VIETNAM NATIONAL UNIVERSITY
UNIVERSITY OF ECONOMICS AND LAW
ECONOMICS DEPARTMENT

GRADUATION THESIS

MAJOR: ECONOMICS

THE INFLUENCE OF GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH IN VIETNAM: AN ARDL APPROACH

Instructor: PhD. Nguyen Thi Dong

Student: Nguyen Yen Linh

Student ID: K204010931

Class: K20401C

HO CHI MINH CITY, 23 MAR 2024

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After a long period of researching and implementing the topic, my graduation thesis has been completed. Alongside my own efforts, I have also had the guidance of my advisor - Ms. Nguyen Thi Dong, who gave me insightful feedback, constructive criticism, and expert advice have not only helped refine my research methodology but have also challenged me to push the boundaries of my academic capabilities. I am profoundly grateful for her unwavering support and dedication, which have inspired me to strive for excellence and persevere through the challenges of completing my thesis.

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COMMENTS FROM INSTRUCTOR

COMMENTS FROM THE REVIEWING TEACHERS

TABLE OF CONTENT

LIST OF FIGURES AND TABLES

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

ARDL……Autoregressive Distributed Lag

FDI……Foreign Direct Investment

GDP……..Gross Domestic Product

VAR……..Vector autoregressive models

VECM……...……Vector error-correction models

OLS……...Ordinary Least Square

FEM……...Fixed Effects Model

REM……..Random Effects Model

ADF……...Augmented Dickey–Fuller

ASEAN…….Association of Southeast Asian Nations

ICOR…….Incremental capital-output ratio

ABSTRACT

This research investigates the multifaceted relationship between government final consumption expenditure, various socio-economic factors, and economic growth in Vietnam, employing an Autoregressive Distributed Lag (ARDL) approach. Using time series data spanning from 1998 - 2022, the study aims to discern both short- and long-term effects of government spending alongside other variables on the overall economic performance of Vietnam. This study finds that government final consumption expenditure exhibits a positive relationship with economic growth in the long run, while paradoxically, it is negatively correlated with economic growth in the short run. This indicates that while increased government spending stimulates economic growth over extended periods, its immediate effects may hinder short-term economic performance. Moreover, the research identifies additional factors influencing economic growth in Vietnam. Gross capital formation and manufacturing value added are found to have positive relationships with economic growth in the long run, underscoring the significance of investment and industrial productivity in driving sustained economic growth. Additionally, the urban population is positively associated with long-term economic growth, reflecting the contribution of urbanization to economic development. However, the study reveals contrasting effects of Foreign Direct Investment (FDI) on economic growth depending on the time horizon. In the long run, FDI exhibits a negative relationship with economic growth, suggesting potential challenges associated with foreign capital inflows such as crowding out domestic investment or adverse impacts on local industries. Conversely, in the short run, FDI is positively correlated with economic growth, indicating its immediate stimulative effect on economic activity.

INTRODUCTION

1. State of problem

Vietnam's rapid economic growth has positioned it as one of Southeast Asia's fastest-growing economies. Understanding the link between government expenditure and economic growth is crucial for policymakers aiming to sustain and enhance this growth. As Vietnam's government significantly influences the economy through expenditure on infrastructure, education, healthcare, and social welfare. Examining how changes in government spending impact economic growth provides insights into the effectiveness of these expenditures in stimulating productivity, investment, and overall economic activity. Employing the ARDL approach allows for analyzing both short-term and long-term relationships between government expenditure and economic growth, capturing any potential lagged effects. This research contributes to the literature on government expenditure and economic growth, offering insights applicable not only to Vietnam but also to other developing economies with similar challenges and opportunities.

2. Research Overview

Research on the impact of government expenditure on Vietnam's economic growth using the ARDL (Autoregressive Distributed Lag) approach examines the complex relationship between various economic factors. With GDP growth as the dependent variable and foreign direct investment (FDI), gross capital formation, government final consumption expenditure, urban population, and manufacturing value added as independent variables, this study covers key drivers of Vietnam's economic development. By focusing on these variables, the research aims to elucidate how government spending interacts with other crucial elements of the economy to shape overall growth dynamics. FDI reflects Vietnam's integration into the global economy and its attractiveness to international investors, while gross capital formation indicates investment activity and infrastructure development. Government final consumption

expenditure stimulates domestic demand and supports social welfare programs, while urban population and manufacturing value added signify structural transformation and industrialization. Utilizing the ARDL approach enables exploration of both short-term and long-term dynamics, capturing potential lagged effects adjustments over time.

One of key highlights is that the nature and influence of government expenditure on economic growth depends on its form, it’s not about one size fits all. For example: Government expenditure on investment and productive activities in the area of state-owned production contributes positively to economic growth, while government expenditure on consumption is expected to impact growth negatively Havi (2013). In accordance with Niloy Bose (2007) government spending can indirectly stimulate economic growth by enhancing the marginal productivity of both public and private factors of production. For example, government investment in research and development can contribute to higher production levels. In high-crime countries, the increase in government expenditure on security can facilitate lower cost of production, by decreasing the necessity to protect physical assets and employees, as a result, attracting more private investment in terms of physical assets investment and increasing productivity of workers Nketiah-Amponsah (2009). This research sets the stage for a comprehensive analysis that not only contributes to the understanding of Vietnam's economic growth dynamics but also provides valuable insights for policymakers and researchers grappling with similar issues in other developing economies.

3. Research Objective

3.1. Overall Objective

The overall goal of the topic is to evaluate the impact and propose recommendations and solutions to take advantage of the positive impacts and limit the negative impacts of government expenditure and other factors on the economic growth in Vietnam.

3.2. Specific Objective

- Build a model to evaluate government expenditure and other factors related to economic growth in Vietnam in the period 1998 - 2022.
- Check the crowding out effect in the impact of government expenditure on economic growth in Vietnam. Propose solutions, implications, and policies to minimize negative impacts and strengthen the role of government expenditure in Vietnam.

4. Research Question

To achieve the research goal of the topic, asking questions is very important, the topic focuses on answering the following questions: First, how do government expenditure and other related factors impact economic growth in Vietnam? Second, does the impact of government expenditure on economic growth (if any) have a crowding out effect?

5. Target and scope of research

5.1. Target of research

Target of the research is the influence of government expenditure on economic growth in the period of 1998 - 2022 through: Government final consumption expenditure (% Annual growth), gross capital consumption (% Annual growth), foreign direct investment (current US $), urban population (% total population), manufacturing value added (% Annual growth).

5.2. Scope of research

Scope of Content

The study customizes the GDP scale by selectively choosing indices that match the economic, political, and social traits of the country under examination, aligning with available research resources. Additionally, beyond analyzing the effect of government expenditure on GDP growth, it assesses the influence of key factors comprising the GDP

scale, focusing on government expenditure, foreign direct investment, manufacturing sector, urban population, and gross capital formation. The GDP growth rate serves as the dependent variable.

Spatial and Temporal Scope

Country: Vietnam

Time: Secondary data collected from 1998 to 2022 provided by the World Bank.

6. Research methodology

The research combines two methods: qualitative and quantitative. With the qualitative method, it reviews theories and previous studies to provide a research foundation. In the quantitative research method, the study used secondary data from 1998 to 2022, employing Autoregressive distributed Lag (ARDL) econometric estimation techniques.

7. Research science and practical values

Research science values: This study can serve as a foundation for further exploration of the role of government expenditure in driving economic growth in Vietnam.

Practical values: Knowing the impact of government expenditure on economic growth can support regulators in making economic growth strategies.

8. Structure of thesis

Chapter 1: Theoretical review

Chapter 2: Empirical review

Chapter 3: The current stage of government expenditure in Vietnam

Chapter 4: Methodology

Chapter 5: Result and discussion

CHAPTER 1: THEORETICAL REVIEW

1.1. Basic concepts

1.1.1. Economic growth

As per the World Bank's definition outlined in the "1991 World Development Report" economic growth pertains to the augmentation in key indicators defining an economic state, primarily encompassing the total social product, adjusted for population changes. Economic growth can be quantified in either absolute terms, denoted as growth scale, or relative terms, indicated by growth rate. The growth scale signifies the extent of increase, whereas the growth rate is employed for comparative purposes, illustrating the pace of growth over time periods. The paramount and inclusive measure of the economy's overall output, primarily utilized in research endeavors.

1.1.2. Government expenditure

Government expenditure refers to the funds that a government allocates or spends on various activities and programs to achieve its objectives. Government expenditure encompasses spending on a wide range of areas, including public goods and services, social welfare programs, defense, infrastructure development, education, healthcare, and law enforcement, among others. Government expenditure can be categorized into two main types: recurrent expenditure and capital expenditure. Recurrent expenditure typically includes day-to-day operating expenses such as salaries for public sector employees, administrative costs, and payments for goods and services consumed within a given period. Capital expenditure, on the other hand, refers to investments in physical assets and infrastructure projects that are expected to yield long-term benefits, such as roads, bridges, schools, hospitals, and other public infrastructure. The allocation of government expenditure reflects the priorities and policy objectives of a government. It is influenced by factors such as economic conditions, social needs, political considerations, and fiscal constraints. Governments may increase spending in times of economic downturn to stimulate demand, create jobs, and support economic growth.

