the world; of course, harmful economic impacts will inevitably be avoided. However, with the decision of economic recovery and development, creating momentum to fulfill the socio-economic goals of 2022 and the period of 2021-2025 as set out by the Resolution of the XIII Party Congress, Vietnam has maintained macroeconomic stability, kept inflation under control and achieved the highest economic growth in the past ten years. Due to the previous harmful effects (COVID-19 pandemic), plus other unexpected fluctuations that appeared since 2022 (the war between Russia and Ukraine), the number of enterprises temporarily suspending business and the number of enterprises completing dissolution still increased. The number of enterprises temporarily suspending business is 73.8 thousand enterprises, an increase of 34.3% compared to 2021; nearly 50.8 thousand enterprises stopped operating waiting for dissolution procedures, up 5.5%; 18.6 thousand enterprises completed dissolution procedures, up 11.2%. On average, 11.9 thousand businesses withdraw from the market every month.

In particular, tightening monetary policies to combat inflation and economic recession in the last months of 2022 has led to a sharp decline in consumption and investment demand globally. The price of raw materials, fuel, and input materials increased, the situation of disruption in the supply of raw materials appeared, so many Vietnamese enterprises had to reduce their scale, dissolve or suspend production and business, cut personnel, and not recruit new personnel because they did not receive orders. This shows that unemployment is an unpredictable risk and explains why the number of people applying for unemployment policy in 2022 increased. According to data released by the Employment Department, the number of people applying for unemployment benefits for the whole year 2022 was 983,810 people, an increase of 22.7% compared to 2021 (801,925 people), of which 975,333 people are eligible for unemployment benefits (a rise of 27.6% compared to 2021 (764,643 people). In addition, the number of people participating in unemployment insurance for 2022 was about 14 million people receiving benefits.

With the picture of a globalized market economy, Vietnam's economy is developing at a high speed, but it also entails the problem of the existence of quite large income inequality. From 1993 until now, receiving aid from developed countries, especially ODA, has become an essential source of foreign capital, contributing significantly to the socio-economic development in Vietnam. Along with foreign investment, employment is an essential indicator of a country's economic development.

## 5.3 The Northern Midlands and Mountainous Region

The Northern Midlands and Mountains are one of Vietnam's six economic regions. The region is strategically located and particularly important in socio-economic, national defense, security, and foreign affairs.

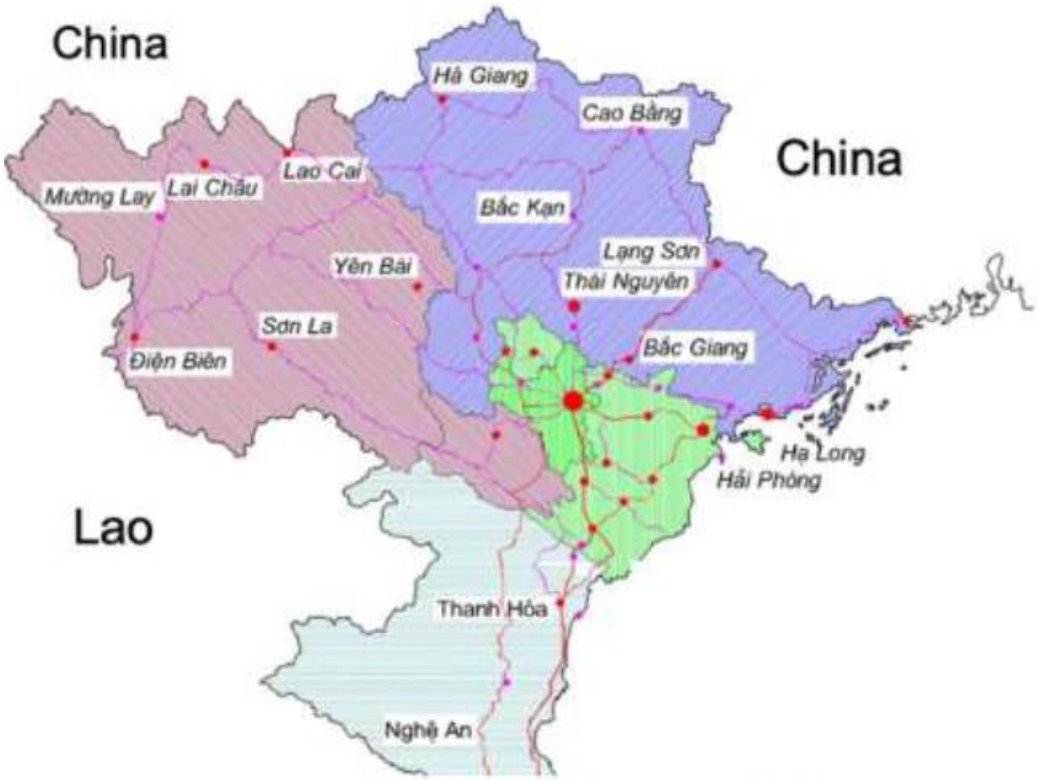
The Northern Midlands and Mountains are the most extensive territories in Vietnam (100,965 $km^2$), accounting for about 28.6% of the country's total area. This region includes 14 provinces: Ha Giang, Cao Bang, Lao Cai, Bac Kan, Lang Son, Tuyen Quang, Yen Bai, Thai Nguyen, Phu Tho, Bac Giang, Lai Chau, Dien Bien, Son La, Hoa Binh. The regional center is Thai Nguyen City. More than 30 different ethnic groups inhabit this region, with a total population of 14.7 million, making up approximately 15.2% of the country's total population.

The Northern Midlands and Mountains have great potential for developing a border trade economy, facilitating trade connections with China and the Association of Southeast Asian Nations (ASEAN). This area is rich in resources, minerals, and hydroelectricity, with strengths in industrial development and mineral processing. There is also favorable potential for the development of agriculture, forestry, and fisheries, with nearly 2.2 million hectares of agricultural land, making it the second-largest fruit tree area in the country.

The highest forest coverage rate in the country (53.4%), accounting for nearly 40% of the country's forest area, is the "lungs" of the country; Fully converges many unique tourism potentials with majestic and beautiful nature, has many unique cultural heritages of ethnic

minorities to develop tourism and plays a vital role in tourism development with the ecological environment of the entire Northern region.

**Picture 5-1 Map of the Northern Midlands and Mountains of Vietnam**



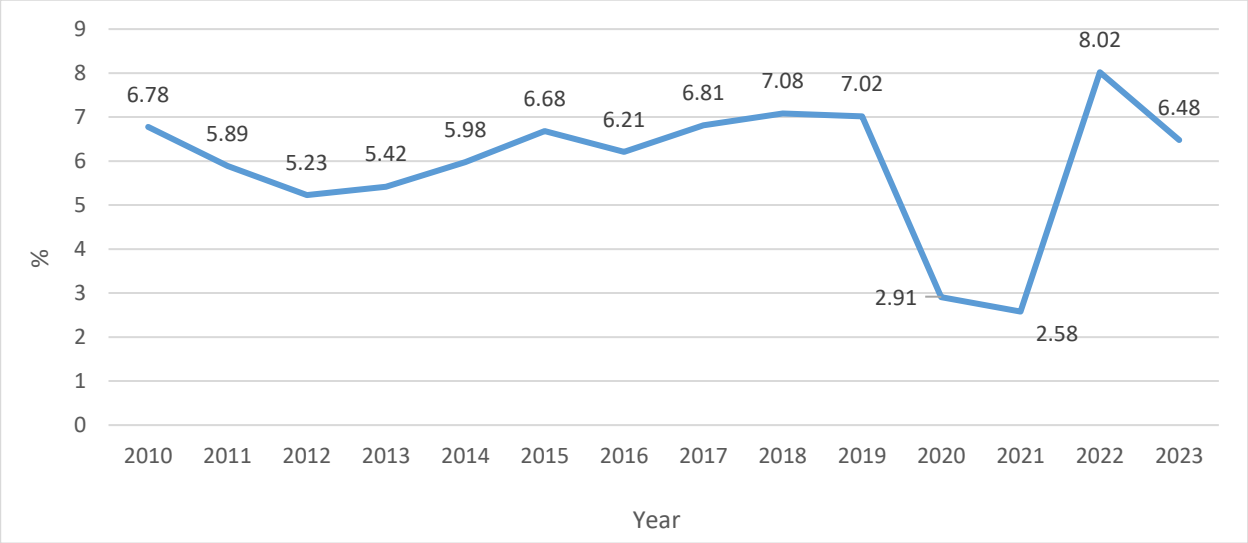

*(Source: Designed by Alotrip, data from GSO, 2020)*

*(Source: Huy Quang Doan, (2021))*

Besides having many potentials and advantages for development, The Northern Midlands and Mountains are receiving special attention from the Government. However, this is still the country's poorest and most challenging core area. Nguyen Hong Son, Deputy Head of the Central Economic Commission, said: "*This is still the poorest and most of the country's difficult area. The income per capita is low, and the income gap tends to widen compared to the whole country. The poverty rate is the highest in the country (in 2018), in which the poverty rate of ethnic minorities is high. Many cultural and social indicators are lower than the national average*.". Along with the Central Highlands, the Northern Midlands and Mountains are the regions with the lowest average income in the top 3 of Vietnam (in 2014, only 1,613,000 VND per month) and the most unequal (Gini index in 2020 is 0.420). Therefore, analyzing the region's

economic and social situation, the Northern Midlands and Mountains have become necessary in the country's sustainable development strategy.

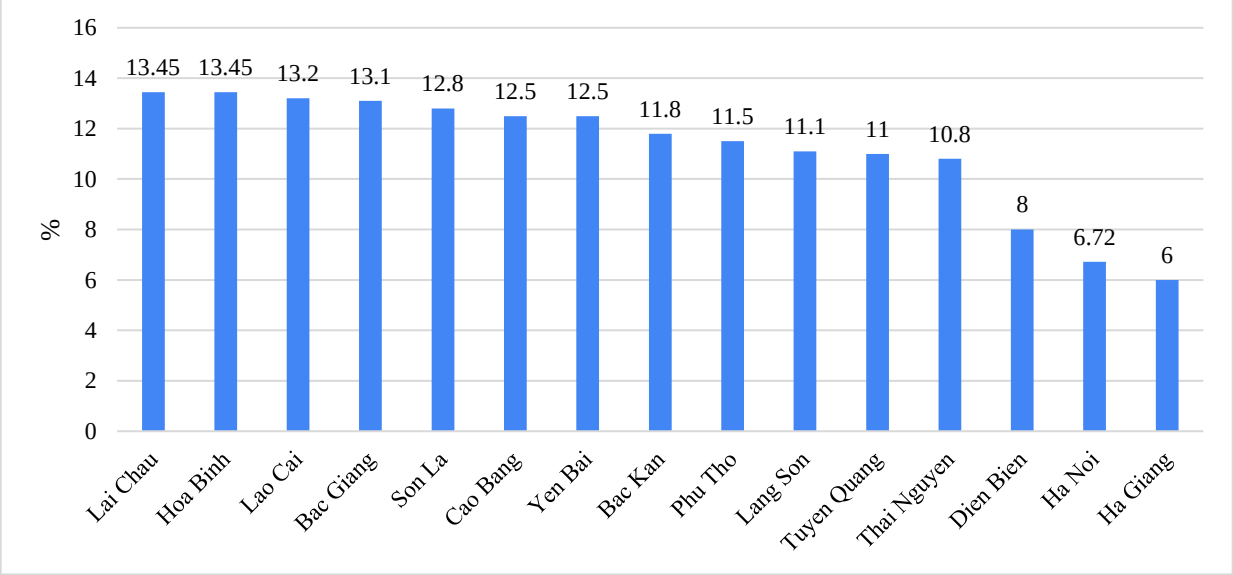
**Figure 5-8 GRDP growth rate in the Northern midland and mountainous region (%)**




*(Source: Own processing based on GSO data)*

Figure 5-8 shows that the GRDP (Gross Regional Domestic Products) growth rate of the Northern Midland and Mountainous region is relatively stable. During the period 2019 - 2021, due to the impact of the COVID-19 pandemic, this region's GRDP decreased sharply from 7.02% (2019) to 2.91% (2020) and 2.58% (2021). However, from 2021 until now, the region's GRDP growth rate is tending to increase again. In 2022, the Northern Midlands and Mountains will lead the country in GRDP growth with 8.02%. Specifically, in 2010, the provinces with the highest growth rates in the region were Son La (14.8%), Lao Cai (14.5%), Lai Chau (14.2%), and Thai Nguyen (14.5%). By 2023, these provinces will still lead the region, but with the rise of Hoa Binh (13.45%).

**Figure 5-9 GRDP growth rate by province in 2023 (%)**



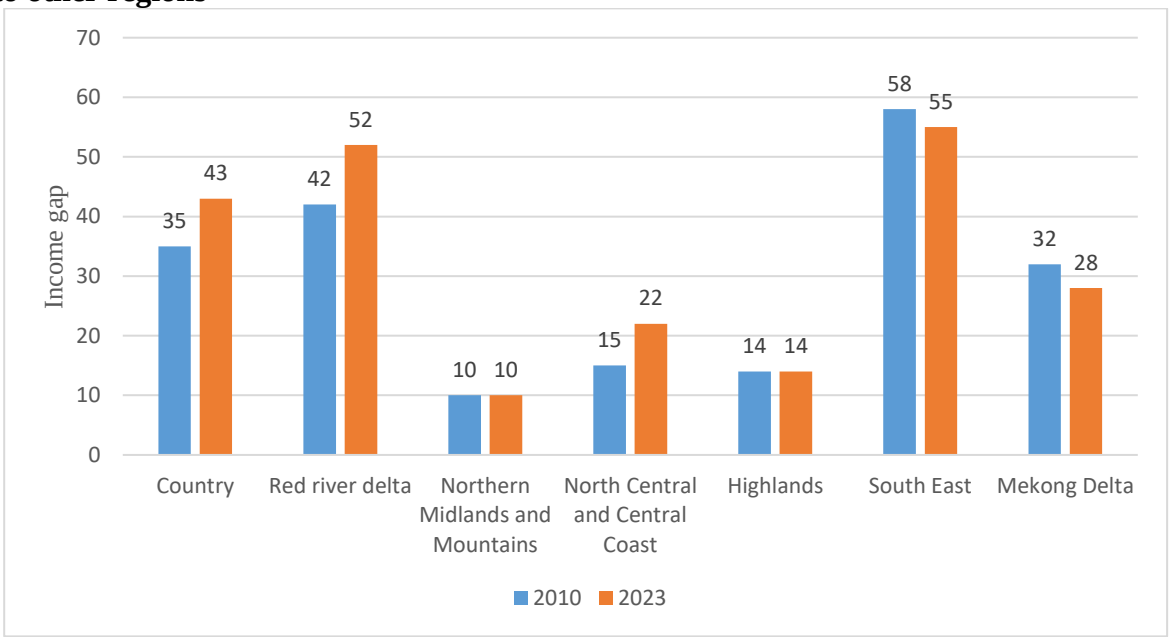

*(Source: Own processing based on GSO data)*

Figure 5-9 shows that Lai Chau province has the highest GRDP growth rate in the Northern Midlands and Mountains region in 2023. Lai Chau Provincial People's Committee has proactively developed and advised on promulgating several Resolutions on policies, support, and distribution of resources to solve difficulties and meet development requirements. Foreign affairs activities are maintained and developed in depth with established relationships and friendly cooperation in many fields with Yunnan province - China, Northern Lao provinces, and foreign embassies in Vietnam.

In 2024, the Provincial People's Committee aims to continue promoting economic growth, with a Gross Regional Domestic Product (GRDP) target of about 9%. The production value of industrial and construction sectors is expected to increase by nearly 40%, while the value of agricultural, forestry, industry, and fishery production is targeted to grow by over 15%. The budget revenue in the area is projected to exceed 2,200 billion VND, and there is a goal to increase total tourist arrivals by 7.9%. To achieve these targets, departments, branches, districts, and cities are urged to thoroughly review and promptly address any obstacles affecting industrial production, trade, and service projects from the previous year. Efforts will be made to speed up

the disbursement of public investment capital. Administrative reform will be emphasized to improve state management effectiveness and the investment and business environment, to attract more investment into the province to drive development. Furthermore, there will be a focus on synchronous implementation of tasks and solutions for sociocultural development, with an emphasis on progress towards social justice.

**Figure 5-10 The income gap of the Northern Midland and Mountainous region compared to other regions**



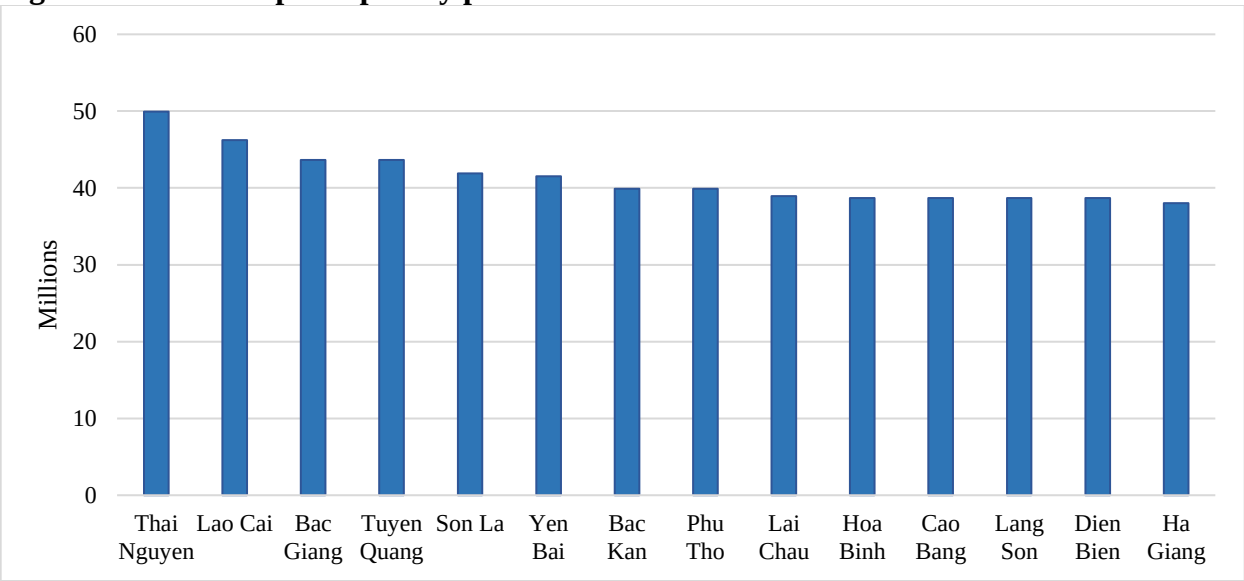

*(Source: Own processing based on GSO data)*

The Northern Midland and Mountainous Region has the lowest per capita income compared to other regions (GSO, 2022). In 2018, the region's average income per capita was nearly 2.5 million VND per month. In 2022, this number has increased to 3.17 million VND per month, still maintaining the lowest position in average income compared to the whole country.

Figure 5-10 shows that from 2010 to 2023, the Northern Midlands and Mountains region narrowed the income gap with the South East, Highlands, and Mekong Delta regions but widened the gap with other regions. The correlation between the Northern Midlands and Mountains region and the Red River Delta is worth noting, with the fact that the Northern

Midlands and Mountains region is considered an ecological buffer zone, ensuring environmental security for the Northern Delta.

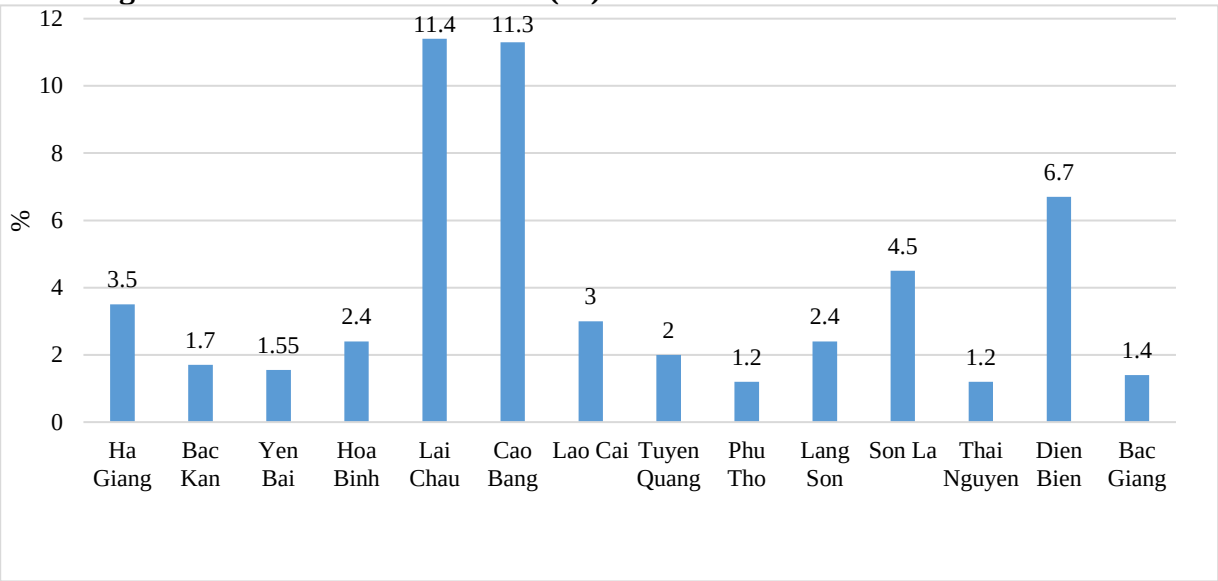
**Figure 5-11 Income per capita by province in 2023**




*(Source: Own processing based on GSO data)*

Figure 5-11 shows that the region's average income per capita by province is similar. The highest average income by province is Thai Nguyen. Industrial area development is one of the driving forces behind the boost in the average income per capita of Thai Nguyen. Up to now, Thai Nguyen has: Thuong Dinh Industrial Area (Thuong Dinh commune, Phu Binh district) with an estimated planning area of 130 hectares; Yen Binh 3 Industrial Area (Diem Thuy commune, Nga My commune, Phu Binh district) is 300 hectares; Yen Binh 2 Industrial Area (Hong et al. wards of Pho Yen city and Diem Thuy and Nga My communes of Phu Binh district) has an estimated planning area of 301 hectares. These industrial areas are oriented to develop into multi-industry industrial areas, ecologically oriented, modern, and environmentally friendly; prioritize attracting projects with advanced technology, energy saving, and use of renewable energy sources.