Conversely, they may reduce spending during periods of economic expansion to avoid overheating the economy and mitigate inflationary pressures. Government expenditure also plays a significant role in redistributing income and reducing socio-economic inequalities within a society. However, excessive or inefficient government expenditure can lead to fiscal imbalances, budget deficits, and unsustainable levels of public debt. Therefore, prudent fiscal management, transparency, and accountability are essential to ensure that government expenditure is allocated efficiently and effectively to achieve desired outcomes while maintaining fiscal sustainability.

1.2. The relationship between government expenditure and economic growth

Classical economists, particularly Adam Smith, advocated for minimal government intervention in providing public goods, maintaining law and order, and investing in areas where the private sector faces high risks or where profitability is uncertain Aluthge, Jibir, & Abdu (2021). In contrast, **Keynesian** economists supported the utilization of public expenditure to foster growth and development by stimulating aggregate demand, particularly during economic downturns. This underscores the rationale for government involvement in economic activities in modern times, as governments are essential for rectifying short-term distortions in an economy Singh (1984) and for steering the growth and development of a country in a socially optimal direction Ram (1986). According to Romer, Endogenous Technological Change (1990), growth depends on investment in research and development (R&D). He added that government action is needed to improve resource allocation efficiency through investment in human capital and encourage private investment in high-tech industries. The implication of the endogenous growth model is that policies including capital formation, openness, competition, change and innovation will promote growth Mbakisya Onyango (2015). Neoclassical growth models suggest that government spending primarily affects the economic growth rate in the short term. Wagner (1883) proposed a theory of government expenditure in economic literature, asserting that as a country's per capita income increases, the proportion of

public spending to gross domestic product also rises, indicating a direct positive relationship between them. In other words, the growth in per capita income driven by industrialization incentivizes governments to increase their expenditures, particularly in areas such as education and healthcare, which, in turn, spurs industries to produce more goods and services as aggregate demand increases. This increased industrial production ultimately leads to higher aggregate output. Wagner's organic theory and the Peacock-Wiseman hypothesis view public expenditure as an endogenous variable to growth, whereas Keynes regards government expenditure as an exogenous factor that can be utilized as a policy instrument to influence economic growth. Barro's study (1990) illustrates that the impact of government expenditure on economic growth follows a three-stage pattern, resembling an inverted U shape. Initially, up to point A, where government expenditure remains low, it enhances private investment profitability, increases the private savings ratio, and boosts the growth rate. Beyond point A, however, the negative effects of higher taxes offset the positive impact of capital on private investment profitability. As a result, private investment increases at a slower pace, and the savings ratio decreases between points A and B. During this phase, increasing government expenditure continues to foster economic growth, as it still generates high productivity. Subsequently, reaching point B, government expenditure productivity diminishes, causing an increase in the savings ratio and a decline in the growth rate.

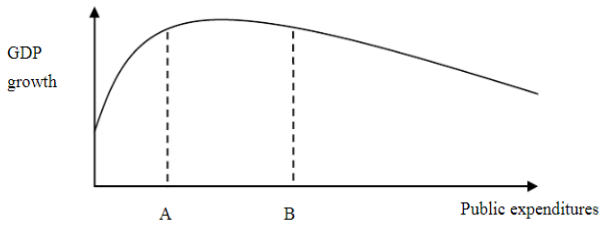

Figure 1.2: Model of influence of government expenditure periods (Source: Barro (1990))

CHAPTER 2: EMPIRICAL REVIEW

2.1. Overview of research on factors affecting economic growth

Foreign Research

Zieba (2022) conducted the research project "Factors affecting economic growth: empirical evidence from developing countries". Using OLS, FEM model along with a panel data set of 62 developing countries from 2010 to 2018, the results of the study showed that government spending and natural resource taxes are the factors that have a positive impact on GDP per capita. The study "Factors Affecting Economic Growth in Developing Countries" by Upreti (2015) used the OLS method with data from 76 developing countries in 2010, 2005, 2000 and 1995. The research results obtained show that higher export volumes, abundant natural resources, longer life expectancy and higher investment rates have a positive impact on GDP per capita in developed countries. Semmanda (2020) conducted the study “Factors affecting economic growth in sub-Saharan Africa”. Using the FEM fixed effects regression model and secondary data for 21 sub-Saharan African countries. It was found that population growth and life expectancy significantly affect economic growth and development in these countries. Philips (2011) conducted the study "Determinants of Economic Growth in Latin America" with the aim of identifying the most important factors in promoting economic growth in Latin America. With data collected from 1995 - 2009 and panel data for 17 countries, the study results show that low levels of corruption, high levels of internet access, low levels of FDI and high net energy imports have statistical significance in increasing GDP per capita in Latin America. Education was found to be statistically insignificant on economic growth.

Domestic research

The group of authors Nguyen Le Hoang Thuy To Quyen (2022) conducted the research "Factors affecting economic growth of the southern key economic region". The research is based on data sets taken from 08 provinces and cities in the period from 2005

to 2019, processed and measured through methods such as panel data estimation such as OLS, FEM, REM and Feasible Generalized Least Squares (FGLS) to understand the factors affecting economic growth of the Southern key economic region. The results of the study show that export factors, the proportion of the population living in urban areas, education levels, and information technology potential have a positive influence on the region's economic growth. Research by author Tru (2018) with the topic "Determinants Affecting Economic Growth: The Case of Vietnam" aims to study the Factors affecting Vietnam's economic growth in 40 years. The results of the study show that the proportion of exports, FDI, added value of agriculture, forestry and fishery, and the participation role of ASEAN have a positive impact on economic growth, on the contrary, imports have a negative impact on Vietnam's economic growth. The author group Ha Thi Thieu Dao (2014) conducted the topic "The role of human capital in economic growth in the South Central coastal region". The results obtained after evaluating using the fixed effects model show the following factors: Physical capital, labor force, human capital, proportion of FDI capital, proportion of government spending and proportion of agriculture has a significant influence on economic growth. The study "Factors affecting the economic growth in the Mekong Delta" Phuoc (2015) aims to find out the factors affecting economic growth (GDP) in 13 provinces/cities in the Mekong Delta. Using secondary data for the period 2005 - 2014 and using technical analysis panel regression method, this study found that factors from the economic crisis had a profound and adverse impact on GDP. In addition, factors such as FDI, state budget revenue and expenditure balance, open economy, inflation and total retail sales of the labor force also affect GDP. The study "The impact of financial inclusion and other factors on economic growth" by Huong (2020) used array data regression method with a data set of 97 countries in the period 2011-2017. Research results have found that financial inclusion has a positive impact on economic growth.

2.2. Overview of research on the relationship between government expenditure and economic growth

Several studies have highlighted a positive correlation. Al-Fawwaz (2016), Kunwar (2019), and Nyarko-Asomani et al. (2019) all point towards such a relationship. Auschauer (1989) conducted a comprehensive study investigating the impact of both aggregated and disaggregated public expenditure on economic growth in the United States (USA) from 1949 to 1985, using annual data. Aschauer's findings underscored that within the USA, non-military public capital stock significantly boosted economic growth compared to its military counterpart. His research also emphasized the pivotal role of core infrastructure elements such as streets, highways, airports, mass transit, sewers, and water systems in enhancing productivity. Sugata Ghosh (2008) examined the correlation between disaggregated government expenditure and economic growth across 15 developing countries using the Generalized Method of Moments (GMM). Their results indicated variability based on the type of government expenditure analyzed, with expenditure on operations and maintenance exhibiting a more robust positive influence on economic growth compared to investments in education and health. More recent studies, such as that by Dan Lupu (2018), focused on selected Central and Eastern European countries from 1995 to 2015. Their findings revealed a positive impact of public expenditures on education and healthcare on economic growth in these countries. Additionally, Rana Asghari and partner (2016) revisited the government spending-economic growth nexus, examining the impact of government size on economic growth in selected OECD-NEA countries from 1990 to 2011. Their study, using the Panel Smooth Transition Regression (PSTR) model, rejected the linearity hypothesis. Conversely, there are studies reporting negative relationships.Aydin & Esen (2019), Barlas (2020), Iheanacho (2016), Okoye et al. (2019), among others, have found such associations. For instance, S. Ghosh and A. Gregoriou (2008) observed a negative impact of capital spending on economic growth in developing countries.

Moreover, studies like Shantayanan Devarajan (1996) and Ali et al. (2013) suggest that while current expenditure may positively affect growth, capital expenditure could have a negative influence. Meanwhile, Pieroni (2019) found a negative impact of defense expenditure on economic growth across middle and low-income countries. Shahid Ali (2013) examined the impact of government expenditure on economic growth in Pakistan from 1972 to 2009, finding that current expenditure did not contribute to growth. Similarly, Fasanya (2013) analyzed the impact of public expenditure on economic growth in Nigeria from 1970 to 2010, with their study revealing an insignificant impact of total government spending on growth in Nigeria.