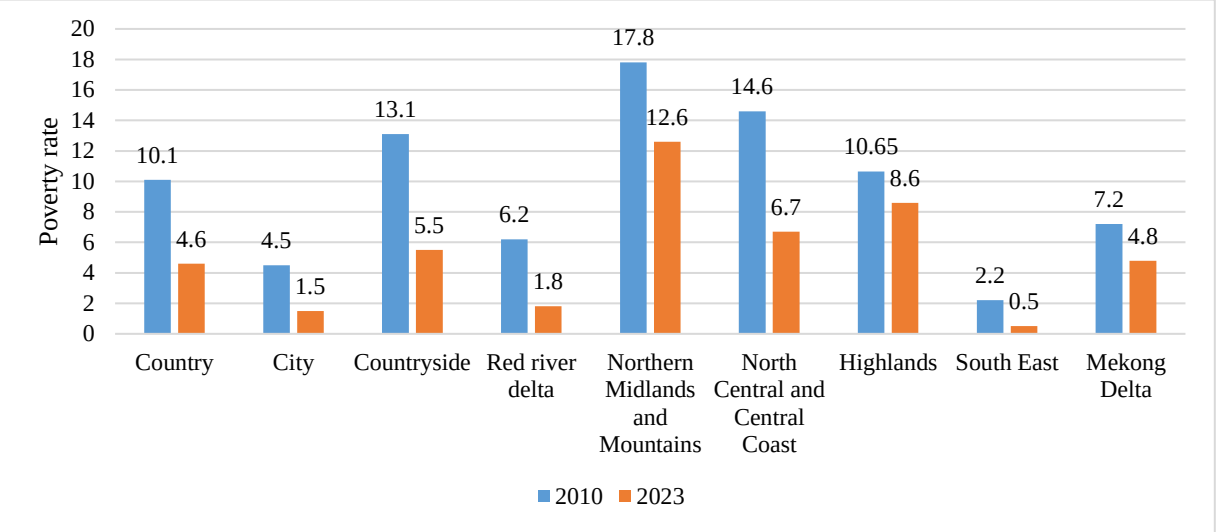
**Figure 5-12 The poverty rate in the Northern midlands and Moutainous region according to national standards in 2023 (%)**




*(Source: Own processing based on GSO data)*

Figure 5-12 shows that Lai Chau is the province with the highest rate of poor households. According to a report of the People's Committee of Lai Chau province, the population of the whole province is about 484 thousand people, including 20 ethnic groups, of which four ethnic groups: Mang, Cong, Lu, and Si La are ethnic groups with particular difficulties. The province still has four poor districts, 54 communes, and 558 extremely difficult villages and hamlets. By the end of 2023, the poverty rate of the entire province is 11.4%, of which the rate of ethnic minority poor households is up to 99.07%. Thus, the vast majority of poor people in Lai Chau are ethnic minorities. With such specific numbers, Lai Chau province always highly appreciates and expects the National Target Program for socio-economic development in ethnic minorities and mountainous areas to be a great driving force to promote socio-economic development, hunger eradication, and poverty reduction for ethnic minorities.

**Figure 5-13 Poverty rate by the regions in Vietnam**




*(Source: Own processing based on GSO data)*

The poverty rate in all regions of Vietnam decreased from 2010 to 2023 (figure 5-13). According to the announcement of the Ministry of Labor, War Invalids, and Social Affairs, the national multidimensional poverty rate (including the rate of poor and near-poor households) in 2023 is 5.71%. The country still has more than 1.58 million multidimensional poor and near-poor households.

Figure 5-13 also indicates that the Northern Midland and Mountainous region has the highest rate of poor households. In 2010, the household poverty rate of this region was 17.8%, eight times higher than the number of South East (2.2%). In 2023, the poverty rate in the region will decrease to 12.6%. This number is about 25 times higher than in the Southeast (0.5%). In terms of poverty reduction rate, the Northern Midlands and Mountains region will reduce the rate of poor households by 5.2% from 2010 to 2023. This achievement is only lower than that of the North Central and Central Coast (down 7.9%).

The quality of life of people in the Northern Midlands and Mountains region still needs to be on par with other regions. Regarding the general trend, all regions have increased the number of hospital beds over the years. Of which, the Northern Midlands and Mountains region had 45,517 hospital beds in 2022, an increase of 1.26 times compared to 35,856 hospital beds in 2010.

# 6 Examining Income Inequality in Vietnam[3]

## 6.1 Official Development Assistance, Economic Growth, and Unemployment

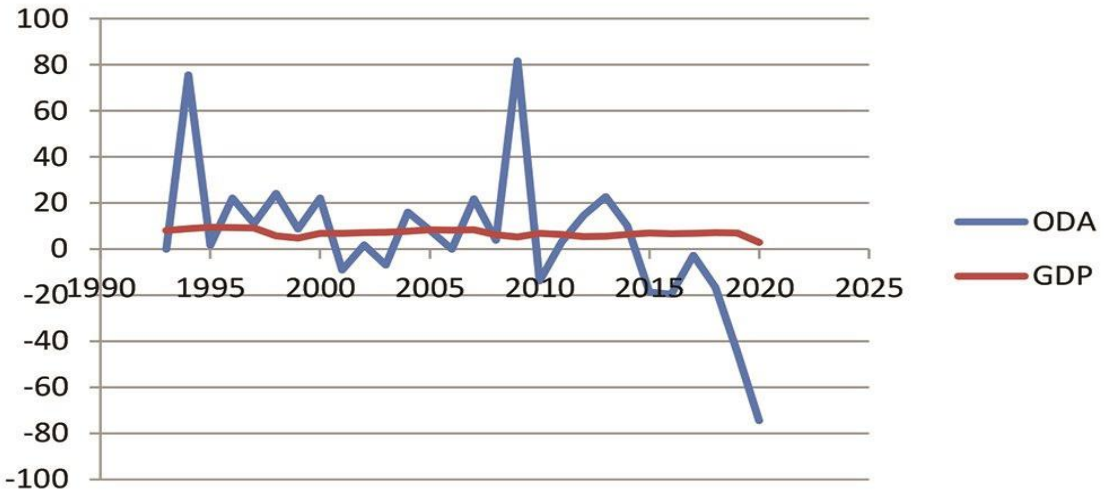
While economic growth in Vietnam has significantly reduced poverty, it has also increased income inequality and regional disparities. Urban areas, particularly Ho Chi Minh City and Hanoi, have seen more rapid growth than rural areas, leading to a growing divide.

One of the instruments for improving economic growth and dealing with income inequality is the Official Development Assistance. Over the past 27 years (from 1993 to 2020), ODA investment has made an essential contribution to the cause of innovation and socio-economic development, developing cooperative and friendly relations with other countries and international financial institutions worldwide, creating favourable conditions for Vietnam to integrate into the global economy more and more deeply. In the period 1993 to 2020, ODA growth was "laggy" and unstable; there were years of sudden high positive change (the highest year was in 2009 when growth was up to 81.72%); from 2015 to 2020, ODA capital decreased continuously with negative increase (the lowest year was -74.37 negative growth). The average annual growth rate for 1993-2020 is 5.5 % per year.

Meanwhile, GDP growth has a reasonably stable pace, excluding 2020 GDP growth is only 2.91% due to the impact of the COVID-19 epidemic; from 1993-2019, GDP fluctuated in growth rate from 5.32 % (2015) to 9.5% (1995). The average annual GDP growth rate in 1993-2020 was 7.26 % per year, higher than the average growth rate of ODA of 1.76 % per year (picture 6-1).

[3] Part of this chapter was already published – (Ho et al., 2023)

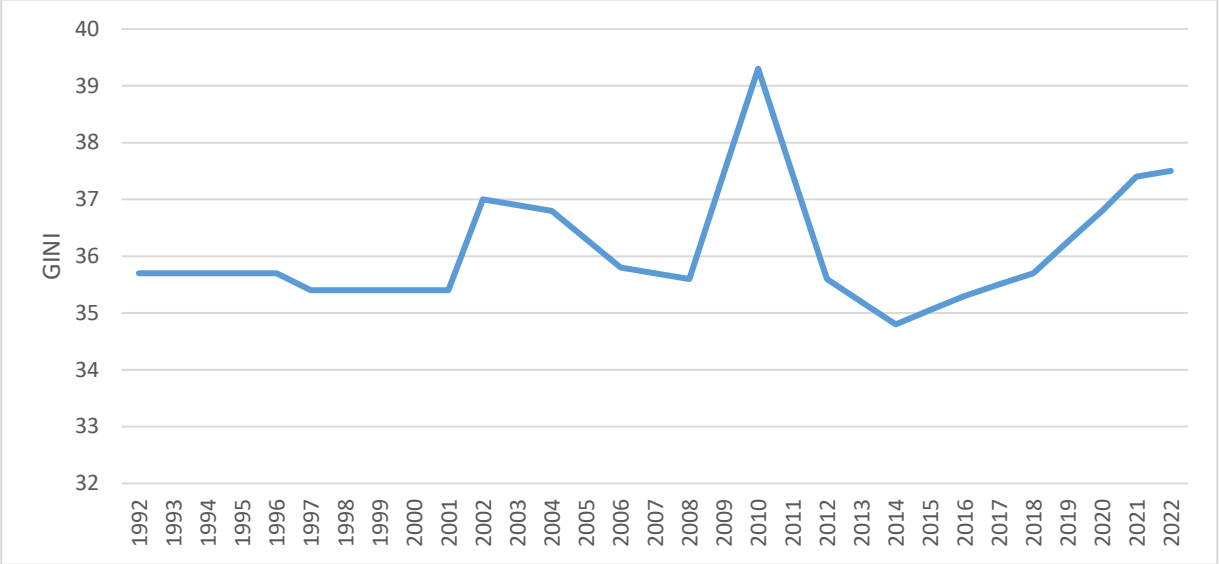
**Picture 6-1 Growth of ODA and GDP in the period 1993-2023 (% per year)**




*(Source: Ministry of Planning and Investment, GSO, 2022)*

Thus, in the past period, annual growth in ODA was unstable, fluctuating from negative -74.37% to positive 81.72%, but GDP growth remained stable with an average yearly rate of 7.26 %/year. Over the years, growth in ODA has been enormous, but GDP has grown disproportionately. On the contrary, during 2015-2020, ODA decreased markedly, continuously growing negatively, but GDP growth remained high. That shows that ODA capital has had little influence on GDP growth recently.

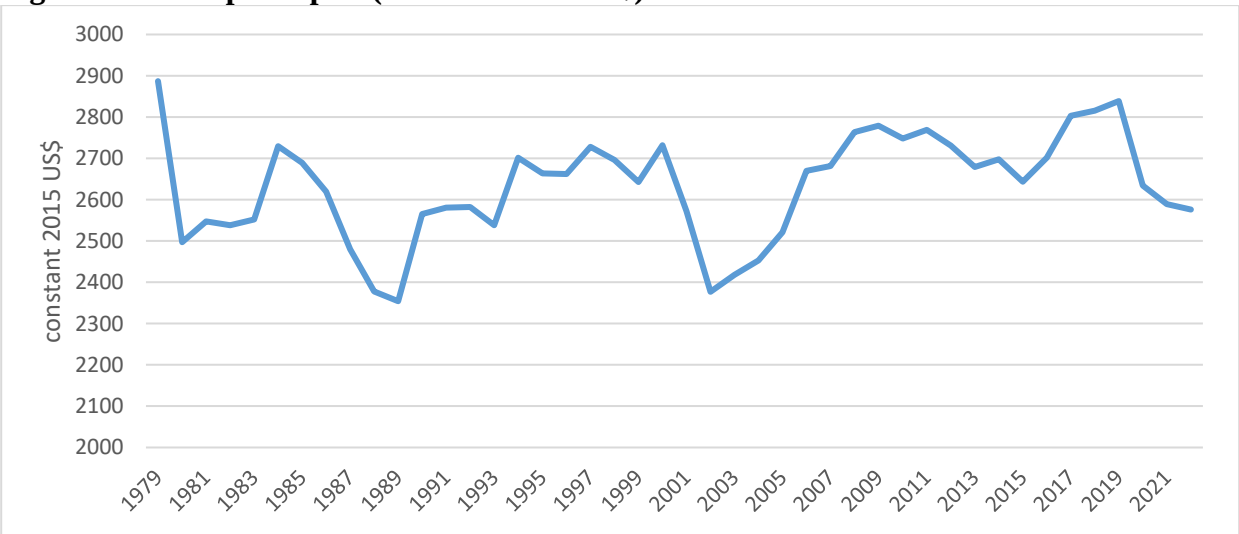
**Figure 6-1 mGINI Index in Vietnam**




*(Source: Own processing)*

Figure 6-1 shows that although there were some periods of significant downward adjustment, the GINI index still tended to increase from 1992 to 2010 and suddenly decreased sharply due to strong tightening control measures in Vietnam until about 2014; the gradual increase is evident until 2022.

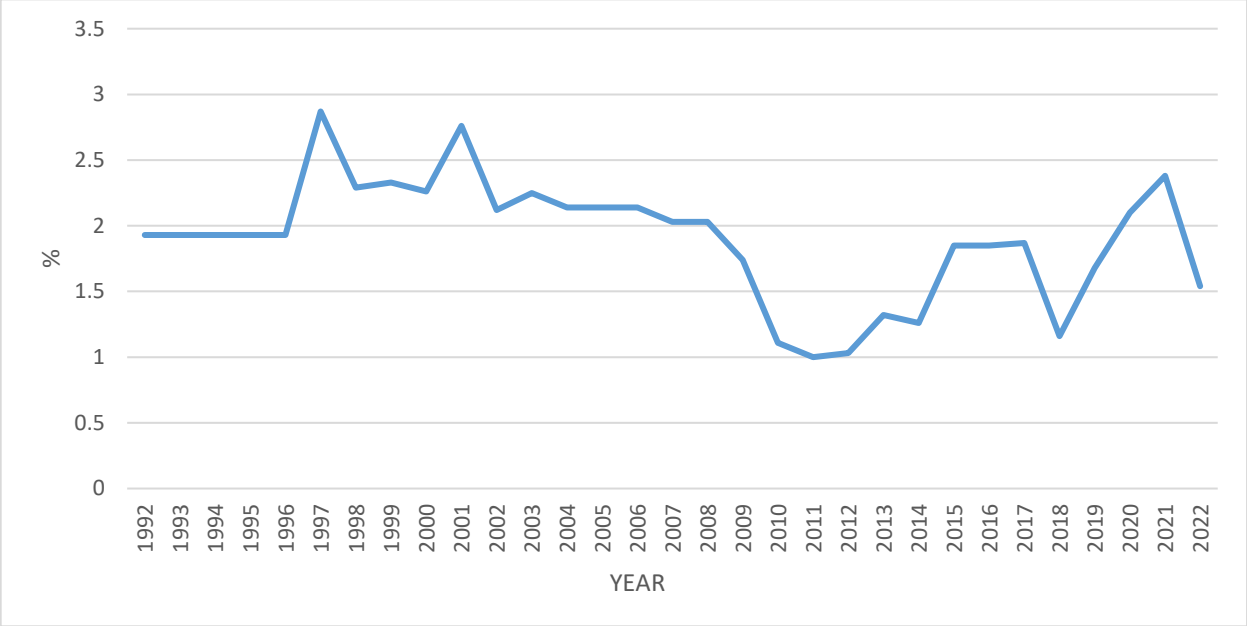
**Figure 6-2 GDP per capita (constant 2015 US$)**




*(Source: Own processing)*

Figure 6-2 depicts the GDP per capita of Vietnam from 1979 to 2021 in constant US dollars. The graph shows fluctuations in Vietnam´s GDP per capita over the year, with significant economic growth and decline periods. It is evident that before COVID-19, there was a period of growth.

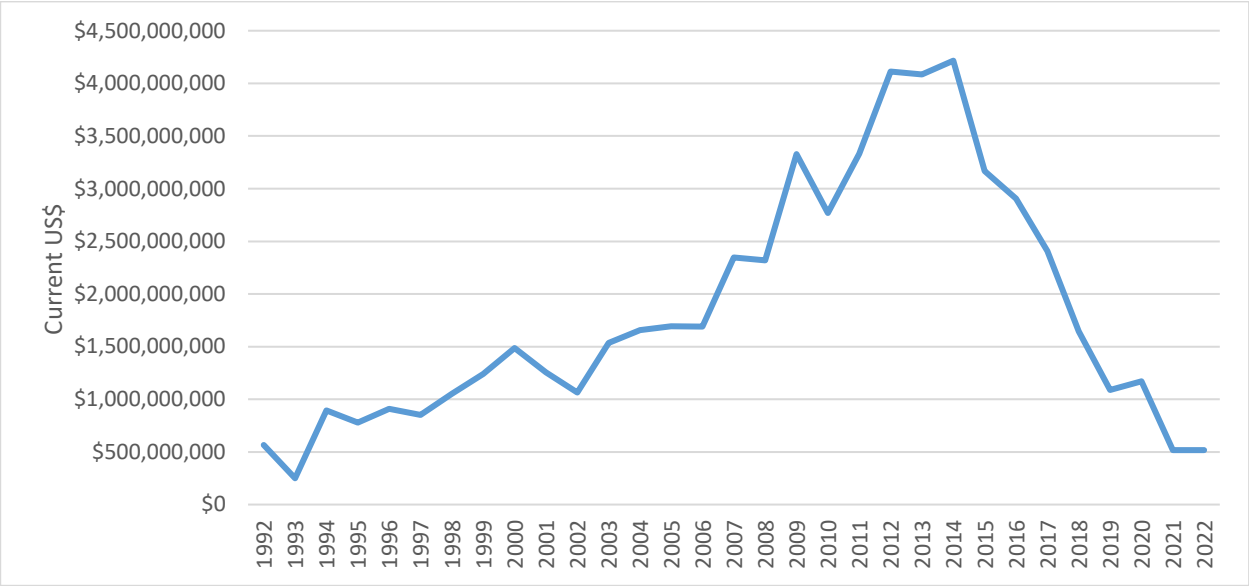
**Figure 6-3 Unemployment in Vietnam (%)**




*(Source: Own processing)*

Figure 6-3 shows that the unemployment rate was high starting before 2002 and gradually decreased until around 2012, then started to increase again but was still controlled and maintained by the Vietnamese government at a lower level than in previous years.

**Figure 6-4 ODA in Vietnam (current US$)**




*(Source: Own processing)*

From figure 6-4, we can see that the source of foreign official development assistance gradually increased from 1992 until 2015; then, there is a sign of decreasing gradually until 2022.

## 6.2 VAR Model to Evaluate the Inequality and Economic Growth

### Unit Root Test

The unit root test detected whether a time series is stationary. The results of the Dickey and Fuller test (DF) are shown in table 6.1.

**Table 6.1 Unit root test**

| Variables | First value | First order difference |
|---|---|---|
| **LogGINI** | -2.079<br>(0.2530) | -3.858***<br>(0.0024) |
| **LogGDP** | -2.048<br>(0.2661) | -3.795***<br>(0.0030) |
| **LogUNEMPLOY** | -2.243<br>(0.1909) | -5.723**<br>(0.0000) |
| **LogODA** | -1.447<br>(0.5593) | -7.624***<br>(0.0000) |

*(Source: Own processing)*

*Note: The Test Statistical value Z(t) is at the top, and the P-value in brackets is at the bottom; *** corresponds to the 1% level of statistical significance.*

The results in Table 6.1 show that the initial values of the variables in the study are all non-stationary series because their p-value is more than 5%. However, when using the first difference, the unit root hypothesis is rejected at the 1% significance level, concluding that the variables LogGINI, LogGDP, LogUNEMPLOY, and LogODA are stationary series at their first difference. Thus, all variables can be considered non-stationary and integrated in order 1.

**Table 6.2 Selection-order criteria AIC, HQIC, SBIC**

| Lag | P-value | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|
| **0** | | 7.6e-06 | -.432956 | -.375872 | -.24098 |
| **1** | 0.000 | 3.9e-09 | -8.0163 | -7.73087* | -7.05642* |
| **2** | 0.024 | 6.4e-09 | -7.61506 | -7.1013 | -5.88728 |
| **3** | 0.039 | 3.7e-09* | -8.41443* | -7.67233 | -5.91874 |
| **4** | 0.517 | 6.8e-09 | -8.34467 | -7.37424 | -5.08109 |

*(Source: own processing)*

The results from table 6.2 show that in two of the three criteria, AIC (Akaike's information criterion), SBIC (Schwarz's Bayesian information criterion), and HQIC (the Hannan and Quinn information criterion), HQIC and SBIC both have * at lag one along with AIC at lag 3, so the optimal lag of the regression model should be 1 or 3.

**Table 6.3 Test For Cointegration with Johansen**

| Maximum Rank | LL | Eigenvalue | Trace Statistics | 5% critical Value |
|---|---|---|---|---|
| **0** | 120.96431 | . | 44.7917* | 47.21 |
| **1** | 131.84694 | 0.52788 | 23.0264 | 29.68 |
| **2** | 139.08655 | 0.39303 | 8.5472 | 15.41 |
| **3** | 143.34424 | 0.25445 | 0.0318 | 3.76 |
| **4** | 143.36014 | 0.00110 | | |

*(Source: own processing)*

Table 6.3 shows that the Trace Statistic value is 44.79, smaller than the Critical value (critical value) of 47.21 at the 5% significance level. Thus, the Johansen cointegration test shows no cointegration relationship among analysed variables. In conclusion, the VAR model can be recommended as a suitable tool for analysing the variables' short-run relationships.