2.3. Scientific gaps

A notable scientific gap in research concerning the relationship between government expenditure and economic growth is the lack of comprehensive studies that consider the specific contextual factors and policy dynamics unique to the Vietnam economy. While some research has examined the overall impact of government spending on economic growth, there remains a dearth of in-depth investigations into the effectiveness and efficiency of different types of government expenditure in stimulating sustainable economic growth in Vietnam. Additionally, there is a limited understanding of how government expenditure interacts with other macroeconomic variables, such as taxation policies, monetary policies, and external factors like trade dynamics and foreign investment inflows, in shaping the trajectory of economic growth in Vietnam. Furthermore, there is a lack of research that explores the potential trade-offs and spillover effects associated with different forms of government expenditure, such as infrastructure investment, social welfare programs, and defense spending, on long-term economic development and welfare outcomes in Vietnam.

2.4. Proposal of study model

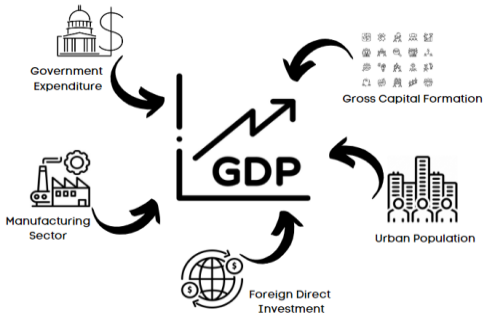

Figure 2.4.1: Proposed model of factors affecting economic growth (Source: Self synthesis)

Basis for selecting factors affecting economic growth to bring into the model:

Inheritance: The selection of factors is based on the foundation of inheriting, learning and drawing experience from the process of reviewing and summarizing scientific gaps in previous research articles. The main research that I take as a foundation for this study is "The influence of government expenditure on economic growth in Ghana: An Ardl approach" Kwasi Poku and partner (2022). They use annual time series data from 1970 to 2016. The study variables include GDP growth as dependent variable (GDPG) and independent variables: Gross Fixed Capital Formation (GFCF), Government Expenditure (GEXP), Population Growth (POP), and Foreign Direct Investment (FDI). The findings indicate that while the long-term impact of government expenditure on economic growth is not statistically significant, there is a significant positive effect of government expenditure on economic growth in Ghana in the short term.

Practicality: The selection of factors is based on current, hot, updated and urgent issues that I believe have a strong impact on current economic growth in Vietnam.

Dependent variable:

Economic growth: The decision has been made to utilize the GDP annual growth rate as a representative variable for measuring economic growth in Vietnam. The GDP Growth Rate, also referred to as the Economic Growth Rate, gauges the change in a country's GDP compared to a previous period. GDP encompasses the final prices of all goods and services produced within an economy over the course of a year, serving as a reflection of production capacity, overall economic performance, and the general well-being of a nation. This research specifically examines the relationship between government expenditure and economic growth. If government expenditure is geared towards bolstering aggregate demand, the use of the GDP growth rate becomes

particularly relevant, as it effectively illustrates the direct correlation between government expenditure and economic growth.

Independent variables:

General government final consumption expenditure: General government final consumption expenditure encompasses all current expenditures made by the government for the acquisition of goods and services, including employee compensation. This category typically covers most expenses related to national defense and security, excluding military expenditures allocated for government capital formation, as defined by the World Bank. Government current expenditure primarily entails expenditures that yield benefits within the current period, representing routine spending for day-to-day operational activities. For instance, this includes procuring goods and services for office equipment and public service provision, as well as disbursing funds for government employee salaries. These current expenditures are typically of modest scale and short-term in nature. In Vietnam, government current expenditure plays a pivotal role in providing essential public services such as healthcare, education, infrastructure maintenance, public administration, and social welfare programs. Significant portions of the government budget are allocated to sectors like healthcare and education, reflecting the government's commitment to improving human capital and ensuring access to basic services for all citizens. Furthermore, current expenditure facilitates the implementation of poverty alleviation programs, social assistance initiatives, and disaster relief efforts, aiming to reduce socio-economic disparities and enhance the well-being of vulnerable populations. As Vietnam continues path of rapid economic growth and development, prudent management of government current expenditure remains essential to ensure fiscal sustainability, promote inclusive growth, and address emerging challenges such as environmental protection and climate change adaptation. Effective allocation and

utilization of resources in current expenditure are crucial for maximizing the impact of public investments and fostering long-term socio-economic progress in Vietnam.

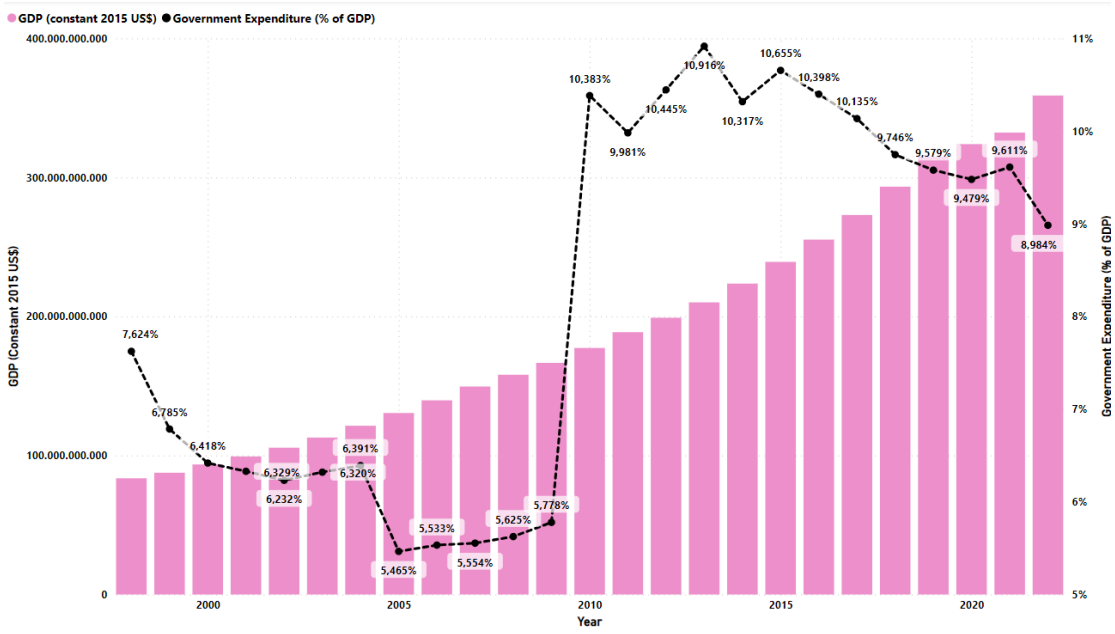

Figure 2.4.2: The correlation between government current expenditure (% of GDP) and GDP growth (Current US$) in Vietnam from 1998 – 2022 (Data source: World Bank)

From 2010, Government current expenditure started increasing together with higher GDP and gradually showing signs of decline starting in 2015.

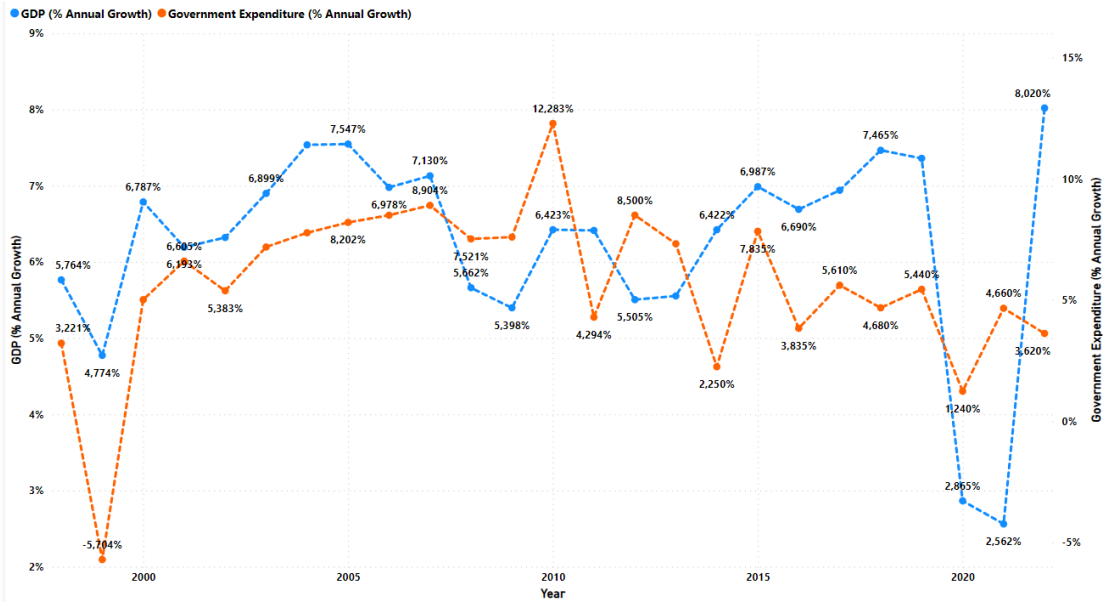

Figure 2.4.3: The correlation between government current expenditure (% Annual growth) and GDP growth (% Annual) in Vietnam from 1998 - 2022 (Data source: World Bank)

From the growth rate perspective, from 2010, government expenditure started declining in the growth rate. Can understand that together with the growth of GDP, government current expenditure reaches its threshold.

Gross capital formation: Formerly termed as gross domestic investment, gross capital formation encompasses expenditures on augmenting the fixed assets of the economy alongside net changes in inventory levels. Fixed assets encompass a spectrum of investments, including enhancements to land such as fences, ditches, and drains, as well as acquisitions of plants, machinery, and equipment. Additionally, it encompasses the construction of infrastructure such as roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories represent the stock of goods held by firms to address temporary or unforeseen fluctuations in production or sales, inclusive of work in progress, as defined by the World Bank.

Government capital expenditure is also integral to gross capital formation. They signify spending on goods and services, contributing to aggregate demand alongside household consumption, business investment, and net exports. However, capital expenditure offers future benefits, unlike current expenditure. Capital expenditures typically represent long-term investments crucial for bolstering economic activity and fostering long-term output growth. For instance, the construction of roads not only enhances the mobility of people and goods but also reduces logistical costs and fosters increased business activity, generating jobs and income both in the present and future. Additional sources of funding for gross capital formation may include:

- Public organizations and enterprises: Entities such as railway companies and electric companies, with capital from government or state agencies, often

undertake large investment projects in infrastructure, financed through the state budget.

- Private enterprises: Private enterprises also contribute to gross capital formation through investments in production and development activities.

In Vietnam, gross capital formation plays a crucial role in expanding the country's productive capacity, modernizing its infrastructure, and supporting the transition towards a more industrialized and competitive economy. Significant investments in sectors such as manufacturing, construction, energy, and transportation contribute to the creation of jobs, the development of value-added industries, and the enhancement of export competitiveness. Gross capital formation also plays a vital role in attracting foreign direct investment (FDI). Moreover, investments in infrastructure, including roads, ports, airports, and telecommunications networks, are essential for improving connectivity, reducing transportation costs, and promoting regional integration.

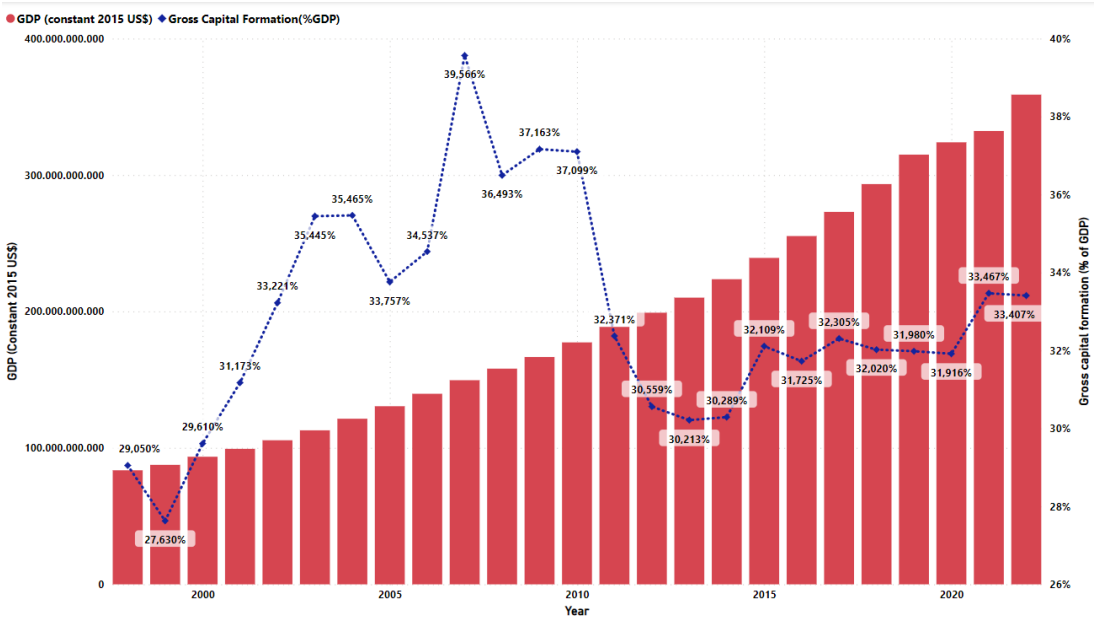

Figure 2.4.4: The correlation between government gross capital formation (% GDP) and GDP in Vietnam from 1998 - 2022 (Data source: World Bank)

Capital formation accounts for a large proportion in GDP, showing signs of declining from 2010 and increasing from 2020 - A milestone of Covid - 19 in Vietnam. We can see clearer through the chart below.

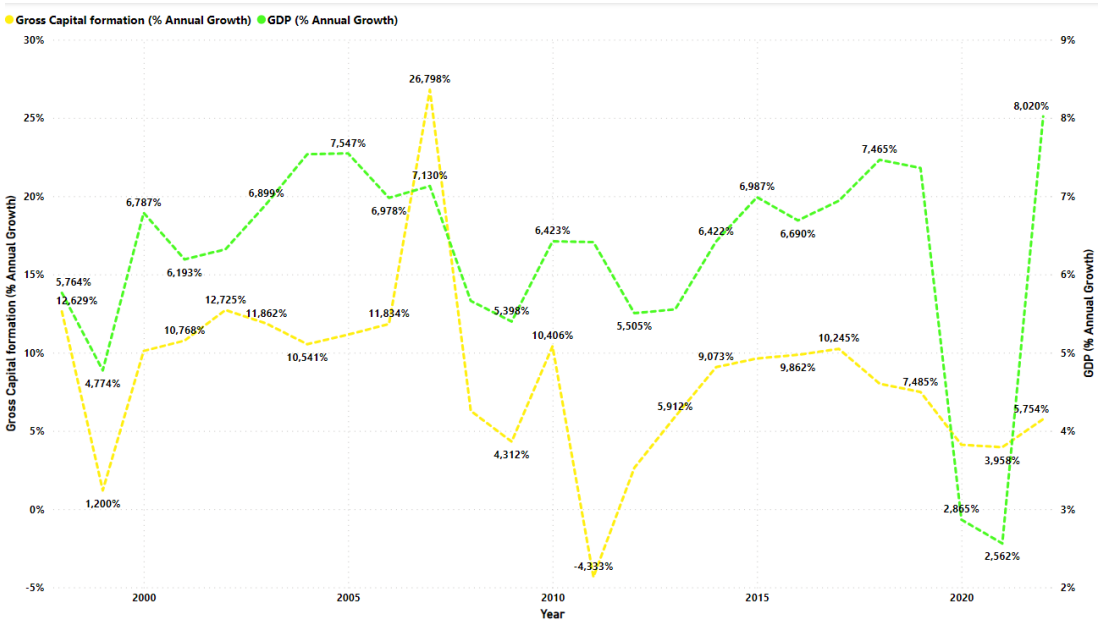

Figure 2.4.5: The correlation between gross capital formation (% Annual growth) and GDP growth (% Annual) in Vietnam from 1998 - 2022 (Data source: World Bank)

Urban population: The urban population represents the percentage of people living in urban areas compared to the total population. Additionally, a country's level of urbanization indicates the degree of urban population growth (World Bank). Data from the General Statistics Office (Ministry of Planning and Investment) for the fourth quarter of 2023 projects Vietnam's total population to reach 100.3 million individuals. Specifically, Vietnam's urban population rate in 2023 stands at approximately 38.1%, showing a 0.6 percentage point increase from 2022 and a 1 percentage point increase from 2021. Cities currently contribute over 50% to the country’s gross domestic product (GDP). Throughout the urbanization process, Vietnam has effectively utilized clustered economies to drive growth by leveraging fiscal, land, labor, and other resources. However, according to Ms. Carolyn Turk, World Bank Country Director for Vietnam,

the nation's urban population is at a critical juncture, with current urban development approaches nearing their limits. Urban population holds significance as a variable in the context of its relationship with economic growth Edwin S. Mills (1986). Edward L. Glaeser (2010) emphasized urbanization's role in fostering entrepreneurship, suggesting that urban populations' access to finance promotes idea generation and local business endeavors to some extent. Strange (2010) explored urbanization's impact on economic growth, indicating that urban concentration encourages knowledge and skill interactions, thereby enhancing productivity and influencing national economic growth. Quigley (2007) underscored Mexico City's substantial contribution to Mexico's GDP, highlighting urbanization's significant effect on national economic output. Chen M (2013) identified strong connections between urbanization levels and GDP per capita but no correlation between urbanization speed and economic growth rate at the global level. Shabu (2010) found a weak relationship between urban growth and economic development in developing countries, while urbanization positively impacted economic growth in developed countries.