**Table 6.4 VAR Model (Vector Autoregressive Model)**

| | | Coef. | Std. Err. | z | P>z |
|---|---|---|---|---|---|
| **logGINI** | | | | | |
| | **logGINI** | | | | |
| | L1. | 1.034362 | .1652407 | 6.26 | 0.000 |
| | L2. | -.6564397 | .2215226 | -2.96 | 0.003 |
| | L3. | .1076534 | .1771885 | 0.61 | 0.543 |
| | **logGDP** | | | | |
| | L1. | -.0320684 | .0480605 | -0.67 | 0.505 |
| | L2. | .1482079 | .0721289 | 2.05 | 0.040 |
| | L3. | -.0933605 | .0438428 | -2.13 | 0.033 |
| | **logUNEMPLOY** | | | | |
| | L1. | .0294301 | .017058 | 1.73 | 0.084 |
| | L2. | .0074777 | .0185851 | 0.40 | 0.687 |
| | L3. | .0326068 | .017267 | 1.89 | 0.059 |
| | **logODA** | | | | |
| | L1. | .0206944 | .0129201 | 1.60 | 0.109 |
| | L2. | -.0050963 | .0106945 | -0.48 | 0.634 |
| | L3. | -.0187072 | .0119976 | -1.56 | 0.119 |
| | _cons | 1.70539 | .6071187 | 2.81 | 0.005 |
| **logGDP** | | | | | |
| | **logGINI** | | | | |
| | L1. | 2.033686 | .4445004 | 4.58 | 0.000 |
| | L2. | -2.002525 | .5958996 | -3.36 | 0.001 |
| | L3. | 1.192577 | .47664 | 2.50 | 0.012 |
| | **logGDP** | | | | |
| | L1. | .996416 | .1292835 | 7.71 | 0.000 |
| | L2. | .4375619 | .194028 | 2.26 | 0.024 |
| | L3. | -.3764588 | .117938 | -3.19 | 0.001 |
| | **logUNEMPLOY** | | | | |
| | L1. | .0234172 | .0458864 | 0.51 | 0.610 |
| | L2. | .0873156 | .0499942 | 1.75 | 0.081 |
| | L3. | .0940033 | .0464486 | 2.02 | 0.043 |

| | | | | |
|---|---|---|---|---|
| **logODA** | | | | |
| L1. | .1650148 | .0347552 | 4.75 | 0.000 |
| L2. | -.0760906 | .0287685 | -2.64 | 0.008 |
| L3. | -.0813107 | .0322738 | -2.52 | 0.012 |
| _cons | -5.010557 | 1.633159 | -3.07 | 0.002 |
| **logUNEMPLOY** | | | | |
| **logGINI** | | | | |
| L1. | -4.059264 | 1.856865 | -2.19 | 0.029 |
| L2. | 1.248218 | 2.489324 | 0.50 | 0.616 |
| L3. | -.0277946 | 1.991126 | -0.01 | 0.989 |
| **logGDP** | | | | |
| L1. | .2825844 | .5400714 | 0.52 | 0.601 |
| L2. | -1.359394 | .8105367 | -1.68 | 0.094 |
| L3. | .8961457 | .4926767 | 1.82 | 0.069 |
| **logUNEMPLOY** | | | | |
| L1. | .2686488 | .1916868 | 1.40 | 0.161 |
| L2. | -.009215 | .2088468 | -0.04 | 0.965 |
| L3. | -.1912994 | .1940354 | -0.99 | 0.324 |
| **logODA** | | | | |
| L1. | -.2812665 | .1451871 | -1.94 | 0.053 |
| L2. | -.0976824 | .1201779 | -0.81 | 0.416 |
| L3. | .2702573 | .1348211 | 2.00 | 0.045 |
| _cons | 14.36658 | 6.822395 | 2.11 | 0.035 |
| **logODA** | | | | |
| **logGINI** | | | | |
| L1. | 1.581276 | 2.116321 | 0.75 | 0.455 |
| L2. | -1.592539 | 2.837151 | -0.56 | 0.575 |
| L3. | 3.721622 | 2.269341 | 1.64 | 0.101 |
| **logGDP** | | | | |
| L1. | .409182 | .6155343 | 0.66 | 0.506 |
| L2. | -.4922718 | .923791 | -0.53 | 0.594 |
| L3. | -.1906734 | .5615172 | -0.34 | 0.734 |
| **logUNEMPLOY** | | | | |
| L1. | .0504801 | .2184707 | 0.23 | 0.817 |
| L2. | -.2865709 | .2380284 | -1.20 | 0.229 |
| L3. | .2977599 | .2211475 | 1.35 | 0.178 |
| **logODA** | | | | |
| L1. | .60084 | .1654737 | 3.63 | 0.000 |
| L2. | .3885037 | .1369701 | 2.84 | 0.005 |
| L3. | .1794502 | .1536593 | 1.17 | 0.243 |
| _cons | -15.11773 | 7.775671 | -1.94 | 0.052 |

*(Source: own processing)*

*Note: Before the dot, "." of each coefficient corresponding to zero is an automatic abbreviation in Stata software 17.*

Based on the P-value, we can conclude a significant relationship between logGINI and logGDP, logGINI and logUNEMPLOY, as well as logGDP and logODA (table 6.4). However, there was no significant relationship between logGINI and logODA, logGDP and logUNEMPLOY, and logUNEMPLOY and logODA.

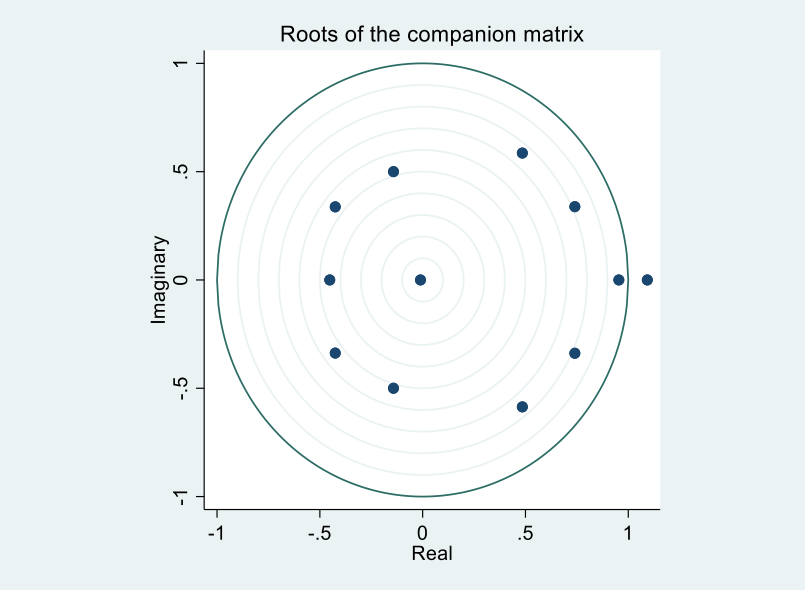
**Table 6.5 Condition testing of the stability of the VAR model**

| Eigenvalue | | Modulus |
|---|---|---|
| .9845458 | | .984546 |
| .6204724 | + .5014871i | .797794 |
| .6204724 | - .5014871i | .797794 |
| .5145217 | | .514522 |
| -.5086043 | | .508604 |
| -.3398126 | | .339813 |

*(Source: own processing)*

Table 6.5 above shows the results of the conditional analysis of the VAR model to check stability. The results show that there is a clear division between eigenvalues. Eigenvalues with an absolute value greater than one may indicate that the VAR model is unstable. However, other eigenvalues with absolute values less than 1 imply that the model is likely to be stable. However, to make a more accurate assessment of the stability of the model, it is necessary to consider other factors, such as the dimensionality of the VAR model and the distribution of the eigenvalues.

**Figure 6-5 Companion Matrix**




*(Source: own processing)*

Figure 6-5 shows that all values are inside the unit circle, and only one value is outside the circle, so we concluded that the VAR model of the study is relatively unstable.

**Table 6.6 Test for autocorrelation**

| Lagrange-multiplier test | | | |
|---|---|---|---|
| **H0: The model does not have autocorrelation** | | | |
| **H1: The model occurs autocorrelation** | | | |
| lag | chi2 | df | Prob > chi2 |
| 1 | 13.4308 | 16 | 0.64104 |
| 2 | 19.2195 | 16 | 0.25745 |

*(Source: own processing)*

Results of table 6.6 show that at two levels of lag 1, the p-value is 0.64 greater than 5%, so hypothesis H0 is not rejected, and the VAR model concludes that there is no autocorrelation of residuals.

**Table 6.7 Test for normally distributed disturbances**

| Jarque-Bera test | | | | |
|---|---|---|---|---|
| H0: | Normal distribution of residuals | | | |
| H1: | The remainder is not normally distributed | | | |
| Equation | chi2 | | df | Prob > chi2 |
| Jarque-Bera test | | | | |
| logGINI | 5.151 | | 2 | 0.07612 |
| logGDP | 1.067 | | 2 | 0.58655 |
| logUNEMPLOY | 0.712 | | 2 | 0.70032 |
| logODA | 1.133 | | 2 | 0.56737 |
| Skewness test | Skewness | | | |
| logGINI | .96424 | 4.339 | 1 | 0.03725 |
| logGDP | -.1095 | 0.056 | 1 | 0.81301 |
| logUNEMPLOY | -.32429 | 0.491 | 1 | 0.48359 |
| logODA | -.2961 | 0.409 | 1 | 0.52241 |
| ALL | | 5.295 | 4 | 0.25837 |
| Kurtosis test | Kurtosis | | | |
| logGINI | 3.8343 | 0.812 | 1 | 0.36751 |
| logGDP | 2.0691 | 1.011 | 1 | 0.31466 |
| logUNEMPLOY | 2.5641 | 0.222 | 1 | 0.63777 |
| logODA | 2.212 | 0.724 | 1 | 0.39472 |
| ALL | | 2.769 | 4 | 0.59717 |

*(Source: own processing)*

From Table 6.7, we can see that all the Jarque-Bera, Skewness, and Kurtosis tests (ALL) mostly have p-values greater than 0.05, so the hypothesis H0 is accepted, and the residuals of the VAR model are concluded to have a normal distribution.

**Table 6.8 Granger test**

| Equation | Excluded | chi2 | df | Prob > chi2 |
|---|---|---|---|---|
| logGINI | logGDP | 13.367 | 3 | 0.004 |
| logGINI | logUNEMPLOY | 12.417 | 3 | 0.006 |
| logGINI | logODA | 3.101 | 3 | 0.376 |
| logGINI | ALL | 18.371 | 9 | 0.031 |
| logGDP | logGINI | 21.871 | 3 | 0.000 |
| logGDP | logUNEMPLOY | 15.324 | 3 | 0.002 |
| logGDP | logODA | 23.073 | 3 | 0.000 |
| logGDP | ALL | 63.298 | 9 | 0.000 |
| logUNEMPLOY | logGINI | 6.2476 | 3 | 0.100 |
| logUNEMPLOY | logGDP | 7.5749 | 3 | 0.056 |
| logUNEMPLOY | logODA | 9.5914 | 3 | 0.022 |
| logUNEMPLOY | ALL | 25.786 | 9 | 0.002 |
| logODA | logGINI | 4.0831 | 3 | 0.253 |
| logODA | logGDP | 9.9611 | 3 | 0.019 |
| logODA | logUNEMPLOY | 2.4508 | 3 | 0.484 |
| logODA | ALL | 25.999 | 9 | 0.002 |

*(Source: own processing)*

Based on the results of the Granger Test (table 6.8), we can sum up:

In the logGINI model, we see a two-way causal relationship between logGINI and logGDP, as well as between logGINI and logUNEMPLOY, with statistical significance reaching the significance level (P-value < 0.05). However, there was no significant causal relationship between logGINI and logODA.

In the logGDP model, the results show that there is a one-way causal relationship between logGDP and logGINI, logGDP and logUNEMPLOY, as well as between logGDP and logODA with statistical significance reaching the significance level (P-value < 0.05).

In the logUNEMPLOY model, there is only a 1-way causal relationship between logUNEMPLOY and logODA, while there is no significant causal relationship between logUNEMPLOY and logGINI, logGDP.

The logODA model shows a 1-way causal relationship between logODA and logGDP, while there is no significant causal relationship between logODA and logGINI, logUNEMPLOY.

In summary, the results of the Granger Test show that some models have a 1-way causal relationship between the variables. Still, there is no significant 2-way causal relationship between the variables in the considered models.

**Impulse Response Analysis**

In this section, the author conducts an orthogonal plotting of impulse response to show the impact of shocks from GDP growth. The rate of unemployment and foreign funding on GINI and vice versa is predicted for the next five years with four small graphs inside that have been plotted using Stata software *(the graph will be presented in Appendix No.3 page 169).*

**Table 6.9. Impulse Response Function (from Model (1) to Model (4))**

| | **(1)** | **(2)** | **(3)** | **(4)** |
|---|---|---|---|---|
| **Step** | fevd | fevd | fevd | fevd |
| **0** | 0 | 0 | 0 | 0 |
| **1** | .11632 | 1 | .006433 | .022312 |
| **2** | .09157 | .931859 | .080013 | .016785 |
| **3** | .056533 | .826241 | .095805 | .010862 |
| **4** | .037279 | .715359 | .109936 | .02687 |
| **5** | .030266 | .646729 | .095498 | .046652 |
| | **(5)** | **(6)** | **(7)** | **(8)** |
| **Step** | fevd | fevd | fevd | fevd |
| **0** | 0 | 0 | 0 | 0 |
| **1** | .88368 | 0 | .001565 | .027781 |
| **2** | .664536 | .008478 | .009765 | .021174 |
| **3** | .571863 | .022808 | .022282 | .019026 |
| **4** | .509461 | .038037 | .027151 | .018492 |
| **5** | .42677 | .043655 | .038375 | .017524 |
| | **(9)** | **(10)** | **(11)** | **(12)** |
| **Step** | fevd | fevd | fevd | fevd |
| **0** | 0 | 0 | 0 | 0 |
| **1** | 0 | 0 | .992001 | .053845 |
| **2** | .003136 | .031784 | .840435 | .047206 |
| **3** | .056739 | .113534 | .714672 | .090708 |
| **4** | .138058 | .214957 | .649517 | .063295 |
| **5** | .267565 | .275585 | .633428 | .046366 |
| | **(13)** | **(14)** | **(15)** | **(16)** |
| **Step** | fevd | fevd | fevd | fevd |
| **0** | 0 | 0 | 0 | 0 |
| **1** | 0 | 0 | 0 | .896062 |
| **2** | .240759 | .027879 | .069787 | .914836 |
| **3** | .314865 | .037417 | .167242 | .879404 |
| **4** | .315202 | .031648 | .213395 | .891343 |
| **5** | .2754 | .034031 | .232699 | .889458 |

Source: *Own processing*

*(1) irfname = impulse, impulse = logGINI, and response = logGDP.*
*(2) irfname = impulse, impulse = logGINI, and response = logGINI.*
*(3) irfname = impulse, impulse = logGINI, and response = logUNEMPLOY.*
*(4) irfname = impulse, impulse = logGINI, and response = logODA.*
*(5) irfname = impulse, impulse = logGDP, and response = logGDP.*
*(6) irfname = impulse, impulse = logGDP, and response = logGINI.*
*(7) irfname = impulse, impulse = logGDP, and response = logUNEMPLOY.*
*(8) irfname = impulse, impulse = logGDP, and response = logODA.*
*(9) irfname = impulse, impulse = logUNEMPLOY, and response = logGDP.*
*(10) irfname = impulse, impulse = logUNEMPLOY, and response = logGINI.*
*(11) irfname = impulse, impulse = logUNEMPLOY, and response = logUNEMPLOY.*
*(12) irfname = impulse, impulse = logUNEMPLOY, and response = logODA.*
*(13) irfname = impulse, impulse = logODA, and response = logGDP.*
*(14) irfname = impulse, impulse = logODA, and response = logGINI.*
*(15) irfname = impulse, impulse = logODA, and response = logUNEMPLOY.*

In model (1), logGINI is the stimulus variable (impulse), and logGDP, logGINI, logUNEMPLOY, and logODA are response variables. The results show that logGINI positively affects logGDP and logGINI in the first period (step 1).

However, the influence diminishes over the next steps. Similarly, in models (2) and (3), logGINI also had an initial positive effect on logUNEMPLOY and logODA, but this effect decreased over time. In model (4), logGINI produced no significant effect on logODA. In model (5), logGDP positively affects itself and logGINI in the initial period, but this influence also decreases over time. Similarly, in models (6) and (7), logGDP has an initial positive effect on logUNEMPLOY and logODA, but this influence decreases with subsequent steps.

In model (8), logGDP does not significantly affect logODA. In model (9), logUNEMPLOY positively affects logGDP in the first period, but this influence decreases with subsequent steps. However, logUNEMPLOY had no significant effect on logGINI, logUNEMPLOY itself, or logODA. In model (10), logUNEMPLOY has no considerable effect on logGINI and logUNEMPLOY. However, logUNEMPLOY positively affects logGDP in the first period, but this influence gradually decreases over the next steps. In model (11), logUNEMPLOY positively affects logUNEMPLOY itself during the first period, but this influence decreases with subsequent steps. However, logUNEMPLOY had no significant effect on logGINI and logODA.

In model (12), logUNEMPLOY produced no significant effect on logODA. However, logUNEMPLOY positively affects logGDP and logGINI in the first period, but this influence gradually decreases over the next steps. In model (13), logODA positively affects logGDP in the first period, but this influence decreases with subsequent steps. However, logODA had no significant effect on logGINI and logUNEMPLOY.

In model (14), logODA produced no significant effect on logGINI. However, logODA positively affects logGDP in the first period, but this influence gradually decreases over the next steps. In model (15), logODA produced no significant effect on logUNEMPLOY.

However, logODA positively affects logGDP in the first period, but this influence gradually decreases over the next steps. In model (16), logODA positively affects logODA itself during the first period, but this influence decreases with subsequent steps. However, logODA had no significant effect on logGINI, logGDP, and logUNEMPLOY.

Overall, the Impulse Response Function results show a complex interaction between the variables in the VAR model. The variables have different effects on each other during the first period, but this influence decreases over time, and not all reach statistical significance.

# 7 Inequality and Economic Growth in Vietnam´s Northern Midlands and Mountains

In this chapter, the author presents research results on the relationship between income inequality and economic growth in the Northern Midland and Mountainous regions.

## 7.1 The relationship between income inequality and economic growth in Nothern Midlands and Mountains

The impact of inequality on growth in the region is analyzed based on the following two research models:

Model (19): Effects of income inequality on economic growth

$$\text{Log GPD}_t = \beta_0 + \beta_1 \text{G\_inc}_{it} + \beta_2 \text{G\_inc}_{it}^2 + \beta_3 \text{EDU}_{it} + \beta_4 \text{POV}_{it} + \beta_5 \text{URBi}_t + \beta_6 \text{LAB}_{it} + \mu \quad (19)$$

Model (20): Effects of expenditure inequality on economic growth

$$\text{Log GDP}_t = \beta_0 + \beta_1 \text{G\_exp}_{it} + \beta_2 \text{G\_exp}_{it}^2 + \beta_3 \text{EDU}_{it} + \beta_4 \text{POV}_{it} + \beta_5 \text{URB}_{it} + \beta_6 \text{LAB}_{it} + \mu \quad (20)$$

In which:

i: provinces

t: time (year)

μ: error in the model

Table 7.1 shows the linear correlation coefficient between the independent and dependent variables. When not using the lower significant value index, the authors checked the upper correlation coefficient to detect the existence of multicollinearity between the variables. Accordingly, if the absolute value of the correlation coefficient is closer to 1, the multicollinearity problem occurs more seriously and vice versa.

**Table 7.1 Correlation matrix between variables**

| | GDP | EDU | G_INC | G_EXP | G_INC² | G_EXP² | POV | LAB | URB |
|---|---|---|---|---|---|---|---|---|---|
| GDP | 1.0000 | | | | | | | | |
| EDU | 0.1595 | 1.0000 | | | | | | | |
| G_inc | 0.0616 | 0.1312 | 1.0000 | | | | | | |
| G_exp | 0.2624 | 0.0910 | 0.4431 | 1.0000 | | | | | |
| G_inc$^2$ | 0.0629 | 0.1373 | 0.9996 | 0.4329 | 1.0000 | | | | |
| G_exp$^2$ | 0.2473 | 0.0945 | 0.4603 | 0.9989 | 0.4509 | 1.0000 | | | |
| POV | -0.5414 | -0.1298 | -0.1437 | -0.0997 | -0.1446 | -0.0949 | 1.0000 | | |
| LAB | -0.2797 | -0.0415 | 0.0126 | 0.0124 | 0.0057 | 0.0079 | -0.0916 | 1.0000 | |
| URB | 0.4972 | 0.0678 | 0.0259 | 0.0878 | 0.0271 | 0.0854 | -0.2668 | -0.0304 | 1.0000 |

*(Source: Own processing)*

The results from table 7.1 indicate a significant correlation between the independent variables in the model and the GDP dependent variable; only two variables, The GINI coefficients of income (G_inc) and the GINI coefficients of income squared (G_inc$^2$), have a low correlation coefficient with only 0.0616 and 0. 0629 shows that they are not correlated with GDP.

Among the independent variables in the model, the variable GINI coefficients of income (G_inc); GINI coefficients of income squared (G_inc$^2$); the coefficients of expenditure (G_exp); the coefficients of expenditure squared (G_exp$^2$) have reciprocal correlations with the highest correlation coefficient between G_inc and G_inc$^2$ of 0.9996; then the correlation between the coefficients of expenditure (G_exp) and the coefficients of expenditure squared (G_exp$^2$) is 0.9989. The correlations between other independent variables are mostly less than 0.5.

**Multicollinearity test**

**Table 7.2 Verification of multicollinearity using VIF**

| Variable | VIF |
|---|---|
| G_inc | 1.27 |
| G_exp | 1.26 |
| POV | 1.12 |
| URB | 1.09 |
| EDU | 1.04 |
| LAB | 1.01 |
| Mean VIF | 1.13 |

*(Source: Own processing)*

Table 7.2 shows the results of the multicollinearity test using the variance exaggeration factor (VIF). According to (Đoge, 2018), if the VIF index is smaller than 10, it will cause weak

multicollinearity or not cause multicollinearity in the model. The VIF value of the variables in this research is 1.13, which is very small compared to 10, so the multicollinearity of the model is low.