The urban population in Vietnam plays a vital role in the country's socio-economic evolution, industrialization, and urban expansion. With Vietnam experiencing rapid urbanization and a considerable portion of its populace transitioning from rural to urban settings, the urban population becomes instrumental in propelling economic growth, fostering innovation, and instigating social transformation. Urban areas act as focal points for economic endeavors, drawing investments, nurturing entrepreneurship, and creating job prospects across diverse sectors such as manufacturing, services, and technology. The concentration of human capital in urban hubs contributes to heightened productivity levels, facilitates the exchange of knowledge, and spreads innovations, all of which are imperative for sustaining economic progress. Furthermore, the urban population serves as a significant consumer base, shaping consumption trends and stimulating domestic demand. As Vietnam continues its urbanization trajectory, effectively managing the opportunities and challenges associated with urban expansion

will be essential for attaining sustainable development goals, alleviating poverty, and enhancing the overall welfare of its citizens.

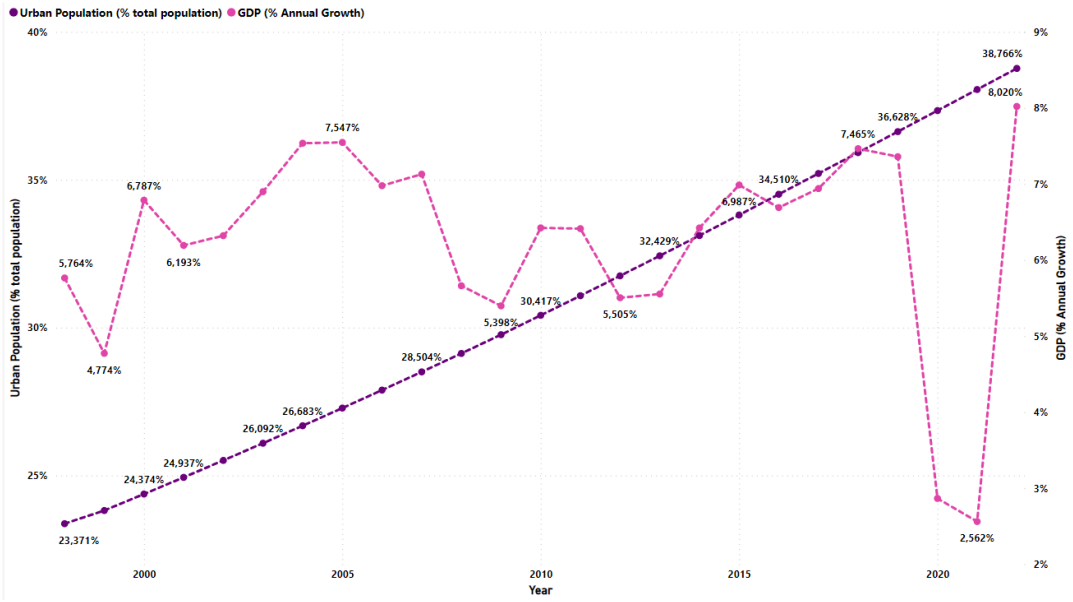

Figure 2.4.6: The correlation between urban population (% total population) and GDP growth (% Annual growth) in Vietnam from 1998 - 2022 (Data source: World Bank)

Vietnam's urban population increases year over year and we can't see the clear linear relationship between urban population and GDP growth in Vietnam through visualization.

Manufacturing value added: Manufacturing encompasses industries classified under ISIC divisions 10-33, which include: the production of food products, beverages, tobacco products, textiles, apparel, leather and related goods, wood and cork products (excluding furniture), paper and paper products, printing and reproduction of recorded media, coke and refined petroleum products manufacturing, chemicals and chemical products production, basic pharmaceutical products and pharmaceutical preparations manufacturing, rubber and plastics products manufacturing, other non-metallic mineral products manufacturing, basic metals manufacturing, fabricated metal products

manufacturing (excluding machinery and equipment), computer, electronic, and optical products manufacturing, electrical equipment manufacturing, machinery and equipment not elsewhere classified manufacturing, motor vehicles, trailers, and semi-trailers manufacturing, other transport equipment manufacturing, furniture manufacturing, other manufacturing activities, and the repair and installation of machinery and equipment.

Value added represents the net output of a sector, obtained by aggregating all outputs and subtracting intermediate inputs. It is computed without accounting for depreciation of fabricated assets or the depletion and degradation of natural resources. Manufacturing holds immense significance as it not only provides essential goods but also generates employment opportunities and drives economic growth. Through fostering innovation and technological advancements, manufacturing industries bolster productivity, competitiveness, and overall economic performance. In the trajectory of industrialization and modernization, the manufacturing sector emerges as a pivotal driver of high growth for countries (Mckinsey). This sector contributed over 20 percent to Vietnam's GDP (“Industrial sector expands over 9% in 2022” Ministry of Industry and Trade of the Socialist Republic of Vietnam) and has served as a cornerstone in maintaining a positive trade balance. It played a pivotal role in Vietnam's remarkable economic resilience amidst global upheavals, sustaining a positive GDP growth rate of 2.6 percent in 2021, even during the Covid-19 pandemic, and maintaining an 8% growth rate in 2022. Manufacturing has positioned Vietnam as a premier destination for international investment due to several unique advantages, including relatively low labor costs, suitable infrastructure, and a strategic geographical position conducive to exports. Despite its numerous advantages, Vietnam's manufacturing sector confronts several challenges, such as labor productivity (Vietnam ranks 136th out of 185 countries in labor productivity as of 2021, according to Mckinsey research). Despite increases in the sector's exports and FDI value, the domestically captured value has not correspondingly increased. In essence, while Vietnam's manufacturing output has expanded over time, the share of locally captured added value has not increased. This issue is compounded

by a fragmented supply chain in various industries, as Vietnam continues to rely heavily on imported inputs despite being an exporter.

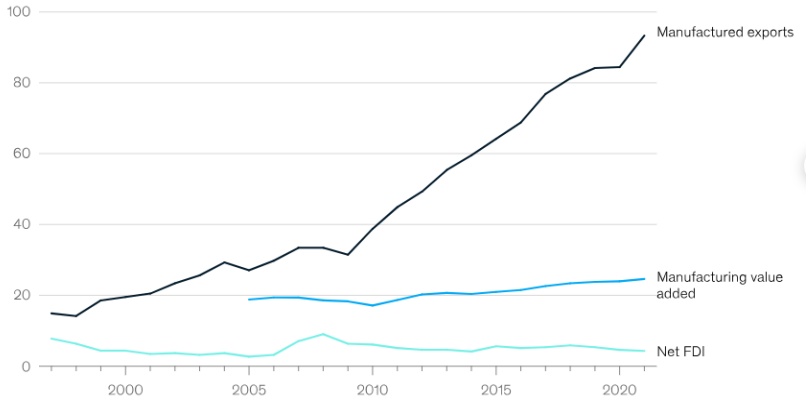

Figure 2.4.7: Manufactured exports, manufacturing value added, and foreign direct investment (FDI) in Vietnam as a share of GDP from 1997 - 2021 (Source: UN comtrade, UNDP Vietnam)

Considering the key highlights mentioned above, I have opted to include Manufacturing Value Added (MVA) as an independent variable in exploring the relationship between government expenditure and economic growth. It is widely recognized in development and growth literature that there exists a robust causal relationship between manufacturing growth and GDP growth in any nation Pacheco-López (2013). In a study analyzing the correlation between Manufacturing Value Added (MVA) and GDP across 92 countries over the periods of 1950–1970, 1970–1990, and 1990–2005, Adam Szirmai (2015) utilized random effects, fixed effects, and Hausman tests. Their findings indicate that the manufacturing sector acts as a growth engine for low and middle-income economies, provided there is a sufficient level of manpower. However, these growth engine characteristics do not extend to the service sector. This underscores the significant role of manufacturing as a driver of growth in both industrialized and emerging economies throughout the 1950–2005 period.

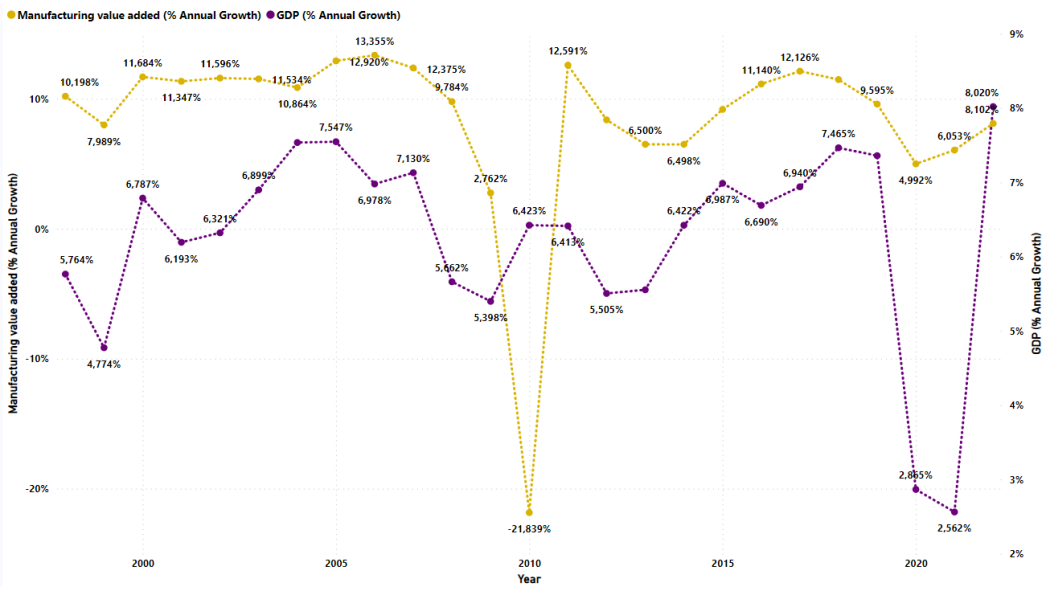

Figure 2.4.8: The correlation between Manufacturing value added ***(% Annual growth)*** *and GDP growth (% Annual) in Vietnam from 1998 - 2022 (Data source: World Bank)*

From the chart, except for 2010, the remaining years witnessed the stability in Vietnam manufacturing value added, and it keeps a higher growth rate than GDP growth over time.

Foreign direct investment (FDI): FDI, or foreign direct investment, encompasses direct investment equity flows within an economy, encompassing equity capital, reinvestment of earnings, and other capital. It entails a form of cross-border investment wherein a resident in one economy holds control or significant influence over the management of an enterprise in another economy (World Bank). According to endogenous growth models Romer, Increasing Returns and Long-Run Growth (1986), FDI underscores the significance of productivity, efficiency, and technological advancement, potentially bolstering a country's economy through positive externalities and spillover effects. However, adhering to endogenous growth theory, the issue of adverse selection may impede developing economies from reaping the benefits of FDI Krugman (1994). Numerous studies have attempted to establish the connection between

FDI and macroeconomic performance. While some papers suggest FDI positively influences growth, others depict a negative impact on economic growth, and some reveal insignificant results. For example, V. N. Balasubramanyam (1996) argue that FDI can expedite the growth of recipient countries by enhancing foreign trade and stabilizing macroeconomic variables, asserting that FDI inflows can more effectively spur economic growth than local investments, especially in developing economies implementing export promotion policies. Bolbol (2001) found a positive effect of FDI inflows on GDP growth and local investment in six Arab countries from 1978 to 1998. Similarly, Bengoa (2003) identified a positive association between FDI and GDP in 18 South American economies. Sokang (2018) demonstrated the favorable impact of foreign direct investment on growth in Cambodia's economy from 2006 to 2016, while Akiri Sunday Edesiri (2016) utilized VECM to determine the positive impact of inward FDI on Nigeria's GDP growth from 1981 to 2014. Conversely, Stoneman (1975) concluded that FDI had a detrimental effect on economic growth in growing economies from 1945 to 1970. Akinlo (2004) found a negative and negligible effect of FDI on Nigeria's GDP when using the Error Correction Model (ECM). Over 35 years, Vietnam's registered foreign direct investment (FDI) has surged from just US$2 million in 1988 to US$524 billion. Presently, FDI contributes 19% to the country's GDP, providing jobs for 35% of its labor force, despite comprising only 3% of businesses.

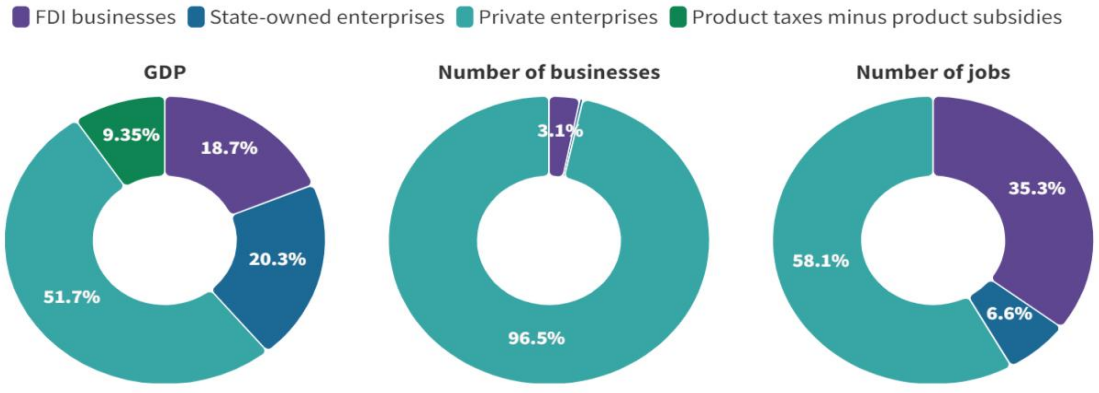

Figure 2.4.9: Contribution of FDI business (Source: General Statistic Office)

Significantly, according to research from vnexpress news, FDI enterprises dominate approximately 98% of the export market for high-tech products such as computers, electronics, mobile phones, and spare parts.

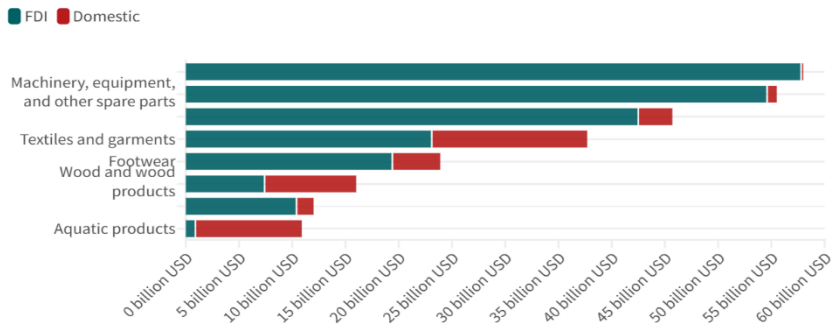

Figure 2.4.10: Vietnam's exports: FDI vs. Vietnamese firms (Source: vnexpress)

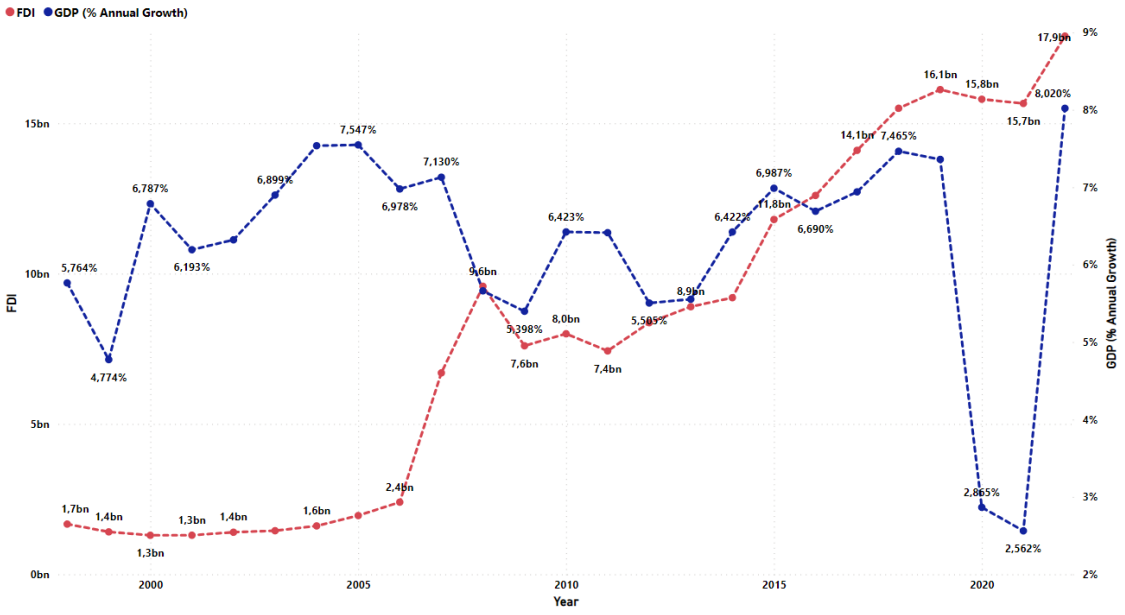

Figure 2.4.11: The correlation between FDI (current US$) and GDP growth (% Annual) in Vietnam from 1998 - 2022 (Data source: World Bank)

Phan Huu Thang, the former Director General of the Ministry of Planning and Investment's Foreign Investment Agency (FIA), underscores the significant role of

Foreign Direct Investment (FDI) in introducing technology and management expertise to Vietnamese businesses. Consequently, numerous local enterprises have diversified into various sectors such as real estate, petroleum, transportation, and information technology. Nonetheless, substantial challenges persist, including inefficiencies in technology transfer and limited collaboration between FDI firms and domestic counterparts. Only 13% of FDI companies operate as joint ventures with local partners, while the majority are wholly foreign-owned. Additionally, out of approximately 400 technology transfer contracts signed by FDI firms in the last five years, none involved local companies. Despite these hurdles, FDI remains a crucial variable in studies concerning economic growth in Vietnam, necessitating thorough examination to comprehend both its positive and negative impacts on the economy.