**Model regression results**

As mentioned in the chapter on research methods, the study will use three commonly used models for panel data, especially OLS, FEM, and REM, to perform regression of research results. The specific results are presented in table 7.3.

**Table 7.3 OLS, FEM, REM model regression according to GINI income (G_inc)**

| logGDP | (1)<br>OLS | (2)<br>FEM | (3)<br>REM |
|---|---|---|---|
| **EDU** | 0.0070*** | 0.0612*** | 0.0098*** |
| | (47.27) | (101.24) | (43.00) |
| **G_inc** | 36.4740*** | 11.5177*** | 11.0630*** |
| | (232.04) | (107.81) | (111.17) |
| **G_inc²** | -28.7613*** | -8.8831*** | -8.3570*** |
| | (-233.50) | (-108.00) | (-108.73) |
| **POV** | -0.0164*** | -0.0298*** | -0.0228*** |
| | (-237.32) | (-126.07) | (-143.76) |
| **LAB** | -0.0419*** | -0.0099*** | -0.0208*** |
| | (-141.49) | (-17.47) | (-41.89) |
| **URB** | 0.0129*** | 0.0598*** | 0.0402*** |
| | (85.75) | (118.87) | (113.54) |
| **_cons** | -4.2405*** | -0.1224** | 1.1943*** |
| | (-91.75) | (-2.14) | (23.88) |
| **F-value** | 0.0000 | 0.0000 | 0.0000 |
| **N** | 101833 | 101833 | 101833 |
| **R-sq** | 0.6226 | 0.7573 | 0.7221 |
| **Hausman Test** | Prob > chi2 = 0.0000 => The suitable model is FEM | | |
| **Modified Wald Test** | Prob>chi2 = 1.0000 => The FEM model does not have variable variance | | |
| **Durbin–Watson Test** | DW value = 0.003386 => The FEM model has autocorrelation | | |

*(Source: Own processing)*
*Note: Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of significance) mean 1%).*
*The number in brackets () is the t value in the regression model.*

The F-values in Table 7.3 show that all the models are robust and prove their suitability for the study with all values less than 0.05. Hypothesis H0 discusses the model's fit or whether the model is qualified to continue the study. With the F-value shown in the table, we can boldly reject this hypothesis. The coefficient of determination $R^2$ in the OLS, FEM, and REM models

is 0.6226, 0.7573, and 0.7221. This result implies that in the OLS model, the independent variables explain 62.26% of the change in the dependent variable of national economic growth; in the FEM model, the independent variables explain about 75.73% of the difference in the dependent variable of national economic growth and in the REM model the independent variables explain about 72.21% of the change in the dependent variable of economic growth nation.

The positive coefficient of education shows that it is aligned with economic theory. Education is a crucial driver of economic growth through its impact on human capital development. Higher education is connected with enhanced productivity and innovation, increasing economic output. Therefore, investment in education will create economic benefits not just for the people but also for the whole country.

Moderate income inequality can stimulate investment and entrepreneurship, initially stimulating economic growth. However, beyond a certain threshold, high inequality can lead to social and economic instability, reduced consumer spending and reduced investment in human capital, ultimately limiting growth.

Inequality is often connected with high poverty rates that can constrain economic growth. The reason is that it limits access to education, health care and other services. With poor health, the workers have lower productivity, and their contribution to economic output is low. Therefore, reducing poverty can improve economic performance by increasing worker productivity. On the other hand, it can lead to higher income and consumption, increasing GDP.

The results suggest a quadratic relationship between income inequality and economic growth when the coefficient is positive for G_inc and negative for $G\_inc^2$. Thus, a moderate level of inequality can positively contribute to economic growth by incentivizing entrepreneurship or investment. However, it leads to social and economic instability when it gets over a certain point. It can be stated that a high level of instability hinders the country's economic potential and reduces economic growth. Therefore, it is evident that income inequality has a complex nonlinear impact on economic growth.

The results of poverty are not in line with traditional economic theory. The negative coefficient suggests inefficiencies in the labour market or underemployment. On the other hand, it can also be connected with a mismatch between labor supply and demand because higher labor force participation is not directly connected with higher economic income.

As the above conclusion about rejecting hypothesis H0 in considering model fit, this hypothesis also compares FEM and OLS models. Expressly, when the hypothesis is H0, it also implicitly confirms that the FEM model will be suitable for further research compared to the OLS model, according to Gujarati and Porter (2009). Therefore, the study will compare and analyze two models, FEM and REM. The results are that after using the Hausman test (Hausman-test) (p-value is 0.000), the authors show that the fixed effects model (FEM) according to the income GINI (G_inc) is the most suitable regression model.

**Table 7.4 OLS, FEM, REM model regression according to GINI expenditure (G_exp)**

| **logGDP** | **(1)**<br>**OLS** | **(2)**<br>**FEM** | **(3)**<br>**REM** |
|---|---|---|---|
| **EDU** | 0.0037*** | 0.0429*** | 0.0071*** |
| | (28.70) | (78.32) | (39.49) |
| **G_exp** | 50.3181*** | 29.7769*** | 32.5690*** |
| | (275.56) | (197.42) | (243.44) |
| **G_exp2** | -40.5800*** | -24.1693*** | -26.2784*** |
| | (-268.39) | (-200.25) | (-245.46) |
| **POV** | -0.0147*** | -0.0167*** | -0.0157*** |
| | (-241.04) | (-93.43) | (-130.01) |
| **LAB** | -0.0423*** | -0.0113*** | -0.0192*** |
| | (-165.06) | (-23.61) | (-48.20) |
| **URB** | 0.0120*** | 0.0609*** | 0.0406*** |
| | (90.45) | (156.12) | (148.76) |
| **_cons** | -9.1660*** | -5.8968*** | -5.6879*** |
| | (-164.70) | (-94.54) | (-102.55) |
| **F-value** | 0.0000 | 0.0000 | 0.0000 |
| **N** | 101833 | 101833 | 101833 |
| **R-sq** | 0.7088 | 0.8152 | 0.7927 |
| **Hausman Test** | Prob > chi2 = 0.0000 => The suitable model is FEM | | |
| **Modified Wald Test** | Prob>chi2 = 1.0000 => The FEM model does not have variable variance | | |
| **Durbin–Watson Test** | DW value = 0.000952 => The FEM model has autocorrelation | | |

*(Source: Own processing)*

*Note: Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (level of significance) mean 1%).*

*The number in brackets () is the t value in the regression model.*

The F-values in Table 7.4 show that all the models are robust and prove their suitability for the study with all values less than 0.05. Hypothesis H0 discusses the model's fit or whether the model is qualified to continue the study; then, with the F-value shown in the table, we can boldly reject this hypothesis. The coefficient of determination $R^2$ in the three models OLS, FEM, and REM is 0.7088, respectively; 0.8152 and 0.7927. This result implies that in the OLS model, the independent variables explain 70.88% of the change in the dependent variable of the national economic growth rate; in the FEM model, the independent variables explain about 81.52% of the difference in the dependent variable of national economic growth and in the REM model the independent variables explain approximately 79.27% of the change in the dependent variable of the international economic growth rate.

As the above conclusion about rejecting hypothesis H0 in considering model fit, this hypothesis also compares FEM and OLS models. Expressly, when the hypothesis is H0, it also implicitly confirms that the FEM model will be suitable for further research compared to the OLS model, according to Gujarati and Porter (2009). Therefore, the study will compare and analyze two models, FEM and REM. The result is that after using the Hausman test (Hausman-test) (p-value is 0.000), the authors show that the fixed effect model (FEM) according to GINI expenditure (G_exp) is the most suitable regression model.

After performing Hausman Test (tables 7.3 and 7.4), the author tests heteroskedasticity and autocorrelation; the results show that both FEM models exist autocorrelation and do not exist heteroscedasticity. Therefore, in the next regression model below, the author fixes autocorrelation and presents the perfect final results of the research model.

Considering the overall results in table 7.5, both models have statistically significant variables at the 1% level. The R-Squared coefficient of the two income and expenditure FEM models reached 0.7923 and 0.8437, respectively, showing that the independent variables in the two models explain more than 79% of the change in the dependent variable. Where the explanatory level of model (20) (using GINI expenditure) is higher than model (19) (using GINI income), it can be seen that income inequality explains the difference in GDP growth rate real

per capita is worse than expenditure inequality. Besides, in general, the impact direction for most variables is consistent with the expectations of the initial research.

**Table 7.5 Results of overcoming model autocorrelation**

| logGDP | Model (19) GINI Income | Model (20) GINI Expenditure |
|---|---|---|
| **G_INC** | 12.7386*** | |
| | (153.64) | |
| **G_INC2** | -9.9295*** | |
| | (-155.97) | |
| **G_EXP** | | 28.2586*** |
| | | (242.31) |
| **G_EXP2** | | -22.8865*** |
| | | (-245.11) |
| **EDU** | 0.0344*** | 0.0247*** |
| | (65.29) | (52.87) |
| **POV** | -0.0380*** | -0.0262*** |
| | (-177.17) | (-196.00) |
| **LAB** | 0.0101*** | 0.0097*** |
| | (18.68) | (21.26) |
| **URB** | 0.0667*** | 0.0559*** |
| | (177.02) | (181.88) |
| **_cons** | -1.2336*** | -6.2177*** |
| | (-5.52) | (-44.85) |
| **R-Squared** | 0.7923 | 0.8437 |
| **N** | 85296 | 85296 |

*(Source: Own processing)*
*Note: Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of significance) mean 1%).*
*The number in () below is the t value in the regression results table.*

The coefficients of income GINI (G_inc) and income-squared GINI ($G\_inc^2$) of the model (19) reached statistical significance at a 1% significance level, in which the coefficient $G\_inc^2$ showed an inverted U-shaped relationship between actual speed GDP per capita growth and household income inequality. Similarly, the coefficients of expenditure GINI (G_exp) and GINI expenditure squared ($G\_exp^2$) of the model (20) also reached statistical significance at the 1% significance level, in which the coefficient $G\_exp^2$ **showed an inverse U relationship between real GDP per capita growth and inequality in household spending**.

The results show that while other factors are constant, income inequality affects growth in two directions. Above a certain threshold, inequality has a positive relationship with growth; conversely, below a certain threshold, inequality harms economic growth. When the income inequality rate changes by 1%, the average income growth rate of the northern midland and

mountainous provinces at the upper threshold increases to 12.76%; otherwise, the lower threshold will decrease by 99.2%.

Inequality by expenditure affects growth in two directions; above a certain threshold, inequality has a positive relationship with growth; conversely, inequality harms economic growth below a certain threshold. When the inequality in spending changes by 1%, the average income growth rate of the northern midland and mountainous provinces at the upper threshold increases to 282.5%; otherwise, the lower threshold will decrease by 228.8%.

These models suggest a nonlinear relationship where income inequality initially boosts lnGDP but diminishes its impact as inequality increases. These findings align with economic theory as a certain level of inequality can stimulate investment and economic activity by concentrating wealth, but if the inequality is too high, it harms social cohesion and negatively impacts aggregate demand.

Table 7.5 shows that the variables of education, poverty rate, labor force rate, and urbanization are significant at the 1% level and have the same impact sign. The average years of schooling of 15-year-old members in the Northern Midland and Mountainous provinces increase (decrease) by one year, and the GDP per capita growth rate in models increases (decreases), respectively, 3.44% and 2.47% in a condition while other factors are constant. A better-educated population contributes more effectively to economic growth.

The poverty rate harms GDP at the 1% significance level, whereby a 1% increase (decrease) in the poverty rate in models will reduce (increase) the growth rate to 3.8% and 2.62%, respectively, with other factors unchanged. Poverty limits people’s access to resources and opportunities, reducing economic growth. Thus, we may conclude that poverty reduces economic potential by limiting human capital development and diminishes the consumption capacity crucial to today's economy.

Both models have positive and significant coefficients for the labour force compared to the previous (table 7.5) when it was negative and was contrary to traditional economic theory. The coefficients suggest that higher labor participation rates are positively associated with higher

economic output and growth. This finding is already in line with economic theory. Differences in model specifications can explain the discrepancy.

The rate of urbanization has a positive effect on growth; when the urbanization rate increases (decreases) by 1% in models, the growth rates increase (decrease) by 6.67% and 5.59% in terms of other factors constant. This finding also supports the theory because high density and infrastructure in urban areas tend to generate more economic activity.

The proportion of the labor force has a positive effect on growth, respectively; when the labor force ratio increases (decreases) by 1% in models, the growth rate increases (decreases) by 1.01% and 0.97%, all other factors being held constant.

The major difference between the model results is the coefficients' magnitude when the coefficients for Gini expenditure are higher than those for Gini income. Based on this, the expenditure-based Gini coefficient substantially impacts GDP per capita more than the income-based Gini coefficient.

The coefficient of education is slightly higher in model Gini income, indicating that the positive impact of education on growth is more pronounced when considering income-based inequality.

## 7.2 Fiscal Policy Impact on Income Inequality in Vietnam´s Northern Midlands and Mountains[4]

To find out the impact of fiscal policy on income inequality in the region, the author builds a model as follows:

$$G_{INC_{it}} = \beta_1 LogINVEST_{it} + \beta_2 LogHEALTHEXP_{it} + \beta_3 LogTAX_{it} + \beta_4 LogEXPENSION_{it} + \beta_5 LogSOCIAL_{it} + \beta_6 EDU_{it} + \mu \quad (21)$$

The relationship between the independent variables in the model is shown through the correlation coefficient in the correlation matrix below.

[4] Part of this chapter was already published (Ho & Benesova, 2023)

**Table 7.6 The correlation matrix between the independent variables**

| | G_INC | LogINVEST | LogHEALTHEXP | LogTAX | LogPENSION | LogSOCIAL | EDU |
|---|---|---|---|---|---|---|---|
| G_INC | 1.0000 | | | | | | |
| LogINVEST | -0.5550* | 1.0000 | | | | | |
| LogHEALTHEXP | 0.2111* | -0.1112* | 1.0000 | | | | |
| LogTAX | 0.3867* | -0.2299* | 0.1632* | 1.0000 | | | |
| LogPENSION | 0.0773* | -0.1307* | 0.1094* | 0.0958* | 1.0000 | | |
| LogSOCIAL | -0.5226* | 0.2669* | -0.0865* | -0.1490* | -0.0163 | 1.0000 | |
| EDU | -0.2042* | -0.0168 | 0.1392* | 0.0524* | 0.1538* | 0.1002* | 1.0000 |

*(Source: Own processing)*

*Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of 1%).*

Table 7.6 shows that the coefficient of linear correlation between independent variables and specific dependent variables is statistically significant, including the correlation between investment (LogINVEST) and social security (LogSOCIAL) and education (EDU) with income inequality (G_INC). The positive correlation reached statistical significance between health expenditure (LogHEALTHEXP), income tax (LogTAX), and Pensions (LogPENSION) with income inequality (G_INC).

For independent variables, the most significant correlation is the positive correlation between investment (LogINVEST) and social security (LogSOCIAL) with 0.26; then there is a negative correlation between investment (LogINVEST) and income tax (LogTAX) with -0.22; followed by a positive correlation between health expenditure (LogHEALTHEXP) and income tax (LogTAX) with 0.16. Most of the remaining independent variables have little correlation, and the correlation coefficient is not too large, showing little possibility of multicollinearity occurring in the model.

**Table regression results**

After carrying out the regression according to the regression models, the author conducts along with the test to select the most suitable model between the two fixed effect model (FEM) and ordinary least square (OLS) models. As a result, the FEM model is suitable for performing the regression after using the Hausman Test with the OLS model. Both FEM and OLS models are presented in the table below as follows:

**Table 7.7 FEM and OLS model regression results**

| G_INC | (1) FEM | | (2) OLS | |
|---|---|---|---|---|
| **LogINVEST** | -0.0197*** | (-49.79) | -0.0198*** | (-50.02) |
| **LogHEALTHEXP** | 0.0121*** | (17.37) | 0.0115*** | |
| **LogTAX** | 0.0167*** | (30.32) | 0.0166*** | (30.05) |
| **LogPENSION** | 0.0014** | (2.22) | 0.0013** | (2.08) |
| **LogSOCIAL** | -0.0220*** | (-44.35) | -0.0224*** | (-45.01) |
| **EDU** | -0.0108*** | (-27.29) | -0.0108*** | (-27.31) |
| **VHLSS** | -0.0000*** | (-8.13) | | |
| **_cons** | 0.7426*** | (120.74) | 0.7414*** | (120.09) |
| **Hausman Test** | Prob > chi2 = 0.0000 => The suitable model is FEM | | | |
| **F-Value** | 0.0000 | | 0.0000 | |
| **R2** | 0.5663 | | 0.5663 | |
| **N** | 7980 | | 7980 | |

*(Source: Own processing)*
*Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of 1%). The number in brackets () is the t value in the regression model*.

FEM model:

$$G\_inc_{it} = \beta_0 + \beta_1 LogINVEST_{it} + \beta_2 LogHEALTHEXP_{it} + \beta_3 LogTAX_{it} + \beta_4 LogPENSION_{it} + \beta_5 LogSOCIAL_{it} + EDU_{it} + VHLSS_t \quad (22)$$

Table 7.7 shows the regression results of FEM and OLS, according to which the model selected as FEM has the following results: The variable LNINVEST harms income inequality (G_inc), reaching statistical significance at 1%; same for social security (LogSOCIAL), education (EDU) and VHLSS variables; the remaining variables include health expenditure (LogHEALTHEXP); income tax (LogTAX) and pension (LogPENSION) have a statistically significant positive impact at 1% and 5% on income inequality (G_inc).

The results from the regression table are similar to the expectations. However, these results may still suffer from various econometric phenomena and defects such as multicollinearity, variable variance, and influence from outliers. Therefore, the thesis will test the strength of the model and ensure the consistency and validity of the results, and the regression results will be based on testing the model's reliability.

**Check model robustness**

**Table 7.8 Verification of multicollinearity using VIF**

| Variables | VIF |
|---|---|
| LogINVEST | 1.14 |
| LogSOCIAL | 1.11 |
| LogTAX | 1.09 |
| LogHEALTHEXP | 1.07 |
| EDU | 1.06 |
| LogPENSION | 1.05 |
| VHLSS | 1.02 |
| Average of VIF | 1.08 |

*(Source: Own processing)*

Table 7.8 shows that the VIF coefficients of all variables are less than 5. Besides, the mean coefficient of VIF is less than five, which is 1.08. Since VIF has a value from 1 to 5, the model has multicollinearity but is not too severe (Wooldridge, 2002).

**Table 7.9 Variance test**

| Breusch–Pagan/Cook–Weisberg Test |
|---|
| **H0: The model is not affected by variance** |
| **H1: The model is changed by variance** |
| **Prob > chi2 = 0.0889** |

*(Source: Own processing)*

The results from Table 7.9 show that p-value = 0.08 < 0.1 (significant level of 10%), so hypothesis H0 is rejected and hypothesis H1 accepted. Therefore, the study's FEM model is concluded with variable variance defects.

Because the FEM model is suffering from variable variance defects, the FEM model will be regressed with the Robust Standard technique (substantial standard) to overcome the defects and give better research results.

**Table 7.10 Regression of FEM model with Robust**

| G_INC | (1) FEM | |
|---|---|---|
| **LogINVEST** | -0.0197*** | (-46.70) |
| **LogHEALTHEXP** | 0.0121*** | (16.99) |
| **LogTAX** | 0.0167*** | (28.59) |
| **LogPENSION** | 0.0014** | (2.04) |
| **LogSOCIAL** | -0.0220*** | (-38.70) |
| **EDU** | -0.0108*** | (-25.40) |
| **VHLSS** | -0.0000*** | (-8.12) |
| **_cons** | 0.7426*** | (123.55) |
| **F-Value** | - | |
| **R2** | 0.5663 | |
| **N** | 7980 | |

*(Source: Own processing)*

***Note:*** *The above results were estimated using a Fixed Effects model (FEM) with vital standard errors (Robust Standard Errors). Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of 1%). The number in brackets () is the t value in the regression model.*

Table 7.10 shows that after overcoming the variable variance defects, the variables still give similar results to the old model regarding sign and impact significance. To control outliers, the author uses the winsorization technique suggested by Lim et al. (2016) to remove outliers in the FEM model in the previous table. The author will remove outliers in the 1st and 99th percentiles in table 7.11.

**Table 7.11 Regression results control for outliers for the FEM model**

| G_INC | Model FEM (1%-99%) | |
|---|---|---|
| **LogINVEST** | -0.0196*** | (-46.60) |
| **LogHEALTHEXP** | 0.0121*** | (16.94) |
| **LogTAX** | 0.0167*** | (28.65) |
| **LogPENSION** | 0.0014* | (1.96) |
| **LogSOCIAL** | -0.0222*** | (-39.12) |
| **EDU** | -0.0108*** | (-25.40) |
| **VHLSS** | -0.0000*** | (-8.17) |
| **_cons** | 0.7426*** | (123.52) |
| **$R^2$** | 0.5671 | |
| **N** | 7980 | |

*(Source: Own processing)*

*Significance of the symbol*: *p<0.1 (significant level of 10%), **p<0.05 (significant level of 5%), ***p<0.01 (significant level of 1%). The number in brackets () is the t value in the regression model.*

The results from 7.11 show that the adjusted $R^2$ coefficient of the FEM model is 0.5671, showing that the independent variables in the model all explain more than 56.71% of the change in the dependent variable. This result is about 0.08% higher than previous FEM models. Most

of the impact directions with the variables are consistent with the expectations of the original research and coincide with the previous models.

The impact of the variables indicates that if household investment and state social security both increase by 1%, household income inequality will decrease by 1.9% and 2.2%, respectively, holding other factors constant. This result supports social security programs' role in reducing income disparity by providing financial assistance to lower-income households.