2.5. The correlation between variables

I used Python for the very first checking the correlation between each variables:

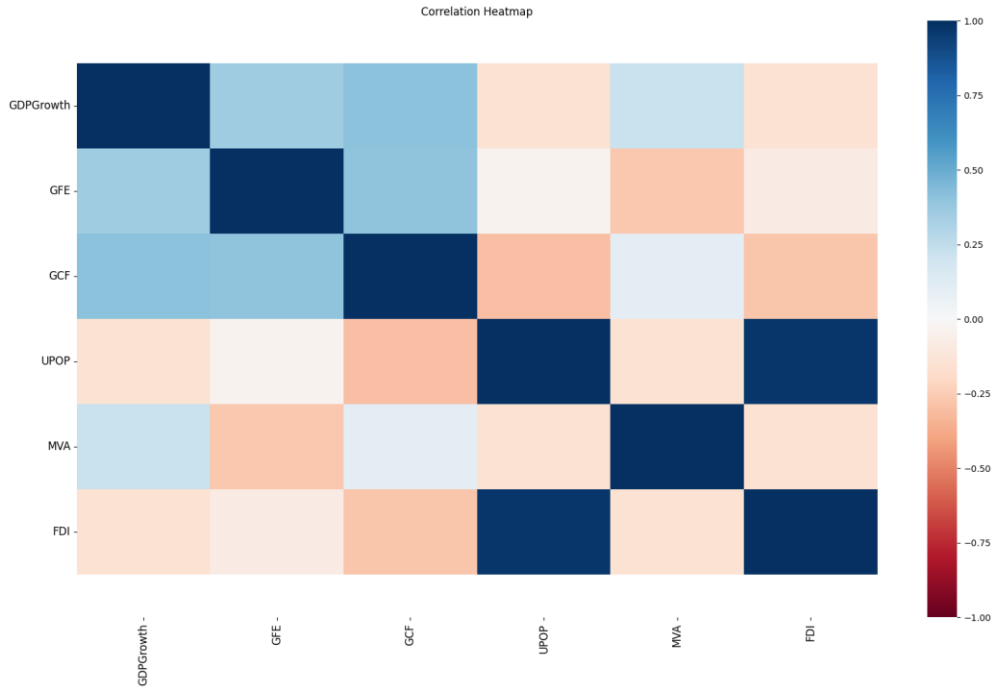

Figure 2.5.1. Correlation heatmap between variables (Source: Self synthesis)

From the figure above, we can see that government expenditure (GFE) and gross capital formation (GCF) has a strong positive relationship with GDP growth. For futher investigation, ARDL model will provide with more detailed result in consideration of short term and long term relationship between each variables.

CHAPTER 3: THE CURRENT STAGE OF GOVERNMENT EXPENDITURE IN VIETNAM

3.1. Government total expenditure and budget allocation

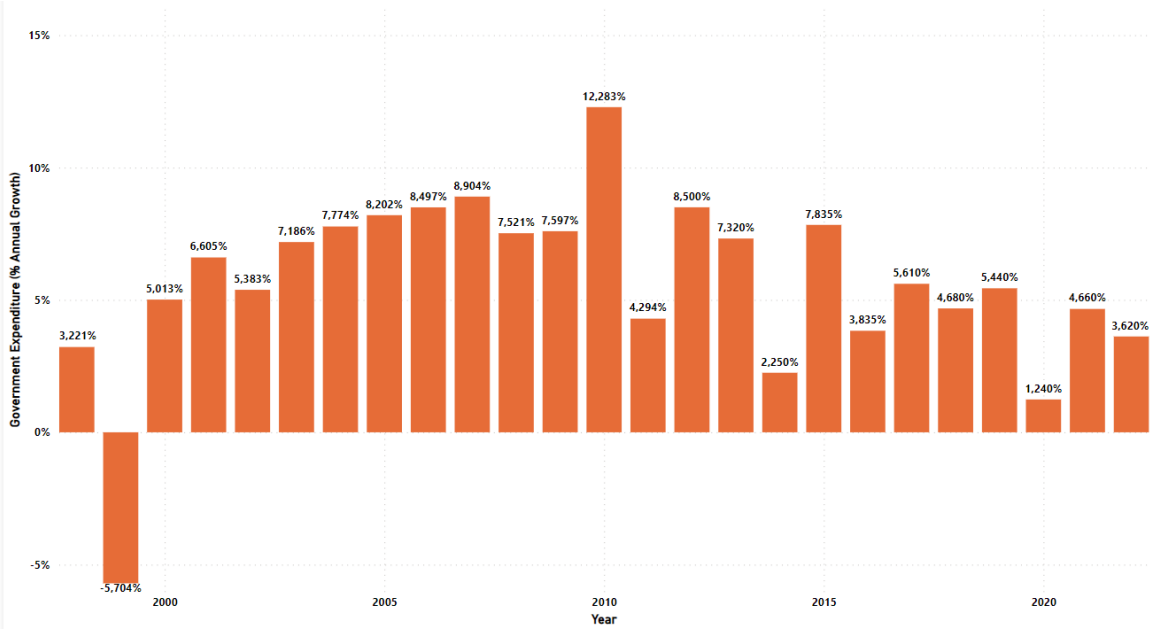

Figure 3.1.1: Vietnam government final consumption expenditure (%Annual growth) in 1998 – 2022 (Data source: World Bank)

According to Industry and Trade Magazine, state budget expenditures have been steadily increasing in tandem with the country's socioeconomic development. Government spending during the period from 2011 to 2015 amounted to 6,324.5 trillion VND, more than double that of the preceding period from 2005 to 2010. Subsequently, in the period from 2016 to 2020, government spending tripled compared to the 2005-2010 period. In 2020, due to concerns regarding the Covid-19 pandemic's impact on budget revenues and national financial security, routine spending was adjusted downwards by cutting non-essential activities such as conferences and missions. Total government spending up to December 15, 2020, was estimated at 1,432.5 trillion VND, a decrease compared to previous years, with routine spending at 966.7 trillion VND, investment expenditure at 356 trillion VND, and debt interest payments at 98.8 trillion

VND. Despite the overall increase in budget spending, the rate of spending growth has been on a downward trend. From 2014 to 2019, it reached 8.5%, significantly lower than the average growth rate of 18.3% from 2008 to 2013. This discrepancy is partly attributed to the period from 2009 to 2012 when the government expanded spending to support the economy after the 2008 global financial crisis. In the subsequent period from 2014 to 2019, the government pursued efforts to restructure public spending to reduce budgetary excesses and national public debt, resulting in a significant decrease in the growth rate of government spending. The ratio of government spending to GDP remains high, ranging from 25% to 29% of GDP, higher than many countries with similar levels of development. Vietnam's budget deficit from 2012 to 2017 ranged from 5.3% to 6.6% of GDP, higher than the 4.4% to 5.6% of GDP in the 2006-2011 period. Although there has been some reduction in the deficit, the overall structure of the state budget has not seen significant improvement compared to previous years. Due to the impact of the COVID-19 pandemic, government expenditure has become a key resource for post-pandemic economic recovery. Capital for government expenditure is concentrated and arranged for strategic infrastructure projects, such as roads, airports, ports, electricity, and infrastructure of urban areas, industrial parks, national target programs for new rural construction, and sustainable poverty reduction (GSO, 2020). In terms of regions, the government expenditure capital of the central government in the 2016-2020 period would be allocated to the following regions: North Central and Central Coast (27%), Northern Mountains (24%), Dong Nai and the Mekong River Delta (17%), the Red River Delta (13%), the Southeast (12%), and the Central Highlands (7%) (H.T. Nguyen, 2022). From 2019 onwards, the ICOR coefficient was relatively low (high investment efficiency), so the GDP growth rate was quite high, peaking in 2018 and 2019. In 2020 and 2021, ICOR was about 2.5 times higher than 2 years ago, which means investment efficiency is low and decreasing, mainly due to the Covid-19 pandemic starting in 2020 and breaking out in 2021, so GDP growth in these 2 years fell to the "bottom" in the last

30 years. In 2022, it is estimated that ICOR will decrease to about 5.92 times, far lower than in 2020 and 2021 (baodautu.vn). Thereby contributing to high GDP growth in 2022.

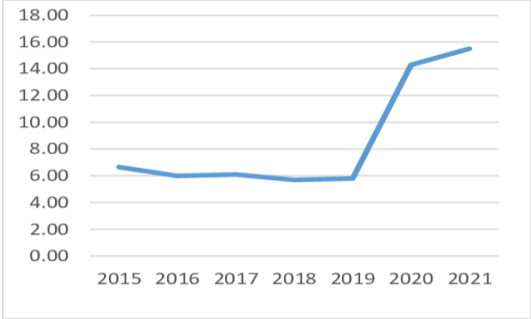

Figure 3.1.2: ICOR indicator of Vietnam, 2015-2021 (Source: Data of General Statistics Office (2023))

Total state budget expenditure in December 2022 was estimated at 203.3 trillion VND, bringing the accumulated expenditure for 2022 to 1,562.3 trillion VND, representing 87.5% of the yearly estimate and an 8.1% increase over the previous year. Regular expenditure in 2022 reached 1,026.2 trillion VND, equivalent to 92.4% of the yearly estimate and a 5.6% increase over the previous year, while development investment expenditure reached 435.7 trillion VND, equivalent to 82.8% of the yearly estimate and a 22.2% increase, with debt interest payments at 97.5 trillion VND, representing 94% of the yearly estimate and a 7.9% decrease.