Similarly, when education increases by one year, income inequality will decrease other things being equal. This association shows the vital role of education in enhancing human capital and economic opportunities across different income groups.

On the contrary, other factors remain constant when health expenditure (LogHEALTHEXP), income tax (LogTAX), and pension (LogPENSION) increase by 1%, and income inequality also increases by 1.2%, respectively; 1.6% and 0.1%. These results may indicate that pension benefits are not equally distributed among households, possibly favouring higher-income ones. Regarding taxes, the positive association between household income tax and income inequality may signal that the current tax system might disproportionately burden lower-income households or that the taxes and benefits are skewed in favour of wealthier households. A similar situation is in the case of health expenditures. The results suggest that health care might be more affordable for wealthier households, increasing the income gap between richer and poorer households.

# 8 Connection between Income Inequality and Economic Growth from the Regional Perspectives

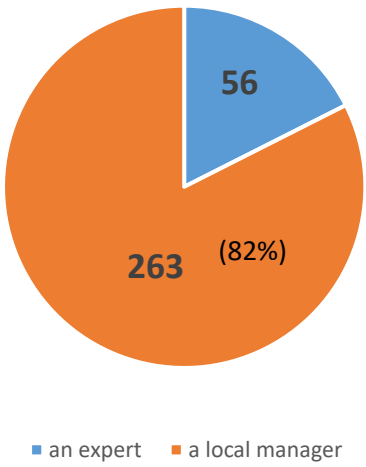
This chapter of the thesis focuses on the evaluation of the questionnaire. The author uses qualitative research methods to provide a scientific perspective on the issue of economic growth and income inequality in the Northern Midlands and Mountainous regions based on the analysis of survey results from local people represented by local experts and managers.

After collecting data, the author entered the survey data into SPSS software and ran a correlation test to select pairs of questions that may be correlated and used for the analysis.

After finding groups of correlated questions and grouping them, the author calculates Crosstab analysis for the above pairs of questions. Based on Crosstabs results from SPSS software, synthesized and presented into 48 detailed analysis tables. Finally, the author provides explanations, analyses the numbers and ratios in the correlation between pairs of questions, and compares them with practice to make appropriate comments and conclusions.

Figure 8-1 will show the survey demographics (the author will cite detailed data results in the appendix).

**Figure 8-1 Job density in the sample**




*(Source: Own processing)*

This figure shows the proportion of survey respondents divided into experts (Job = 1) and local managers (Job = 2). The sample's experts are 56 people, accounting for 17.55%, and the number of local managers in the sample is 263, accounting for 82.45%. Thus, the group of local managers accounts for a much more significant proportion than the experts in this survey sample.

**Table 8.1 Viewpoints of income inequality according to experts and local managers**

| INEQUALITY | Experts | Local managers | Total |
|---|---|---|---|
| **0 - no change** | 23 | 130 | 153 |
| **1- change** | 33 | 133 | 166 |
| **Total** | 56 | 263 | 319 |

*(Source: Own processing)*

Table 8.1 shows the opinions of experts and local people on changes in income inequality (INNEQUALITY variable), in which 0 is no change in inequality; 1 is there is a change in inequality. Results: In the expert group, 23 people thought there was no change in inequality, and 33 people thought there was change. In the group of local managers, 130 people think there has been no change in inequality, and 133 people think there has been a change. Overall, both groups have similar numbers of people saying there will be no change in income inequality.

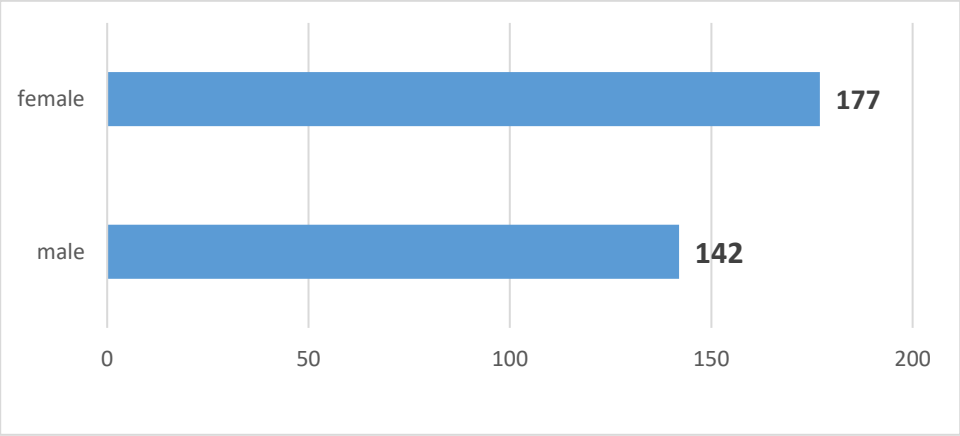
**Table 8.2 ANOVA test between Job and Inequality**

| Source | SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| **Between groups** | .322538563 | 1 | .322538563 | 1.29 | 0.2570 |
| **Within groups** | 79.2950163 | 317 | .250142007 | | |
| **Total** | 79.6175549 | 318 | .250369669 | | |

*(Source: Own processing)*

The ANOVA (Analysis of Variance) analysis in table 8.2 refers to differences between groups in views on income inequality (INEQUALITY) based on occupation (JOB). In the analysis table, the F-ratio value is 1.29, and the p-value (Prob > F) is 0.2570. Because the p-value is more significant than the commonly used significance threshold, there is insufficient evidence to reject the hypothesis of no between-group differences in opinions about income inequality based on occupation. It means there are no significant differences between occupational groups in the survey sample regarding views on income inequality.

**Figure 8-2 Gender ratio in the survey sample**




*(Source: Own processing)*

Of the total number of survey participants, the female group accounted for more than the male group, with 177 people (55.49%) female and 142 people (44.51%) male (figure 8-2). This result reflects that among the respondents, the number of females is about 10% higher than males.

In this survey sample, 319 people were surveyed regarding gender ratio. The male ratio (Job = 1) accounts for 44.51% (142 people), while the female ratio (Job = 2) is 55.49% (177 people). It shows that the gender distribution in the survey sample is relatively balanced, with the female portion accounting for a higher proportion. However, the difference is not too significant compared to the male portion.

**Table 8.3 Viewpoints of income inequality according to gender**

| INEQUALITY | Male | Female | Total |
|---|---|---|---|
| **No change in inequality** | 64 | 89 | 153 |
| **Inequality has been changed** | 78 | 88 | 166 |
| **Total** | 142 | 177 | 319 |

*(Source: Own processing)*

The author examines men's and women's views on income inequality in the survey sample in table 8.3. In the male group (Job = 1), 45% (64 people) believe there has been no change in inequality, while 55% (78 people) believe there has been change. In the female group (Job = 2),

the proportion of people saying there has been no change and that there has been change is equivalent to 50% (89 people and 88 people respectively).

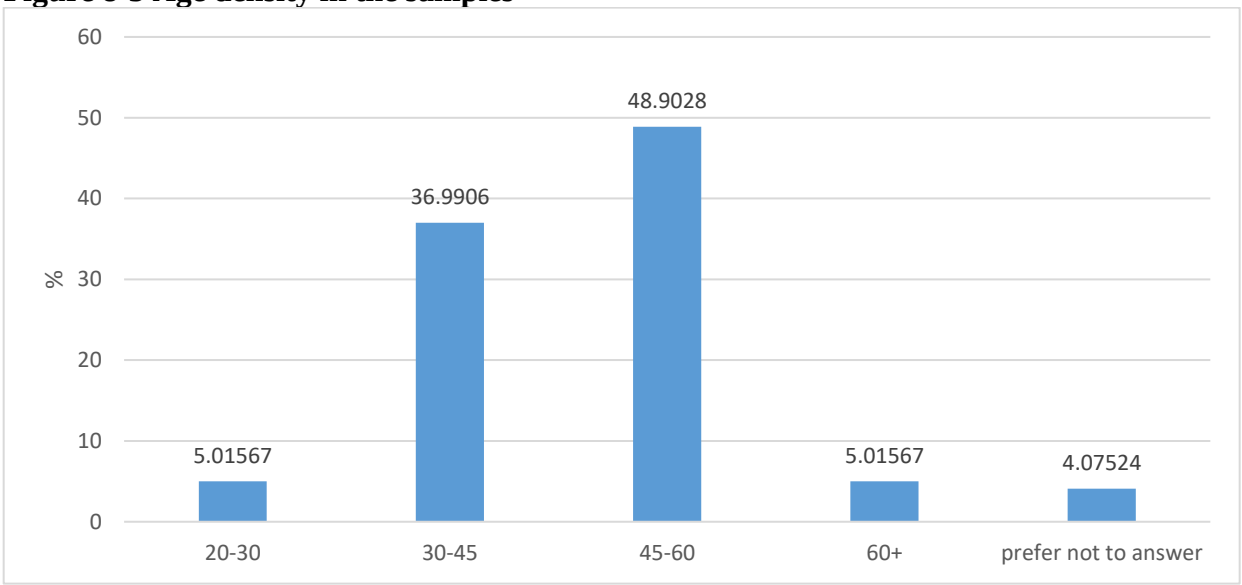
**Table 8.4 ANOVA test between Gender and Inequality**

| Source | SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| **Between groups** | .214037711 | 1 | .214037711 | 0.85 | 0.3560 |
| **Within groups** | 79.4035171 | 317 | .250484281 | | |
| **Total** | 79.6175549 | 318 | .250369669 | | |

*(Source: Own processing)*

The F-ratio value is 0.85, and the p-value (Prob > F) is 0.3560 (table 8.4), which is higher than the typical significance threshold of 0.05. This indicates that there is not enough evidence to reject the hypothesis that there is no difference between gender groups in terms of their views on income inequality. It suggests that views on income inequality are unrelated to gender in this sample. Furthermore, the Bartlett test revealed no difference in variance between groups, which confirms the reliability of the ANOVA analysis results.

**Figure 8-3 Age density in the samples**




**(S***ource: Own processing)*

Figure 8-3 shows the age ratio of individuals in the survey sample. According to the table, the author found a diverse distribution of ages of survey participants. The age group with the highest proportion is group 3 (the 45-60-year-old group) (48.90%), followed by group 2 (the 30-45-year-old group) (36.99%). The remaining groups include Group 1 (the 20-30-year-old

group) (5.02%), group 4 (the 60+-year-old group) (5.02%), and Group 5 (the Prefer not to Answer group) (4.08%). It shows that the survey sample had diversity in age of participating individuals.

**Table 8.5 Viewpoints of income inequality according to age**

| INEQUALITY | No change in inequality | Inequality has been changed | Total |
|---|---|---|---|
| 1 | 6 | 10 | 16 |
| 2 | 62 | 56 | 118 |
| 3 | 71 | 85 | 156 |
| 4 | 8 | 8 | 16 |
| 5 | 6 | 7 | 13 |
| Total | 153 | 166 | 319 |

*(Source: Own processing)*

Table 8.5 shows the age ratio of survey participants according to their views on income inequality, divided into five groups from 1 to 5. Group 1 (the 20-30-year-old group) has 16 people (5.02% of the total sample), group 2 (the 30-45-year-old group) has 118 people (36.99%), group 3 (the 45-60-year-old group) has 156 people (48.90%), group 4 (the 60+ -year-old group) has 16 people (5.02%), and group 5 (the Prefer not to Answer group) has 13 people (4.08%). The proportion of survey participants who view income inequality reflects the age diversity in the survey sample. It may suggest that views on income inequality do not depend entirely on an individual's age. To better understand the relationship between age and this perspective, further analysis of other factors such as occupation, education level, and income of individuals in the survey sample may be necessary.

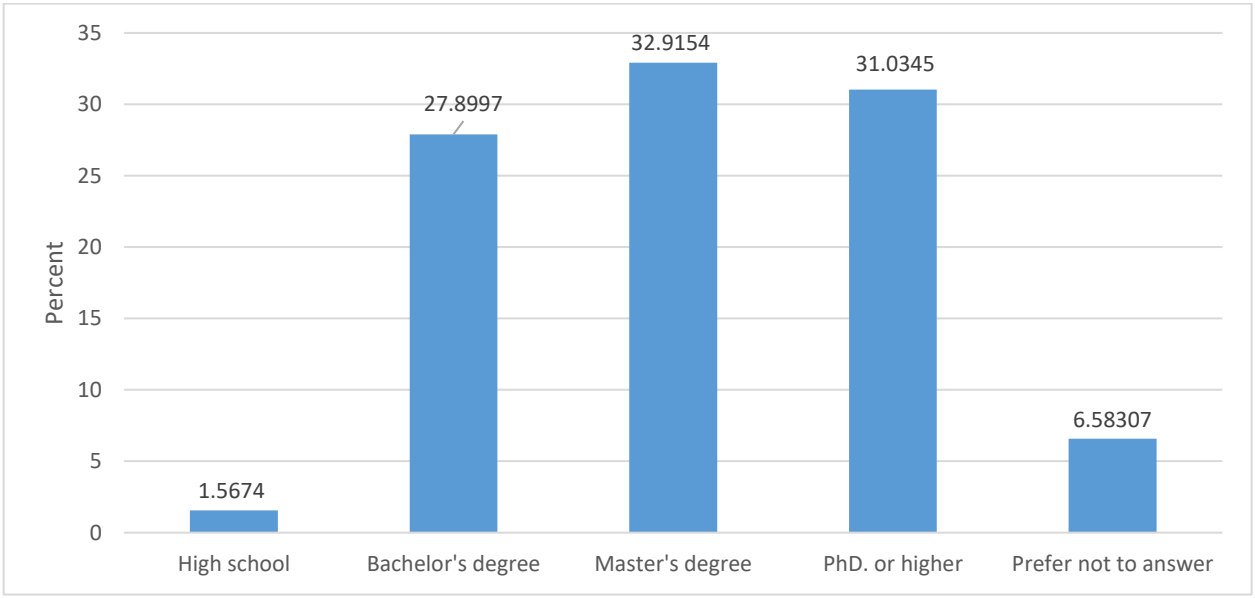
**Table 8.6 ANOVA test between Age and Inequality**

| Source | SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| **Between groups** | .527159379 | 4 | .131789845 | 0.52 | 0.7187 |
| **Within groups** | 79.0903955 | 314 | .25188024 | | |
| **Total** | 79.6175549 | 318 | .250369669 | | |

*(Source: Own processing)*

The F-ratio value is 0.52 with a p-value (Prob > F) of 0.7187 (table 8.6), more significant than the significance threshold of 0.05, showing no significant difference between age groups regarding views on income inequality. The Bartlett test indicates no difference in variance between age groups, supporting the reliability of the results of this ANOVA analysis.

**Figure 8-4 Education level density in the samples**




*(Source: Own processing)*

Figure 8-4 shows the educational level ratio of survey participants, divided into five different groups from group 2 to group 7, specifically:

- Group 2: High school
- Group 3: Bachelor´s degree
- Group 4: Master´s degree
- Group 5: Ph.D. or higher
- Group 6: Trade school
- Group 7: Prefer not to answer

A total of 319 people were in the survey sample. Overall, there was considerable diversity in the educational level of participating individuals, with the highest proportions in groups 4 and 5 (32.92% and 31.03% respectively), followed by group 3 (27.90% respectively). %). The lowest education level group is Group 2 (1.57%), while Group 7 has a rate of 6.58%.

It shows that the survey sample had significant diversity in the educational level of participating individuals, with no group accounting for a significant proportion compared to

other groups. This diversity can help survey results become representative and reflect multiple perspectives and opinions from representatives of many different educational level groups.

**Table 8.7 Viewpoints of income inequality according to education**

| INEQUALITY | No change in inequality | Inequality has been changed | Total |
|---|---|---|---|
| **2** | 4 | 1 | 5 |
| **3** | 40 | 49 | 89 |
| **4** | 52 | 53 | 105 |
| **5** | 46 | 53 | 99 |
| **7** | 11 | 10 | 21 |
| **Total** | 153 | 166 | 319 |

*(Source: Own processing)*

The proportion of survey participants with views on income inequality reflects the diversity of educational levels in the survey sample (table 8.7). Education groups had similar proportions of survey participants, with no group standing out in this regard. It shows that views on income inequality depend not only on education level but also on many other factors such as economic status, personal views, and many other factors. This diversity of perspectives can help survey results become representative and reflect the multidimensionality of perspectives from representatives of many different educational level groups.

**Table 8.8 ANOVA test between Education and Inequality**

| Source | SS | df | MS | F | Prob > F |
|---|---|---|---|---|---|
| **Between groups** | .683106037 | 4 | .170776509 | 0.68 | 0.6067 |
| **Within groups** | 78.9344488 | 314 | .251383595 | | |
| **Total** | 79.6175549 | 318 | .250369669 | | |

*(Source: Own processing)*

The F-ratio value is 0.68 with a p-value (Prob > F) of 0.6067, also more remarkable than the significance threshold, showing no significant differences between education level groups in terms of views on income inequality. The Bartlett test also did not detect differences in variance between educational level groups (table 8.8).

## 8.1 Factors contributing to economic growth according to local people

In this section, after using crosstab to analyse the pair of questions, the author points out some factors that can affect the economic growth of the Northern Midlands and Mountains region from the perspective of local people.

**Table 8.9 Correlation between continuous GDP growth trend and access to clean water (S2.Q1.2* S3.Q5.4)**

| GDP GROWTH TREND | ACCESS TO CLEAN WATER | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| 1 | 0 | 1 | 4 | 0 | 1 | 6 | 1,9% |
| 2 | 0 | 0 | 9 | 6 | 6 | 21 | 6,6% |
| 3 | 0 | 0 | 57 | 33 | 23 | 113 | 35,4% |
| 4 | 1 | 1 | 59 | 40 | 27 | 128 | 40,1% |
| 5 | 1 | 0 | 25 | 18 | 7 | 51 | 16,0% |
| Count | 2 | 2 | 154 | 97 | 64 | 319 | 100,0% |
| % of Total | 0,6% | 0,6% | 48,3% | 30,4% | 20,1% | 100,0% | |
| Pearson Chi-Square = 33,211 (,007) | | | | | | | |

*(Source: Own processing)*

Table 8.9 shows question S2.Q1.2 related to the **continuous growth trend in GDP per capita of the province over the monitoring period**, while question S3.Q5.4 evaluates the contribution of continuing **access to clean water for improving income equality in the province**.

The test results show the Pearson Chi-Square value = 33.211 with a significance level of 0.007 < 0.05, proving a statistically significant correlation between these two observed variables.

This result means that a province's GDP per capita growth trend is related to an assessment of the contribution of clean water access to improving income equality in that province. Access to clean water is an essential basic service that improves people's living conditions and health, especially low-income people. When poor people have better access to clean water, they can reduce medical costs and increase their ability to work, thereby improving their income. Investment in providing clean water also creates jobs and income for a part of the people, contributing to increasing the total GDP of the province. Higher economic growth can enable local governments to invest more in infrastructure and public services such as clean water supply, thereby improving income equality.

This result shows the importance of investing in clean water supply for economic growth and reducing income inequality in Vietnam's Northern Midlands and Mountains provinces.

**Table 8.10 Correlation between the GDP growth and factors on personal income (S2.Q1.1 * S3.Q6.4)**

| GDP GROWTH | FACTORS ON PERSONAL INCOME | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | | 1 | 3 | 5 | 2 | 11 | 3,4% |
| **2** | | 0 | 3 | 2 | 2 | 7 | 2,2% |
| **3** | | 0 | 67 | 35 | 36 | 138 | 43,3% |
| **4** | | 0 | 34 | 27 | 21 | 82 | 25,7% |
| **5** | | 0 | 35 | 26 | 20 | 81 | 25,4% |
| **Count** | | 1 | 142 | 95 | 81 | 319 | 100,0% |
| **% of Total** | | 0,3% | 44,5% | 29,8% | 25,4% | 100,0% | |
| Pearson Chi-Square = 31,977 (,001) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.10 describes the correlation between views on the **province's GDP growth** (S2.Q1.1) and **assessments of the influence of factors on personal income** (S3.Q6.4). Detailed results show that the highest distribution of opinions is at "Somewhat Agree" (44.5%), while the lowest is at "Strongly Disagree" (0.3 %). This situation could positively influence views on GDP growth and how this factor affects personal income. The test results show the Pearson Chi-Square value = 31.977 with a significance level of 0.001 < 0.05, proving a statistically significant correlation between these two observed variables.

During economic growth, if illegal business activities such as smuggling, trade fraud, and tax evasion appear, it will distort information about people's actual income, affecting the accurate assessment of income inequality in society. Illegal business activities can generate high income for a few people, increasing income inequality compared to most people with legitimate income. High economic growth may also create more illegal business opportunities due to local authorities' need for effective control and management.

This result emphasizes the importance of controlling and preventing illegal business activities to ensure fairness and transparency in social income distribution while maintaining healthy and sustainable economic growth.

**Table 8.11 Correlation between the GDP growth and factors on personal income (S2.Q1.1 * S3.Q6.6)**

| GDP GROWTH | LAND OWNERSHIP | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | | 0 | 6 | 4 | 1 | 11 | 3,4% |
| **2** | | 0 | 4 | 3 | 0 | 7 | 2,2% |
| **3** | | 4 | 44 | 65 | 25 | 138 | 43,3% |
| **4** | | 5 | 41 | 23 | 13 | 82 | 25,7% |
| **5** | | 5 | 44 | 20 | 12 | 81 | 25,4% |
| **Count** | | 14 | 139 | 115 | 51 | 319 | 100,0% |
| **% of Total** | | 4,4% | 43,6% | 36,1% | 16,0% | 100,0% | |
| Pearson Chi-Square = 33,211 (,007) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.11 describes the correlation between **views on provincial GDP growth** (S2.Q1.1) and **assessments of the impact of land ownership on personal income** (S3.Q6.6). Detailed results show that the highest distribution of opinions is at "Somewhat Agree" (43.6%), while the lowest is at "Strongly Disagree" (4.4 %). This situation may indicate a remarkable consistency in views on GDP growth and assessments of the impact of land ownership on personal income.

The test results show the Pearson Chi-Square value = 33.211 with a significance level of $0.007 < 0.05$, indicating a statistically significant correlation between these two observed variables.

Land ownership is vital in agricultural production and generating income for people, especially in rural areas. When land ownership rights are guaranteed, people are motivated to invest and produce more effectively, contributing to increasing production value and local GDP. Land becomes a precious asset during urbanization and economic development. Landowners can sell or lease land for large profits, leading to income disparities between those with and without land. High economic growth is often accompanied by increased land prices, creating profitable opportunities for landowners. However, this can also increase income inequality if land ownership is distributed unequally.

Overall, this result emphasizes the importance of managing and properly distributing land ownership to ensure fairness in income distribution while creating motivation for sustainable economic development.

**Table 8.12 Correlation between the GDP growth trend and doing business (S2.Q1.2 * S3.Q6.2)**

| GDP GROWTH TREND | DOING BUSINESS | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 0 | 0 | 1 | 2 | 3 | 6 | 1,9% |
| **2** | 1 | 1 | 5 | 11 | 3 | 21 | 6,6% |
| **3** | 0 | 7 | 32 | 58 | 16 | 113 | 35,4% |
| **4** | 0 | 9 | 27 | 57 | 35 | 128 | 40,1% |
| **5** | 0 | 1 | 16 | 20 | 14 | 51 | 16,0% |
| **Count** | 1 | 18 | 81 | 148 | 71 | 319 | 100,0% |
| **% of Total** | 1 | 18 | 81 | 148 | 71 | 319 | |
| Pearson Chi-Square = 28,261 (,029) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.12 shows the correlation between views on **innovation in provincial development** (S2.Q1.2) and the assessment of the **impact of the factor "Good at doing business" on people's income** (S3.Q6 .2). Detailed results show the distribution across rating levels from 1 to 5, along with the corresponding percentages. The "Somewhat Agree" level has the highest rate at 40.1%, followed by "Agree" with 35.4%. In contrast, the "Strongly Disagree" level accounts for only 1.9%.

Table 8.12 records 319 responses, and the chi-square value is 28.261 with a p-value of 0.029, showing a correlation between views on innovation and assessments of the "Good at business" factor is statistically significant.

In economic growth, people's business ability and entrepreneurial spirit are essential in creating value and income. People who are good at business can seize opportunities and create and develop businesses, promoting local GDP growth. Strong economic growth often creates more business opportunities, attracts investment, and stimulates people's entrepreneurial spirit. This can lead to an increase in income for those with good business abilities. However, the ability to do business successfully also depends on many other factors, such as investment

capital, education level, experience, and relationships. If people have more favorable business conditions, it can lead to income inequality in society.

Overall, this result emphasizes the importance of promoting entrepreneurship in society while creating a favorable environment and conditions for everyone to have the opportunity to develop their business, contributing to economic growth and reducing income inequality.

**Table 8.13 Correlation between GDP growth trend and Working in the public sector (S2.Q1.2 * S3.Q6.3)**

| GDP GROWTH TREND | WORKING IN THE PUBLIC SECTOR | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 0 | 1 | 2 | 0 | 3 | 6 | 1,9% |
| **2** | 0 | 0 | 3 | 6 | 12 | 21 | 6,6% |
| **3** | 2 | 0 | 29 | 19 | 63 | 113 | 35,4% |
| **4** | 1 | 1 | 19 | 35 | 72 | 128 | 40,1% |
| **5** | 1 | 2 | 9 | 8 | 31 | 51 | 16,0% |
| **Count** | 4 | 4 | 62 | 68 | 181 | 319 | 100,0% |
| **% of Total** | 1,3% | 1,3% | 19,4% | 21,3% | 56,7% | 100,0% | |
| Pearson Chi-Square = 27,822 (,033) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.13 shows Question S2.Q1.2 regarding the **continuous growth trend in GDP per capita of the province over the monitoring period**. Question S3.Q6.3 evaluates the **impact of the factor "working as a civil servant" on people's income**. The "Somewhat Agree" level has the highest rate of 40.1%, followed by "Agree" with 35.4%. The "Strongly Disagree" level accounts for 1.3%, the lowest rate among the ratings. The test results show the Pearson Chi-Square value = 27.822 with a significance level of 0.033 < 0.05, proving a statistically significant correlation between these two observed variables.

During economic growth, the need for human resources in the public sector increases to serve management, administrative activities, and provision of public services. Therefore, the proportion of civil servants in society also tends to increase. Jobs in the public sector often bring stable income and certain welfare benefits, which can increase the income of the people working in the public sector compared to other groups. However, if the ratio of civil servants is too high compared to actual needs or if there is discrimination in recruitment, it will lead to income inequality between the public and private sectors and between different population groups.

Overall, this result emphasizes the importance of managing and properly distributing human resources in the public sector to ensure income distribution fairness while meeting economic development and public service needs.

## 8.2 Factors contributing to income inequality according to local people

Along with the method as in section 8.1, the author also found several factors that local people believe affect income inequality in the study area.

**Table 8.14 Correlation between GDP growth trend and the spending on education and health care of the poorest group (S2.Q1.2* S3.Q1.9)**

| GDP GROWTH TREND | SPENDING ON EDUCATION AND HEALTH CARE | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 1 | 0 | 2 | 0 | 3 | 6 | 1,9% |
| **2** | 2 | 0 | 13 | 2 | 4 | 21 | 6,6% |
| **3** | 5 | 5 | 32 | 34 | 37 | 113 | 35,4% |
| **4** | 0 | 4 | 41 | 48 | 35 | 128 | 40,1% |
| **5** | 0 | 4 | 14 | 13 | 20 | 51 | 16,0% |
| **Count** | 8 | 13 | 102 | 97 | 99 | 319 | 100,0% |
| **% of Total** | 2,5% | 4,1% | 32,0% | 30,4% | 31,0% | 100,0% | |
| Pearson Chi-Square = 35,742 (,003) | | | | | | | |

*(Source: Own processing based on SPSS)*

Based on the crosstab table (table 8.14) between question S2.Q1.2 (**There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period**) and question S3.Q1.9 (**The poorest group has had much lower spending on education and health care than the rich**) we can see that the Pearson Chi-Square value = 35.742 with $p = 0.003 < 0.05$ proves a statistically significant correlation between the two variables.

The group that strongly disagrees that GDP has increased continuously (S2.Q1.2 = 1) accounts for 1.9% of the sample (6 people), of which 50% strongly agree that there is a gap in spending between rich and poor. (S3.Q1.9 = 5). It shows strong skepticism towards the information. The group that disagrees with GDP increasing (S2.Q1.2 = 2) has 21 people, accounting for 6.6%. The number of people agreeing with the gap in spending between rich and poor in this group is not much. The group neutral to GDP (S2.Q1.2 = 3) has the most significant number of 113 people (35.4%), 32.7% (37 people) of which agree with the spending gap. It

shows that this group does not have a clear assessment of the two issues. The group that entirely agrees with increased GDP has a high percentage of people agreeing on income and expenditure inequality, with 20 people accounting for 39.2%.

High economic growth often comes with improvements in people's lives and income. However, if growth is not coupled with equitable income distribution, the gap between rich and poor will increase. Wealthy groups can spend more on education and health care, while poor groups may have difficulty accessing these services due to income limitations. The difference in the ability to pay for education and healthcare between rich and poor can lead to unequal human resource development and health opportunities, increasing the vicious cycle of poverty. The results of the above table analysis accurately reflect the reality that income inequality is increasing in Vietnam in the context of rapid economic growth. According to a 2018 survey by the Institute of Labor Sciences and Social Affairs, the population with the highest income in Vietnam spends 33.7% on children's education, ten times more than the group with the lowest income (3.3%). Inequality is clearly shown in the Gini coefficient on income, which increased from 35.7% in 1992 to 41.3% in 2018. Thus, the study shows that the more people agree with economic growth information, the more there is a tendency to see the reality of inequality more clearly. It is similar to what is happening in Vietnam.

**Table 8.15 Correlation between the access to primary school and the income source from Farming or Fishing (S2.Q1.5 * S3.Q3.2)**

| ACCESS TO PRIMARY SCHOOL | INCOME SOURCE – FARMING/ FISHING | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 1 | 0 | 2 | 4 | 3 | 10 | 3,1% |
| **2** | 0 | 4 | 9 | 12 | 7 | 32 | 10,0% |
| **3** | 0 | 2 | 37 | 50 | 32 | 121 | 37,9% |
| **4** | 0 | 6 | 30 | 35 | 25 | 96 | 30,1% |
| **5** | 0 | 2 | 20 | 23 | 15 | 60 | 18,8% |
| **Count** | 1 | 14 | 98 | 124 | 82 | 319 | 100,0% |
| **% of Total** | 0,3% | 4,4% | 30,7% | 38,9% | 25,7% | 100,0% | |
| Pearson Chi-Square = 40,347 (,001) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.15 shows the relationship between two variables: "**All the pupils attend primary school**" (S2.Q1.5) and "**Income of the poorest group of people during the monitored period**

**- Farming/fishing**" (S3.Q3.2), we see that Pearson Chi-Square value: 40.347 with p = 0.001 < 0.05. It shows that there is a statistically significant correlation between the two variables.

The group that strongly disagreed that all students attended primary school (S2.Q1.5 = 1) accounted for 10 (3.1% of the total sample), of whom three strongly agreed that agriculture /Fishing was a source of income for people with low incomes during the monitoring period. Group disagrees that all children do not go to school regularly (S2.Q1.5 = 2): Accounts for 10% (32 people), 12 of whom strongly agree that agriculture/fishing is a source of income for poor groups during the monitoring period. The neutral group regarding all children attending school (S2.Q1.5 = 3) is the largest, accounting for 37.9% (121 people). In this group, 50 people agreed that agriculture/fishing was a source of income for low-income people during the monitoring period. The group agrees with all children attending school (S2.Q1.5 = 4), accounting for 30.1% (96 people). Of these, only six respondents disagreed that agriculture/fishing was a source of income for low-income people during the monitoring period. The group that strongly agrees with all children attending primary school (S2.Q1.5 = 5) accounts for 18.8% (60 people) of the total sample. In this group, two people disagreed that agriculture/fishing was a source of income for low-income people during the monitoring period.

In many rural areas, especially Midland and Mountainous areas, agriculture and fishery are still the primary sources of income for poor people. Low education levels and lack of skills to find non-agricultural jobs are the leading causes of this situation. The high rate of students participating in primary education reflects the level of universal basic education in the locality. It can improve the education and skills levels of the young generation, creating opportunities to escape poverty and diversify income sources in the future. However, it should be noted that primary education is only the first step; continuing to higher levels of education is also essential to expand employment opportunities and increase income.

**Table 8.16 Correlation between access to primary school and the increasing income inequality (S2.Q1.5 * S3.Q1.10)**

| ACCESS TO PRIMARY SCHOOL | INCREASING INCOME INEQUALITY | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 2 | 0 | 5 | 2 | 1 | 10 | 3,1% |
| **2** | 0 | 1 | 15 | 6 | 10 | 32 | 10% |
| **3** | 7 | 10 | 39 | 44 | 21 | 121 | 38% |
| **4** | 2 | 1 | 32 | 31 | 30 | 96 | 30,1% |
| **5** | 3 | 2 | 22 | 17 | 16 | 60 | 18,8% |
| **Count** | 14 | 14 | 113 | 100 | 78 | 319 | 100% |
| **% of Total** | 2,5% | 4,1% | 32,0% | 30,4% | 31,0% | 100,0% | |
| Pearson Chi-Square = 27,375 (,038) | | | | | | | |

*(Source: Own processing based on SPSS)*

This research result is consistent with previous studies on the correlation between education and poverty. For example, a 2022 World Bank study found that education is one of the most critical factors in reducing poverty. This study also shows that each additional year of schooling can reduce the risk of falling into poverty by 10%.

Based on the crosstab table (table 8.16) between question S2.Q1.5 (**Every child has access to primary school**) and question S3.Q1.10 (**There is increasing income inequality among ethnic groups in my province**), we see that Pearson Chi-Square value: 27.375 with $p = 0.038 < 0.05$. It shows that there is a statistically significant correlation between the two variables. The group that strongly agrees with all children attending primary school (S2.Q1.5 = 5) accounts for 18.8% (60 people) of the total sample. In this group, three people strongly disagree that there is an increase in income inequality between ethnic groups (S3.Q1.10 = 1).

The group agrees with all children going to school (S2.Q1.5 = 4): It accounts for 30.1% (96 people), of which only one person disagrees with the increase in income inequality between ethnic groups. The neutral group towards all children attending school (S2.Q1.5 = 3): This is the largest, accounting for 38% (121 people). In this group, 44 people agree with increased income inequality between ethnic groups. Group disagrees with all children not attending school regularly (S2.Q1.5 = 2): Accounts for 10% (32 people), 10 of whom agree with increased income inequality between peoples. The group that strongly disagrees that all children do not

attend school (S2.Q1.5 = 1) accounts for 3.1% (10 people). In this group, only one person entirely agrees with the increase in income inequality between ethnic groups.

To explain the correlation in the table, we can consider the following aspects of the correlation between education and income inequality between ethnic groups. Elementary education, such as primary school, helps equip children of different ethnicities with knowledge and skills, creating a foundation for equal employment opportunities and increasing future income. When ethnic minority children have access to better education, they will be able to rise out of poverty and low income, reducing the gap in living standards compared to other ethnic groups. However, access to education also depends on many other factors, such as economic conditions, culture, and social prejudices. Therefore, there needs to be appropriate policies and measures to encourage and support ethnic minority children to go to school.

This table shows a statistically significant correlation between education awareness and income inequality. The more people agree that all children should go to primary school, the more likely they are to perceive income inequality. This reflects the fact that income inequality is increasing in Vietnam, especially between ethnic groups.

**Table 8.17 Correlation between GDP growth and the income source from Farming or Fishing (S2.Q2 * S3.Q3.2)**

| GDP GROWTH | INCOME SOURCE – FARMING/ FISHING | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 0 | 0 | 2 | 0 | 0 | 2 | 0,6% |
| **2** | 1 | 0 | 1 | 1 | 0 | 3 | 0,9% |
| **3** | 0 | 11 | 75 | 102 | 71 | 259 | 81,2% |
| **4** | 0 | 2 | 15 | 11 | 8 | 36 | 11,3% |
| **5** | 0 | 1 | 5 | 10 | 3 | 19 | 6,0% |
| **Count** | 1 | 14 | 98 | 124 | 82 | 319 | 100,0% |
| **% of Total** | 0,3% | 4,4% | 30,7% | 38,9% | 25,7% | 100,0% | |
| Pearson Chi-Square = 46,777 (,000) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.17 describes the correlation between **views on the province's GDP growth** (S2.Q2) and the **primary income sources of the poorest group** during the monitoring period (S3.Q3.2), with the distribution Details from level 1 to level 5.

In total, 319 cases were evaluated, with the majority (38.9%) rating the GDP growth situation at level 4 and 30.7% rating it at level 3. Meanwhile, the poorest group's primary income is farming and fishing (S3.Q3.2). Chi-square analysis with a value of 46.777 and a p-value of 0.000 show that the correlation between views on GDP growth and income from agricultural occupations of the poor group is statistically significant.

In many localities, especially rural areas, agriculture and fishery are still the primary sources of income for the poorest population groups. Therefore, when the economy grows, it is necessary to focus on developing the agricultural sector so that people experiencing poverty can benefit. Investing in agriculture, applying science and technology, and improving productivity and production value will help increase income for agricultural people, thereby contributing to poverty reduction and narrowing the income gap. However, agricultural development alone is not enough; other policies and solutions are needed, such as diversifying livelihoods, creating non-agricultural jobs, and improving rural infrastructure so that low-income people can escape poverty sustainably.

These correlations demonstrate the importance of investing in education and agricultural sector development in reducing income inequality and ensuring equitable, inclusive economic growth.

**Table 8.18. Correlation between GDP growth and the income source from Construction (S2.Q2 * S3.Q3.4)**

| GDP GROWTH | INCOME SOURCE - CONSTRUCTION | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 0 | 1 | 0 | 1 | 0 | 2 | 0,6% |
| **2** | 0 | 0 | 2 | 0 | 1 | 3 | 0,9% |
| **3** | 1 | 2 | 95 | 99 | 62 | 259 | 81,2% |
| **4** | 0 | 0 | 14 | 11 | 11 | 36 | 11,3% |
| **5** | 0 | 2 | 6 | 8 | 3 | 19 | 6,0% |
| **Count** | 1 | 5 | 117 | 119 | 77 | 319 | 100,0% |
| **% of Total** | 0,3% | 1,6% | 36,7% | 37,3% | 24,1% | 100,0% | |
| Pearson Chi-Square = 30,226 (,017) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.18 describes the correlation between views on the **province's GDP growth** (S2.Q2) and the **primary income sources of the poorest group** during the monitoring period (S3.Q3.4), with the distribution details from level 1 to level 5.

Detailed results show that the highest distribution of opinions is at "Somewhat Agree" (37.3%), while the lowest is at "Strongly Agree" (0.3%). ). The chi-square value (30,226) and p-value (0.017) show that this correlation is statistically significant and shows the connection between views on GDP growth and the primary source of income from construction in the poor group. This linkage provides essential information about community views on economic growth and its effects on specific populations.

Construction and retail are often economic sectors that require unskilled labor with few skills and high qualifications. Therefore, these are popular career choices for workers in the low-income group. As the economy grows, demand for housing, infrastructure, and consumer goods will increase, stimulating construction and retail activities to develop and create more jobs for unskilled workers. Poor people often need more opportunities to access high-quality education for more specialized jobs, so construction and retail have become popular choices.

**Table 8.19 Correlation between GDP growth and the income source from Retail (S2.Q2 * S3.Q3.6)**

| GDP GROWTH | INCOME SOURCE - RETAIL | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 1 | 0 | 1 | 0 | 0 | 2 | 0,6% |
| **2** | 0 | 0 | 2 | 0 | 1 | 3 | 0,9% |
| **3** | 7 | 5 | 123 | 106 | 18 | 259 | 81,2% |
| **4** | 1 | 2 | 14 | 12 | 7 | 36 | 11,3% |
| **5** | 0 | 0 | 10 | 7 | 2 | 19 | 6,0% |
| **Count** | 9 | 7 | 150 | 125 | 28 | 319 | 100,0% |
| **% of Total** | 2,8% | 2,2% | 47,0% | 39,2% | 8,8% | 100,0% | |
| Pearson Chi-Square = 30,226 (,017) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.19 shows the correlation between views on the **province's GDP growth** (S2.C2) and the **income sources of the poorest group in the community** (S3.C3.6), **with the main characteristic being retail (Retail).**

In total, there are 319 cases evaluated, of which 47.0% are at level 3 and 39.2% are at level 4 in terms of GDP growth situation. The retail industry is the primary source of income for the poorest group in the community, with 81.2% of the situation rated at levels 3 and 4. Chi-square analysis shows the value is 30.226 and the p-value is 0.017, indicating that the correlation between views on GDP growth and income from the retail industry for the poorest group is statistically significant. This correlation shows that economic growth can bring employment and income opportunities to poor populations through industries such as construction and retail. However, for the poor to truly escape poverty sustainably, there needs to be measures and policies to support them in accessing higher quality education and skills training to do more specialized jobs and gain higher income. In addition, it is necessary to have policies to redistribute income, creating conditions for low-income people to access essential social services to improve their quality of life.

In sum, these results highlight the importance of economic growth in creating jobs and income for people experiencing poverty but also indicate that additional measures are needed to help the poor rise and decrease the income gap in society.

**Table 8.20 Correlation between GDP growth and the income source from Public sector (S2.Q2 * S3.Q3.9)**

| GDP GROWTH | INCOME SOURCE – PUBLIC SECTOR | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 0 | 0 | 0 | 2 | 0 | 2 | 0,6% |
| **2** | 0 | 0 | 2 | 1 | 0 | 3 | 0,9% |
| **3** | 4 | 13 | 120 | 117 | 5 | 259 | 81,2% |
| **4** | 4 | 0 | 11 | 18 | 3 | 36 | 11,3% |
| **5** | 0 | 2 | 10 | 7 | 0 | 19 | 6,0% |
| **Count** | 8 | 15 | 143 | 145 | 8 | 319 | 100,0% |
| **% of Total** | 2,5% | 4,7% | 44,8% | 45,5% | 2,5% | 100,0% | |
| Pearson Chi-Square = 26,482 (,048) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.20 shows the correlation between views on the **province's GDP growth** (S2.Q2) and the **income sources of the poorest group in the community** (S3.Q3.9), **with the main characteristic being the industry Public sector.**

In total, there are 319 cases evaluated, of which 45.5% are at level 4 and 44.8% are at level 3 in terms of GDP growth. The primary source of income for the poorest group in the community is from the public sector, with 81.2% of the situation rated at levels 3 and 4. Chi-square analysis shows that The value is 26.482 and the p-value is 0.048, indicating that the correlation between views on GDP growth and income from public work for the poorest group is statistically significant.

This correlation may be due to the impact of economic growth on employment in the state/public sector. As the economy develops, the need for human resources in the public sector also increases, which can open up job opportunities for people with low incomes, but these are just a few exceptions.

This result shows a link between economic growth and employment/income opportunities for people experiencing poverty. However, the public sector is only one of the sources of income for this population according to general assessment.

**Table 8.21 Correlation between GDP growth and the income source from Extraction of raw materials (S2.Q2 * S3.Q4.1)**

| GDP GROWTH | INCOME SOURCE – EXTRACTION OF RAW MATERIALS | | | | | COUNT | % OF TOTAL |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| **1** | 1 | 0 | 0 | 1 | 0 | 2 | 0,6% |
| **2** | 0 | 0 | 0 | 2 | 1 | 3 | 0,9% |
| **3** | 1 | 21 | 120 | 85 | 32 | 259 | 81,2% |
| **4** | 1 | 21 | 120 | 85 | 32 | 259 | 11,3% |
| **5** | 1 | 2 | 8 | 6 | 2 | 19 | 6,0% |
| **Count** | 3 | 27 | 145 | 105 | 39 | 319 | 100,0% |
| **% of Total** | 0,9% | 8,5% | 45,5% | 32,9% | 12,2% | 100,0% | |
| Pearson Chi-Square = 62,128 (,000) | | | | | | | |

*(Source: Own processing based on SPSS)*

Table 8.21 shows based on the correlation table between question S2.Q2, "Overall, **based on your experience, how do you evaluate the GDP growth in your province**," and S3.Q4.1, "**Sources of revenue of the richest group of people in recent years has been raw material exploitation**".

Pearson Chi-Square value = 62.128 with a significance level of 0.000 shows a statistically significant correlation between these two variables. Most of those who assess provincial GDP growth at an average level (point 3) believe that the source of income for the wealthiest group is not raw material exploitation (accounting for 45.5% of the total observations). Those who assess provincial GDP growth at a high level (scores 4 and 5) also often believe that the source of income for the wealthiest group is not raw material exploitation (accounting for 44.2% of the total observations).

From this result, for provinces with good GDP growth, the income source of the rich group often does not come from raw material exploitation. However, it can come from other industries, such as manufacturing, construction, and service. It is consistent with the general trend of developed economies when the economic structure gradually shifts from raw material exploitation to economic sectors with higher added value.

In summary, the analysis results show that in provinces with good economic growth, the primary source of income for the rich group does not come from exploiting raw material resources but from other complex and higher productivity.

Thus, from the results of the above analysis, we can see several factors affecting the region's income inequality problem. Growth is not accompanied by fair income distribution; the gap between rich and poor will increase. Wealthy groups spend more on education and health care, while poor groups may have difficulty accessing these services due to income limitations. Low education levels and lack of skills for non-agricultural jobs are among the leading causes of income inequality. The high rate of students participating in primary education reflects the level of universal basic education in the locality. It can improve the education and skills levels of the young generation, creating opportunities to escape poverty and diversify income sources in the future. However, it should be noted that primary education is only the first step; continuing to higher levels of education is also essential to expand employment opportunities and increase income.

In the Northern Midlands and Mountainous areas, agriculture and fishing are still the primary sources of income for poor people. In addition, construction and retail are also industries that

attract the region's workforce because these are economic industries that do not require workers to have too many skills and high qualifications. In addition, as the economy develops, the demand for human resources in the public sector also increases, which can open up job opportunities for people with low incomes, but these are just a few exceptions. The wealthy group's primary income does not come from exploiting natural resources and raw materials but from other more complex and productive economic sectors such as business or trade.

# 9 Discussion and Limitations

## 9.1 Official Development Assistance, Economic Growth and Income Inequality in Vietnam

From the results of running analysis and performing tests in the previous two parts, the author would like to summarize the findings of specific research as follows:

The variables in the model are performed descriptive statistics, and the stationarity test with the result is that the variables income inequality, total income per capita, unemployment rate, and official development assistance are stationary variables at their first difference. Next, the cointegration test shows that the model is not co-coherent, so the author chooses the VAR model for regression and analysis in the following sections. To select the optimal delay, it found that lags 1 and 3 are optimal for the model, so these two lags are used to regress the VAR model.

The results of the VAR model are summarized as follows:

- The logGINI variable and the logGDP variable have a significant influence on each other.
- The logUNEMPLOY variable has a significant effect on the logGDP variable.
- On the contrary, the logODA variable has no significant impact on any other variables in the model.

Next, the author uses tests as the results from the Varstable table show that the VAR model does not satisfy the stability condition, which means that at least one eigenvalue of the VAR matrix is greater than or equal to 1. This indicates that the VAR model is unstable, and its results

may not be reliable. In the Varlmar table, Lagrange Multiplier (LM) tests are performed to check the existence of autocorrelation at different lag levels. The results show insufficient evidence to reject the hypothesis that autocorrelation does not exist at lag levels. These steps are intended to ensure the reliability and validity of the VAR model and provide insightful information about real-world macroeconomic relationships. It contributes to improving the quality and applicability of research results.

After checking the defects to ensure the certainty of the model, the author conducts a causal relationship test between all model variables. The results of Granger causality Wald tests show the following causal relationship:

- The variable logGINI has a causal relationship with the variables logGDP and logUNEMPLOY.
- The logGDP variable is causal to the logGINI, logUNEMPLOY, and logODA variables.
- The logUNEMPLOY variable has a causal relationship with the logODA variable.
- The loggODAvariable has no causal relationship to the other variables.

Finally, the author plots the impulse response over the next five years to see the reaction of shocks from GDP growth, Unemployment rate, and foreign funding to GINI and vice versa.

The results show that logGINI increases by one unit, logGDP also increases by some units in the initial period and gradually decreases. This relationship reflects the opposite correlation between income inequality and total income per capita, similar to that found in Risso et al. (2013) both show a positive relationship between income inequality and gross income per capita in the first three years of the forecast and a negative from year four onwards. This indicates that income inequality in Vietnam increases as GDP per capita increases, mainly among the middle class, which is affected by the poor distribution of wealth in Vietnam as a developing country than in developed countries. Therefore, it is necessary to have more solutions to change in the National Assembly of Vietnam sessions about the wealth disparity among people to help the country grow more robust in the future.

Next, when logGINI increases by one unit, logUNEMPLOY increases in the initial period and then gradually decreases. This result is similar to the research of (Deyshappriya 2017, Pal et al. (2022) and Zandi et al., 2022). This relationship shows the opposite correlation between income inequality and the unemployment rate. High-income inequality can create an unfair economic system that makes the rich richer and the poor poorer, thereby creating pressure and insufficient employment opportunities for lower-class populations. An increase in the unemployment rate can indicate imbalances and instability in the economy and increase inequality.

The relationship between logODA and the remaining variables is significant, reflecting the positive correlation between ODA inflows and the variables logGINI, logGDP, and logUNEMPLOY. The research of Deyshappriya (2017), and Pal et al.(2022) have the same finding Receiving official development aid can help improve income distribution and reduce societal inequality. ODA can invest in education, health care, infrastructure, and economic development programs, thereby helping create more equitable economic opportunities and benefits for all population segments.

## 9.2 Income inequality, Economic Growth, and Fiscal policy in the Northern Midlands and Mountainous region in Vietnam

The study shows that income and expenditure inequality negatively impacts economic growth in Vietnam's Northern Midlands and Mountains region. It means that if inequality increases, the region's economic growth will tend to decrease, and this impact is very significant on the GDP of the provinces in the sample. This result is consistent with the region's conditions. The income disparity in the Northern Midlands and Mountains must be more vital to have many rich people with high accumulation of savings and assets, creating many enterprises, job opportunities, and immense production value to promote economic growth. Besides, the Government of Vietnam is paying much attention to the region, so the implementation of social security policies also partly limits the impact of income inequality on the economic growth of the Northern Midlands and Mountains areas.

Currently, Vietnam also has much research on economic growth and income inequality. Hoang (2015) and Le & Nguyen (2019) are influential articles in the field of research. Compared with the above studies, the author's study has similar methods and models; however, this study is researched in a different area where an investigation has yet to be done in Vietnam. The author also assesses the impact of income and expenditure inequality on economic growth through factors such as poverty rate, education, labor, and urbanization level. The study results are quite similar to those of the previous studies, which aim to determine the linear relationship between income inequality, spending, and economic growth. Accordingly, other factors such as labor force, poverty rate, and education all impact economic growth, in which urbanization and education significantly impact economic growth. The factor rate of poor households that negatively affects economic growth is sure to happen when there are too many poor households in the Northern Midland and Mountainous areas. **The difference between the above studies is that the author found an inverted U-shaped relationship between income inequality and income per capita growth rate, which no studies have proven in Vietnam yet**. In addition, it is the first study to fully and effectively exploit and use the population living standard data set (VHLSS) issued by the General Statistics Office in the survey on income and expenditure of households to apply use in research.

On the other hand, the research papers of Nguyen (2019), Le (2019), and Hoang (2015) are all built on the national level, while this research is built on the regional level – this is relatively new in Vietnam.

In the results of this study, the author provides clear evidence that health expenditure, pensions, and income taxes will all increase inequality in household income. These results are similar to those of (Dang, 2019; Muinelo-Gallo & Roca-Sagalés, 2014) while social security reduces inequality in household income. Working to correct for defects and remove outliers allows for a more precise determination of the effects of fiscal policy on income distribution.

The results from the proxy variables for fiscal policy demonstrate that the middle and poor classes are affected by fiscal policy. At the same time, the rich will be the beneficiaries. This outcome is generated through health spending (which exacerbates inequality from the middle

and poor classes) and social security spending in pensions (increasing pension systems will reduce lower-class participation). The results show that household investment will reduce inequality and improve the income ratio of the poor and middle classes while reducing the participation of the rich. Similar findings were reached by (Muinelo-Gallo & Roca-Sagalés, 2014).

A relatively high investment rate of 1.9% and social security of 2.2% will create a stimulating effect to reduce the pressure from fiscal policies such as taxes, pensions, and spending because the percentage impact is relatively low. Finally, increasing the education level of households will help reduce income inequality in the future because the opportunities that education offers are tremendous compared to households with a low level of education. This result also supports the findings on education level and income inequality in Vietnam with some authors such as (Nguyen, 2016; Tran et al., 2021)

Implementing fiscal policies by the Vietnam Government focusing on increasing public investment and focusing on more equitable income distribution is contributing to limiting the impact of income inequality on the economic growth of the Northern Midlands and Mountains. In the future, the Vietnamese government may focus more on changing not only the tax structure and pension control but also household health spending behaviour while improving the control of tax evasion, encouraging households' investment with preferential loan packages, or increasing the implementation of social security and study promotion activities in remote areas, especially when the sample of the study is in the Northern Midlands and Mountains.

## 9.3 Income Inequality and Economic Growth in the Northern Midlands and Mountains from the Regional Perspectives

**The relationship between perceptions of economic growth and assessments of spending inequality**

The analysis results show a correlation between awareness of the province's continuous GDP per capita growth trend (S2.Q1.2) and assessment of the gap in spending on education and health between the poor and the rich (S3.Q1.9). Specifically, those who perceive a higher trend of

continuous GDP per capita growth tend to think that the consumption level of the poor group is much lower than that of the rich regarding education and health. This result is consistent with the reality in Vietnam during accelerated economic growth, but increasing inequality still exists, especially in spending on vital social services. According to research by the International Labor Organisation (ILO, 2018), the highest income group in Vietnam spends 33.7% on children's education, ten times more than the lowest income group (3.3 %). Therefore, this correlation accurately reflects the current situation and is a warning signal that it is necessary to have policies to address the problem of inequality and ensure social justice. The relationship between educational development and manifestations of income inequality

Research results also show a correlation between views on educational development, specifically that all children attend primary school (S2.Q1.5) and assessments of income inequality between ethnic groups (S3.Q1.10). The more people agree that all children should attend primary school, the more they tend to perceive the reality of increasing income inequality among ethnic groups in the province. This result is consistent with studies such as the General Statistics Office (2022) and the World Bank (2018) that have shown that education is one of the critical factors in reducing poverty and inequality. Thus, improving access to education will contribute to solving the problem of income inequality between ethnic groups. Besides, this correlation also shows that people with a higher awareness of the role of education will also be more sensitive in detecting income inequality. The relationship between macroeconomic awareness and income sources of social groups

There is a correlation between the assessment of the province's GDP growth (S2.Q2) and the primary income sources of the poorest and wealthiest groups in the community in the monitored period. Specifically, people with a positive assessment of local GDP growth are more likely to agree that the primary source of income for people with low incomes is farming and fishing (S3.Q3.2). At the same time, the income of the wealth comes from the exploitation of resources (S3.Q4.1). It reflects the reality of urbanization and industrialization in many localities with high growth rates. The poor still rely heavily on agriculture and handicrafts, while the rich can benefit more from exploiting expanding natural resources.

**The relationship between macroeconomic awareness and assessment of factors affecting personal income**

The survey results also show that the views on GDP growth are closely related to assessing factors affecting personal income, such as business skills and land ownership, professional qualifications, and working in diplomacy/international affairs. Specifically, people tend to agree more about the importance of these factors for income when they have a more positive opinion about the province's GDP growth. It is consistent with the study on the wealth effect by Surroca et al. (2010), who have shown that when people feel the general prosperity of the economy, they also tend to consider more important than the factors that bring individual success.

Therefore, maintaining healthy economic growth also indirectly impacts people's income through changing awareness. However, we also need to be careful to avoid only pursuing personal success and ignoring social justice.

**The relationship between assessing economic growth drivers and income sources of social groups**

The results of the analysis show that there is a correlation between the assessment of the role of human resources, resources, and technology factors in the province's economic growth (S2.Q3) and the perception of the primary source of income for the poorest group (S3.Q3).

When people are better aware of the contribution of growth drivers, they will have a deeper insight into the structure and income sources of disadvantaged groups such as people experiencing poverty. Studies by the International Labor Organisation (2019) and the World Bank (2012) also point out the connection between macroeconomic dynamics (such as economic growth) and the income of the poor and disadvantaged groups. Therefore, an increased understanding of economic drivers will help determine more effective and equitable policies.

Next, technological change and innovation positively impact the province's economic development but can also lead to increased income inequality. In addition to high-quality human

resources, it positively impacts the province's economic development and reduces income inequality.

Transport infrastructure positively impacts the income of poor groups, primarily through the construction industry. The level of investment in the province can affect the income of poor groups through income sources such as education and health care. Finally, economic growth must be sustainable and inclusive, ensuring equal income distribution among population groups.

**The relationship between economic groups in economic development**

The analysis results show that people tend to appreciate the contributions of economic sectors and policies that positively impact issues related to income, income equality, and public services. Specifically, people tend to appreciate the contributions of economic sectors that directly impact their income, have good service quality, and positively impact income inequality. It can help them improve their business ability and can help them get lucky.

The economic sectors that have a direct impact on people's income include sectors such as agriculture, construction, retail, and public services. These industries can create jobs and income for people, especially those in rural and mountainous areas. The World Bank's 2022 study also shows that economic sectors positively impact income, including agriculture, industry, and services.

The economic sector with good service quality includes public industry, education, and healthcare. According to research by the International Labor Organisation in 2021, economic sectors that positively impact income inequality include education and health care. These industries can improve workers' education and health levels, giving them more opportunities to increase their income and reduce income inequality.

Overall, the correlation analysis results provide essential messages about the connection between people's awareness and opinions about the macroeconomic situation and social issues such as income inequality and division between rich and poor. These are the key points that

determine the effectiveness of policies. A sustainable development strategy must be based on profoundly understanding community awareness and the specific socio-economic context.

## 9.4 Limitations of the study

Although there are breakthroughs and new points in the research field, the dissertation still has limitations:

Studies on the impact of growth on income inequality within the Northern Midlands and Mountains region, between provinces with socioeconomic differences within the scope of the study, find it challenging to analyze each province's unique characteristics.

Another limitation of the research is verifying the accuracy of the absolute value of the effect of the dependent variables extracted from the dataset (including G_INC, G_EXP, and EDU) on growth in the regression function because the VHLSS data are not representative of the province. However, this is unavoidable due to this study's characteristics and sampling method. Therefore, the research only focuses on understanding the impact direction and comparing income and expenditure inequality in the relationship with economic growth. However, the level of impact of income inequality variables in the model needs to be analyzed.

The interview method mainly used closed questions; the investigation was relatively narrow, the survey sample was relatively small (319 observations), and the primary research method used descriptive statistics and simple regression. The research has yet to determine the necessary Gini threshold in Vietnam's Northern Midlands and Mountains.

# 10 Proposing policies to address the relationship between income inequality and economic growth

The process of industrialization and urbanization has led to growth and has created many new pressing social problems related to inequality: jobless farmers in areas changing the purpose of using agricultural land; labour migration from rural to urban areas to find work (social issues of migrant workers); jobless due to the global economic recession, integration, most of them are low-skilled workers and from rural areas (Benjamin et al., 2017), poor households. All these phenomena lead to social consequences, increasing the rich and poor differentiation (Anwar & Nguyen, 2010; Nguyen et al., 2020; Tuyen, 2016). This problem is unavoidable, but the government can intervene to limit this situation.

Due to the process of opening up and international economic integration (Nguyen et al., 2019; Nguyen et al., 2020), Vietnam has created resources for several regions, sectors, and parts of the population in the economy. The income gap between agriculture, industry, services, urban and rural areas, skilled and unskilled workers (Vu, 2020), and workers in foreign and local companies has increased. Provinces with ineffective bureaucracy and complicated business procedures have also gradually lagged as the private sector is less active and does not create many jobs. The increase in inequality from the process of economic integration is also inevitable, and the government should have a managerial and regulatory role to overcome this situation.

Growth patterns and resource allocation mechanisms in recent years strongly influence inequality (Erman et al., 2019). Over the past years, Vietnam has implemented the orientation of prioritizing resource allocation: (i) for capital-intensive industries and projects, (ii) for high-growth potential regions (focus areas), and (iii) for state-owned enterprises. The adoption of such a growth model and resource allocation has clear consequences for the goal of improving social equity. In particular, high growth but not expanding job opportunities and the high cost of creating a job mean that growth is not widely distributed among the population classes, and this causes inequality. Therefore, adjusting the economic growth model in the coming period is necessary to limit inequality.

**Solutions for economic growth, narrowing the gap between rich and poor.** Policies and solutions combining growth and social justice aim at income equity and expand the chance for low-income people to benefit from economic growth. Therefore, to solve this relationship well, there are some practical solutions.

**Developing and implementing an equitable growth model** for people experiencing poverty. This model must ensure that the income of the poor will increase more than the average income of the society and contribute to a rapid reduction in the poverty rate according to the prescribed standards. In this model, it is necessary to promote the role of the private sector in investment growth, improving labor productivity, creating jobs, and expanding the participation of social partners in poverty reduction. In addition, the growth model must maintain a high and stable growth rate that can be achieved on a large scale to benefit low-income people.

**State policies must encourage and create opportunities for low-income people to benefit from economic growth.** This can be done through supporting policies on developing infrastructure for production, land, credit capital, agricultural extension, and product consumption. The poor also need to be allowed to participate in economic development and poverty reduction activities. The labor market and job policy need to be reformed in the direction of flexibility by industry, so people from poor provinces and poor areas can participate in the labor market. On the other hand, agriculture is the primary source of income for most people with low incomes. Therefore, improving agricultural productivity is essential to eradication and alleviation of hunger and poverty alleviation. The state can do this through technological investment in agriculture and developing small and medium-sized enterprises in rural areas.

**Migration from rural to urban areas to improve income** is a common problem in Vietnam and developing countries. However, it must be recognized that this issue has both positive and negative perspectives. Therefore, the Government needs to implement targeted policies to limit the negative aspects and protect migrating people from risks.

**Implementing social security policies for underdeveloped areas and the poor is crucial.** This can be done through various channels, such as supporting programs for infrastructure

development, assisting in credit, land, vocational training, and job creation, incentivizing health, education, culture, and housing; disbursing ODA to remote and disadvantaged provinces.

**Enhancing the government's role is necessary in managing and regulating macroeconomics**. The Government must know how to take advantage of the strengths of the market mechanism to develop production and promote economic growth. At the same time, the Government must effectively combine legal tools, planning, policies, and the strength of the state economic sector to overcome the failures of the market mechanism to promote the economy, ensure social justice, and protect the legitimate interests of all classes of people.

**Proposing policies for the Midlands Northern and Mountainous region.** The research results show that income and expenditure inequality negatively impacts economic growth in Vietnam's Northern Midlands and Mountains region. It means that the region's economic growth will decrease if inequality increases. The research finding indicates that specific fiscal policy measures, such as spending on health, income taxes, and pensions, contribute to increased household income inequality. Conversely, social security measures have a positive impact by reducing inequality in household income. Based on the actual situation in the Northern Midlands and Mountains region, the author proposes some policy implications to address the relationship between income inequality and economic growth.

**Planning policies for general economic development in the Northern Midlands and Mountains region are needed to ensure economic growth cohesion and limit income inequality between population groups**. Development policies need to aim to take advantage of positive impacts and restrict negative impacts in resolving the relationship between income inequality and economic growth in the Northern Midlands and Mountains region to achieve the goal of economic growth associated with social justice. First, it is necessary to review product and industry development plans in the economy. Readjusting plans and strategies to encourage extensive development requires more focus and promotion of the region's advantage and direct investment resources to areas of regional strength. For the industry, focus resources on the processing industry for specific and advantageous products. Conduct a serious, systematic, objective general survey to re-evaluate the region's master plan for each period to match new

development trends. Regional and local planning information must be consistent, avoiding overlapping planning and conflicts in planning. The development of sectoral and regional planning can be done on a large scale in the form of bidding, encouraging the participation of independent consulting units with professional qualifications and high reputations internationally and in Vietnam.

In addition to policies to promote economic growth, more useful job creation policies are needed. Policies supporting job creation must target the manufacturing, processing, and construction sectors and encourage private economic development.

The top issue is to solve the **need for residential and production land** for people (mainly ethnic minorities). Currently, people with low incomes in the Northern Midlands and Mountains region, impoverished people from ethnic minorities, still do not have the conditions to access land and forest resources and adequately benefit from these resources. Almost everywhere near the forest, the poorer place is, the reason is that currently most of the forest land is managed by the state; the allocation of land and forests to ethnic minority communities is mainly to preserve national cultural identity associated with customs and practices (spiritual culture, worship, beliefs) but not focusing on livelihood issues for people experiencing poverty. To ensure effectiveness in implementing land policy, it is necessary to adjust land policy appropriately based on the Decrees guiding the implementation of the 2013 amended Land Law, such as the contents of resource investigation and assessment land, supplement and stipulate land use rights and obligations in planning areas approved by competent state agencies.

**Income differences lead to substantial educational inequalities**. Economic reasons explain why low-income families invest in education less than wealthy families. Education brings many social benefits, such as educational attainment related to improving democracy, reducing crime, increasing rights for women, especially allowing people to live more fully when they are equipped with information, increasing income, and being proactive in life. Using educational services effectively plays an important role, especially in the current trend of globalization and competition for skills and ideas; countries and regions need to nurture future talent.

**Social security policies** must target poor groups, in which the elderly, children, women, and disabled people are the ones who need the most attention. Social security policies like grid electricity and clean water need attention, especially in remote and ethnic minority areas. They are changing people's energy and clean water habits towards a better life. Protect and develop green, clean, beautiful, and civilized environmental landscapes following the traditional cultural practices of ethnic groups. Encourage the construction of household houses and residential areas of village communities according to housing and ecological village models based on the traditional customs and traditions of the region and each ethnic group.

Although the population density of the Northern Midlands and Mountainous region is low compared to other regions, the high population growth rate (mainly mechanical increase) puts much pressure on socio-economic development. Recent immigration has dramatically affected people's economic growth and income in the Northern Midlands and Mountainous region. We need to look at this issue both positively and negatively. Have policies to attract high-quality immigrant workers, science and technology, and investment capital to the region. It is necessary to have policies that limit negative aspects and protect immigrants from risks to ensure economic growth and social justice.

# 11 Conclusions

Research on the relationship between economic growth and income inequality in Vietnam, especially in the Northern Midlands and Mountains region, shows that:

Firstly, for the "H1: Economic growth, ODA, and unemployment rates significantly impact income inequality in Vietnam.", the research points to a nuanced relationship between Official Development Assistance and income inequality in Vietnam. While the impulse response function shows an initial positive effect of ODA on reducing income inequality, this impact diminishes over time and is not consistently statistically significant. Therefore, the long-term impact needs to be clarified. These results suggest that other factors than ODA play a role in shaping the income distribution in Vietnam. This finding opens a possibility for further research. Besides that, there is a one-way causal relationship between the employment rate and GDP but not a significant relationship between the employment rate and income inequality. Based on this, the author suggests that while employment may contribute to economic growth, it does not directly contribute to the mitigation of income inequality. It means that more than policies focusing solely on increasing employment may be required to deal with income inequality.

Secondly, answering "H2: Income inequality negatively impacts economic growth in Vietnam's Northern Midlands and Mountains region from 2010 to 2020", the research indicates that income and expenditure inequality negatively impacts economic growth in the Northern Midlands and Mountains region of Vietnam. It means that if inequality increases, the region's economic growth will tend to decrease, and this impact is very significant on the GDP of the provinces in the sample. This result is consistent with the region's conditions. The income disparity in the Northern Midlands and Mountains must be more vital to have many rich people and high accumulation of savings and assets, creating many enterprises, job opportunities, and immense production value to promote economic growth.

Thirdly, following the "H3: Fiscal policy can significantly impact income inequality in Vietnam's Northern Midlands and Mountains region", this study examines the relationship between fiscal policy elements and income inequality in the Northern Midlands and Mountains region of Vietnam, aiming to address income inequality in the area. The research finding

indicates that specific fiscal policy measures, such as spending on health, income taxes, and pensions, contribute to increased household income inequality. Conversely, social security measures have a positive impact by reducing inequality in household income. The study reveals that fiscal policy affects different economic classes in the region differently. The middle and poor classes are more negatively impacted, while the rich tend to benefit. Health spending exacerbates inequality for the middle and poor while increasing pension systems reduces participation by the lower class. On a positive note, household investment emerges as a practical approach to reduce inequality and improve the income ratio of the poor and middle classes while decreasing the participation of the rich. Additionally, enhancing household education is identified as a critical strategy to reduce income inequality in the future, given the significant opportunities education provides compared to households with lower education attainment.

Finally, results from analyzing surveys from local people in the Northern Midlands and Mountains region have provided essential messages about the connection between people's awareness and opinions about the macroeconomic situation and social issues such as income inequality and the gap between rich and poor. The results also confirm that the statement "H4: According to the opinions of local people, specific factors of income inequality are correlated with economic growth in the Northern Midlands and Mountains region" is accurate. These findings show that certain factors have a stronger impact on economic growth, while others are more closely related to income inequality.

The dissertation has some theoretical and practical meanings to help policymakers have an overview of the current situation in the region, thereby proposing reasonable development policies.

This study combines qualitative and quantitative methods to examine the relationship between income inequality and economic growth in the Northern Midlands and Mountains of Vietnam. From there, the study provides more accurate conclusions for research issues on economic growth and income inequality.

Researching on a regional scale (Northern Midlands and Mountains of Vietnam) proves the existence of an inverted U-shaped nonlinear relationship between income inequality and

economic growth and expenditure inequality and economic growth in the region. From there, point out the achievements, problems, and causes in resolving this relationship. It has provided the basis for making policies affecting economic concentration and unemployment inequality in the Northern Midland and Mountainous region.

The survey techniques and consulting with local experts and managers show that local people are concerned and aware of economic growth and income inequality in the area. Based on people's opinions on factors related to economic growth and inequality in the region, the thesis also discusses research results, pointing out achievements, existing problems, and causes when resolving the relationship between inequality and economic growth in the Northern Midlands and Mountains.

The thesis proposes policy implications, including general economic development policy of the region in the direction of integrating economic growth and social justice, employment and poverty reduction policy, policy to ensure fair equality in access to resources, policies to access essential social services (health, education, social security), immigration policies and response to climate change; Make recommendations to the state on policies to distribute assets, income and development opportunities in the economy by the characteristics of the Northern Midlands and Mountains region.

The thesis "The Relationship between Economic Growth and Income Inequality in Vietnam" has thoroughly evaluated the interaction and relationship between economic growth and income inequality, and the research methodology is handled rigorously. Based on the existing theoretical foundation combined with experimental research in Vietnam and around the world, as well as the academic instructor's research experience, However, to ensure comprehensiveness of all methods and solutions, it is challenging to meet all requirements, therefore, in the following study, the survey sample needs to be expanded and supplement with analytical methods with multivariate and econometric models such as VAR/VECM to study further the causal relationship between income inequality and economic growth.

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# 13 Appendix

# Appendix No.1 Qestionnaire

**SURVEY OF ASSESSMENT ON THE RELATIONSHIP BETWEEN INCOME INEQUALITY AND ECONOMIC GROWTH IN THE NORTHERN MIDLANDS AND MOUNTAIN REGION IN VIETNAM**

*(For experts and local managers)*

The Northern Midlands and Mountains are the largest territory in Vietnam (100,965 km2), accounting for about 28.6% of the country's total area. This region includes 14 provinces Ha Giang, Cao Bang, Lao Cai, Bac Kan, Lang Son, Tuyen Quang, Yen Bai, Thai Nguyen, Phu Tho, Bac Giang, Lai Chau, Dien Bien, Son La, and Hoa Binh. The regional centre is Thai Nguyen city. There are also many ethnic groups living in this region. The Northern Midlands and Mountains are regions with many potentials and advantages for rapid and sustainable development. However, the development orientation of the area still faces many obstacles, leading to uneven development.

Within the framework of implementing the PhD thesis *"The relationship between income inequality and economic growth in the Northern Midlands and Mountains region of Vietnam"* by PhD student Ho Huong Lien, she needs to collect data and assessment of experts and managers about this relationship in the Northern Midlands and Mountains region of Vietnam in the **period 2001 - 2021**. Therefore, she looks forward to receiving your cooperation and help by providing information in the survey below. The information you provide is only used for this study, not for any other purpose.

Sincerely thank!

**SECTION 1 – GENERAL INFORMATION**

***1) Please indicate the province you live/work in***

☐ Ha Giang ☐ Cao Bang ☐ Lao Cai ☐ Bac Kan ☐ Lang Son ☐Tuyen Quang

☐ Yen Bai ☐ Thai Nguy ☐ Phu Tho ☐ Bac Giang ☐ Lai Chau ☐ Dien Bien ☐ Son La

☐ Hoa Binh

**2)** ***You are:*** ☐ an expert ☐ a local manager

**3)** ***What gender do you identify as?***

☐ Male ☐ Female ☐ Prefer not to answer

**4) What is your age**

☐ 20 - 30 years old

☐ 30 – 45 years old

☐ 45 – 60 years old

☐ 60 +

☐ Prefer not to answer

**5. What is the highest degree or level of education you have completed?**

☐ Some high school

☐ High school

☐ Bachelor´s degree

☐ Master´s degree

☐ PhD. or higher

☐ Trade school

☐ Prefer not to answer

**6. Please identify what is your professional background. Please specify.**

**……**

## SECTION 2 – ECONOMIC GROWTH OF THE PROVINCE

***1. Please indicate how much you agree with the following statements:***

*(Cross your answers, each line has only one cross)*

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|---|---|---|---|---|---|
| The GDP per capita of the province is growing. | | | | | |
| There is a continuous growth trend in the province´s economy regarding the GDP per capita during the monitored period. | | | | | |
| All the inhabitances of the province have access to the electricity | | | | | |
| All the inhabitances of the province have access to clean water | | | | | |
| All the pupils attend primary school | | | | | |
| Innovations play an essential role in the development of the province | | | | | |
| Economic growth brings more benefits than negatives to the province | | | | | |
| The level of investment is high | | | | | |

***2. Overall, from your experience, how would you rate the growth of GDP in your province?***

☐ Poor ☐ Fair ☐ Good ☐ Very good ☐ Excellent

***3. Evaluate the contribution of the following sources to the province's economic growth.***

*(Cross your answers, each line has only one cross)*

| | Very low | Low | Medium | High | Very high |
|---|---|---|---|---|---|
| Natural resources | | | | | |
| Human resources | | | | | |
| Capital formation and physical capital | | | | | |
| Technological change and innovation | | | | | |

***4. There is at least one university or research and development institute in the province.***

☐ Yes ☐ No

***5. How would you rate the traffic infrastructure (road, railroads) in your province:***

☐ Poor ☐ Fair ☐ Good ☐ Very good ☐ Excellent

***6. How would you rate the level of investment in your province?***

☐ Very high ☐ Above average ☐ Average ☐ Below average ☐ Very low

***7. In your experience, why is your province attractive for investment? Please specify your answer.***

……

……

……..

***8. A diversified economic base is crucial for sustainable growth. Evaluate the contribution of the economic sectors to the province's economic growth.***

*(Cross your answers, each line has only one cross)*

| | Very low | Low | Medium | High | Very high |
|---|---|---|---|---|---|
| Extraction of raw materials | | | | | |
| Farming/fishing | | | | | |
| Manufacturing | | | | | |
| Construction | | | | | |
| Utilities – electricity, gas, etc. | | | | | |
| Retail | | | | | |
| Construction | | | | | |
| Education and health care | | | | | |
| Public sector | | | | | |
| Others | | | | | |

In the case of others, please specify …… …… ……

……

***9. What is the impact of the following obstacles on the economic growth of your province?*** *(Cross your answers, each line has only one cross)*

| | Very low | Low | Medium | High | Very high |
|---|---|---|---|---|---|
| Low investment | | | | | |
| Income inequality | | | | | |
| Insufficient infrastructure | | | | | |
| Low qualification of the labour force | | | | | |
| Legislation | | | | | |
| Inflation | | | | | |
| Covid 19 | | | | | |
| Labour shortage | | | | | |
| Insufficient utilities (electricity, gas, etc) | | | | | |
| Luck of support from the community | | | | | |
| Missing long-term vision and business strategy | | | | | |
| Others | | | | | |

***10. According to your experience, what is the impact of the negative aspects of economic growth on your province?***

*(Cross your answers, each line has only one cross)*

| | Very low | Low | Medium | High | Very high |
|---|---|---|---|---|---|
| Inflation | | | | | |
| Pollution | | | | | |
| Congestion | | | | | |
| Disease of affluence | | | | | |
| Inequality | | | | | |
| Use of non-renewable resources | | | | | |
| Maximising hours worked | | | | | |
| Loss of regional identity | | | | | |

***11. How are you satisfied with how your province is coping with the negative aspects of the economic growth (such as pollution, congestion, inequality etc.)?***

☐ Not al all satisfied ☐ Slightly satisfied ☐ Moderately satisfied ☐ Very satisfied ☐ Extremely satisfied

## SECTION 3 – INCOME INEQUALITY IN THE PROVINCE

***1. Please indicate how much you agree with the following statements about your province:***

*(Cross your answers; each line has only one cross)*

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|---|---|---|---|---|---|
| The well-being of the inhabitants improved during the monitored period | | | | | |
| The income and living standards of people in my province have increased | | | | | |
| Income inequality in my province changed between 2001-2021 | | | | | |
| The more economy grows, the more income is inequitable in my province | | | | | |
| The income inequality situation is acceptable in my province. | | | | | |
| The income inequality has improved over the monitored period in my province | | | | | |
| The wealthiest group has a higher expenditure ratio than the poorest group in recent years | | | | | |
| The income inequality worsen in my province | | | | | |
| The poorest group has had much lower spending on education and health care than the rich. | | | | | |
| There is an increase in income inequality among ethnic groups in my province | | | | | |
| People with a high level of education have higher incomes compared to people with lower qualifications | | | | | |

***2. According to you, the increase in income of the wealthiest group compared to the poorest group is:***

☐ Faster ☐ Slower

***3. What is the source of income of the poorest group of people during the monitored period?***

*(Cross your answers, each line has only one cross)*

| | Not likely | Somewhat likely | Very likely |
|---|---|---|---|
| Extraction of raw materials | | | |
| Farming/fishing | | | |
| Manufacturing | | | |
| Construction | | | |

| | | | |
|---|---|---|---|
| Utilities – electricity, gas, etc. | | | |
| Retail | | | |
| Construction | | | |
| Education and health care | | | |
| Public sector | | | |
| Others | | | |

***4. What is the source of income of the richest group of people during the last years?***

*(Cross your answers, each line has only one cross)*

| | Not likely | Somewhat likely | Very likely |
|---|---|---|---|
| Extraction of raw materials | | | |
| Farming/fishing | | | |
| Manufacturing | | | |
| Construction | | | |
| Utilities – electricity, gas, etc. | | | |
| Retail | | | |
| Construction | | | |
| Education and health care | | | |
| Public sector | | | |
| Others | | | |

***5. Evaluate the contribution of the following social services to improving the province's income equality.***

*(Cross your answer, each line has only one cross)*

| | Very low | Low | Medium | High | Very high |
|---|---|---|---|---|---|
| Medical services | | | | | |
| Education | | | | | |
| Access to electricity | | | | | |
| Access to clean water | | | | | |
| Public transportation | | | | | |
| Infrastructure (road, railroad, etc.) | | | | | |
| Access to Internet | | | | | |
| | | | | | |

***6. What is the impact of the following factors on people´s income?***

*(Cross your answers, each line has only one cross)*

| | No affect | Minor affect | Neutral | Moderate affect | Major affect |
|---|---|---|---|---|---|
| High qualification | | | | | |
| Good at business | | | | | |
| Being a public servant | | | | | |
| Illegal business | | | | | |
| Luck | | | | | |
| Own land | | | | | |
| Others | | | | | |

In the case of others, please specify …… …… ……

……

***7. Please indicate how much you agree with the following statements about your province:***

*(Cross your answers, each line has only one cross)*

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|---|---|---|---|---|---|
| High division of inequality has promoted economic growth in my province | | | | | |
| High inequality negatively affects the economic growth of the province | | | | | |
| Poor people do not enjoy the benefits of economic growth | | | | | |
| High economic growth has created opportunities for many wealthy people | | | | | |
| Improved employment conditions boost local economic growth | | | | | |
| Immigration has adversely affected local economic growth | | | | | |
| Rich people have contributed more to economic growth and job creation | | | | | |
| High economic growth made poor people poorer | | | | | |

***8. What government poverty method reduction do you know?***

……

…….

*If you do not know any method skip the following question number 3.*

***9. In your opinion, should the Government continue to maintain the current poverty reduction method?***

☐ Yes ☐ No ☐ Do not know

Please give reasons for your assessment:

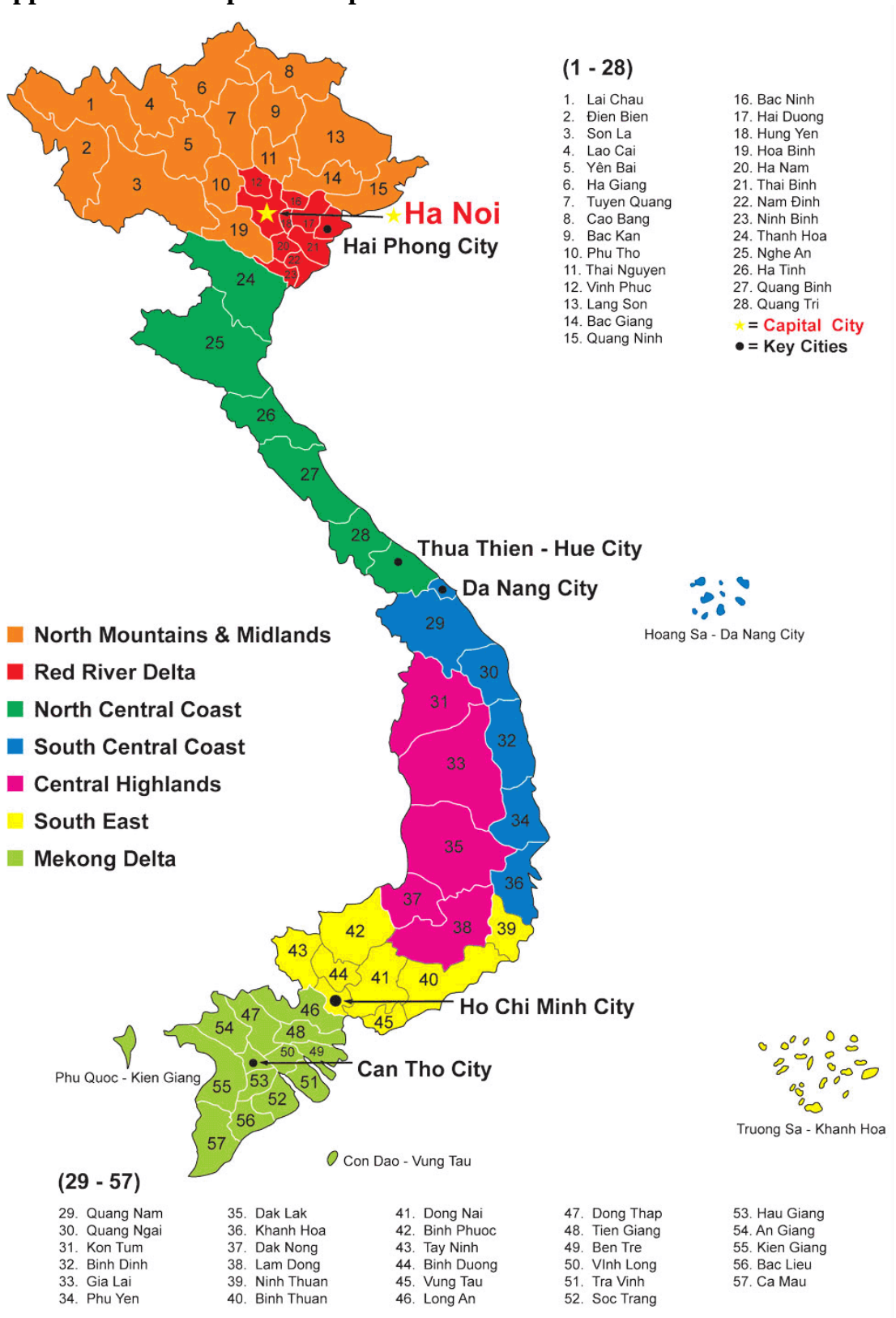
……

……

……

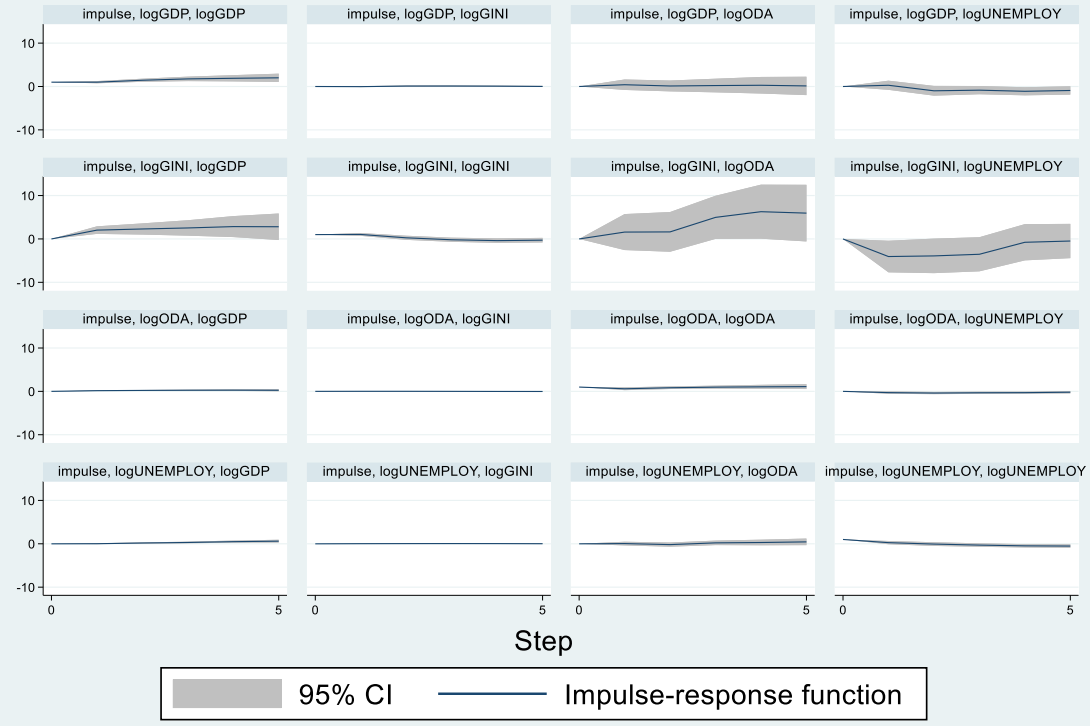
Thank you for your time!

## Appendix No.2 Map 13-1 Map of Vietnam




Source: https://amotravel.com/map-of-regions-of-vietnam/

## Appendix No.3 Impulse Response Analysis




(Source: Own processing)