3.2. Vietnam government expenditure structure and trends

Between 1993 and 2000, government spending on essential physical and social infrastructure, including education, healthcare, roads, electricity, irrigation, water supply, and telecommunications, increased in real terms. Although there was a notable decrease in the government's budget allocation for these sectors in 1994, it gradually recovered by 1998. During this period, the government shifted its spending priorities towards sectors providing public goods and fostering human capital development. From 1992 to 2002, the growth rate of public expenditure on agricultural research and

development (R&D) was 4.83% annually in real terms. While recurrent expenditure experienced a decrease of 8.34% per annum, capital investment saw a substantial growth rate of 13.48% per annum, mainly driven by increased spending on construction works at an average growth rate of 23.74% per annum. However, this shift towards capital investment led to a reduction in public spending on research activities. Consequently, domestic research institutions could only meet 10% of farmers' demand for high-yield crop varieties and livestock breeds, resulting in heavy reliance on imports. Total government expenditure on irrigation decreased from 11.35% in 1993 to 7.89% in 2000 at the national level, and from 21.48% to 9.85% at the provincial level. Investment in irrigation was also unevenly distributed among regions, with a bias towards more developed areas. The largest irrigation works were typically located in regions such as the Red River Delta, Mekong River Delta, North Central, and South East regions, receiving 60 to 80% of total investment in irrigation systems. Additionally, the rehabilitation and modernization of the road network accounted for the largest share of public expenditure and 94% of total transport spending, marking a 17 percentage point increase from 1994. Furthermore, public spending on upgrading the country's road network grew at a rapid rate of around 13.51% per annum during the period 1993-2000 (Trinh, 2004). In the period 2006–2015, Vietnam experienced slowed economic growth due to the 2008 financial crisis. Consequently, the Vietnamese government implemented a comprehensive economic restructuring plan. This involved a significant reduction in public investment and an increase in spending on education, healthcare, environmental protection, and scientific activities. Additionally, fiscal decentralization was largely delegated to local authorities based on principles of accountability and efficiency.

Over the three years from 2018 to 2020, the government maintained a relatively high level of investment in education and training. Government expenditure on social welfare ranks second in total government spending. However, investment in child care and protection, as well as social assistance, during the period 2018-2020, remains modest.

The government increased expenditure on healthcare infrastructure, health inspections, and medical examinations and treatment.

In 2022, government expenditure prioritized socio-economic development, national defense and security, state management, debt repayment, support for those affected by health crises, and the revitalization of sectors impacted by natural disasters and COVID-19, as per a government report released in 2022. According to data from the World Bank, Vietnam's non-tariff trade costs are higher than those of other ASEAN countries, with transport congestion costs reaching 21% of GDP in 2016, far exceeding the global average of 12%. Therefore, upgrading and modernizing existing infrastructure will create conditions for Vietnam to reduce trade barriers and enhance its ability to attract FDI, thereby contributing to long-term growth support. Therefore, Government implemented many important public expenditure projects aimed at developing infrastructure: North-South Expressway: A project connecting Vietnam's northern and southern regions to bolster domestic maritime and trade transport, comprising routes like the Hanoi - Hai Phong and Hanoi - Lao Cai expressways. Urban Renewal and Infrastructure: The government undertook initiatives to revitalize urban areas and enhance infrastructure in major cities like Hanoi and Ho Chi Minh City, encompassing upgrades to transportation, parks, and drainage systems. Power and Renewable Energy: Vietnam invested significantly in power ventures, including hydroelectric and thermal plants, alongside renewable energy endeavors like wind and solar power projects.

During the period from 1998 to 2022, data from the General Statistics Office of Vietnam shows that the average annual GDP growth rate during this period ranged from about 6-7%, a remarkable growth rate. This growth reflects the effectiveness of infrastructure projects and physical development initiatives in creating favorable conditions for production and trade activities. Construction and upgrading projects for highways, seaports, and railways have facilitated the transportation of goods and people. The growth rates of industries related to exports and imports can provide a clear insight

into the positive impact of improved transportation infrastructure. Additionally, improvements in sectors such as education and healthcare need to be examined. The number of schools, hospitals, and community healthcare facilities that have been built or upgraded can reflect progress in providing basic services to the population. The improvement in the quality of education and healthcare services can bring long-term benefits to the health and development of society as a whole. However, it's essential to acknowledge that government expenditure also faces some challenges. Projects may encounter issues related to quality, financial management, and negative environmental and social impacts. Specifically, due to the higher ratio of budget expenditure to GDP compared to the ratio of budget revenue to GDP, the budget deficit ratio is high. For many years, the budget deficit ratio has exceeded 5% of GDP, with the deficit reaching nearly 8% of GDP in 2012. On average, during the period from 2011 to 2015, the budget deficit ratio compared to GDP was as high as 6.1% of GDP. However, during the period from 2016 to 2019, the budget deficit ratio decreased to below 4% of GDP. In 2020, due to the impact of the COVID-19 pandemic, economic activities slowed down, leading to a decrease in budget revenue. Meanwhile, there was an increase in budget expenditure to cope with the pandemic, the budget deficit reached a significant 11.12%. Therefore, improvement in these areas is necessary to ensure that government expenditure achieves the highest effectiveness and maximizes benefits for the entire society.

CHAPTER 4: METHODOLOGY

4.1. Data

4.1.1. Source of data

The data for the variables used in the study are secondary data collected the World Bank's database - World Development Indicators (WDI).

Table 4.1.1: Variables description (Source: Self synthesis)

Order	Variable name	Abbreviation	Variable	Data source
1	GDP growth	GDPGr	GDP growth (annual %)	World Development Indicator
2	Manufacturing sector	MVA	Manufacturing, value added (annual % growth)	World Development Indicator
3	Government current expenditure	GFE	General government final consumption expenditure (annual % growth)	World Development Indicator
4	Gross capital formation	GCF	Gross capital formation (annual % growth)	World Development Indicator
5	Foreign Direct Investment	lnFDI	Foreign direct investment, net inflows (BoP, current US$)	World Development Indicator
6	Urban Population	UPOP	Urban population (% of total population)	World Development Indicator

4.2. Model specification

Utilizing economic growth as the dependent variable, this study adopts a growth model wherein GDP growth is represented as a function of various factors, including General government final consumption expenditure (GFE), Gross capital formation (GCF), Foreign direct investment (lnFDI), Urban population (UPOP), and Manufacturing value added (MVA). The general model for this study is presented as follows:

$$GDPGr_t = \beta_0 + \beta_1 GFE_t + \beta_2 GCF_t + \beta_3 lnFDI_t + \beta_4 UPOP_t + \beta_5 MVA_t + \varepsilon_t \quad (1)$$

where β_1, β_2, β_3, β_4 and β_5 represent the elasticities of the variables in the model with respect to GDP. t represents time and ε is the error term. The log form safeguards the removal of likely outliers as well as large coefficients. Elasticities are of importance as they bring to bear the actual responses of GDPGr as the dependent variable, against General government final consumption expenditure (GFE), Gross capital formation (GCF), Foreign direct investment (lnFDI), Urban population (UPOP), Manufacturing value added (MVA).

4.3. Estimation technique

In the analysis of time series data, conducting preliminary tests on the variables is crucial to ensure the reliability of the estimated parameters within the specified model. In this study, I initially examine the stationarity properties of all variables to mitigate the risk of spurious results. Subsequently, we employ the Autoregressive Distributed Lag (ARDL) estimation approach, following the methodology outlined by Stephen Taiwo Onifade (2020). The ARDL approach is widely known for its versatility in analyzing time-series data, regardless of the integration order of variables, as long as none are integrated at the second order. This method can be used irrespective of whether the underlying regressors are integrated at order one (I(1)), order zero (I(0)), or are fractionally integrated. Moreover, it remains effective even with small sample sizes, making it suitable and efficient for analysis.

4.4. Stationarity test

4.4.1. Augmented Dickey–Fuller (ADF) test

The Augmented Dickey-Fuller (ADF) test represents a refined and enhanced iteration of the Dickey-Fuller test. Unlike the Dickey-Fuller test, which presupposes that error terms should be uncorrelated and exhibit white noise characteristics, the ADF test is employed in scenarios where error terms may display correlation. This is particularly relevant considering that many macroeconomic variables often exhibit correlation and trendiness. The ADF test addresses this by incorporating additional lagged terms of the dependent variable into the equation, effectively mitigating issues related to autocorrelation. A simple formulation of the ADF stationarity test expressed as follows:

$$\Delta X_t = \alpha_1 + \alpha_2 t + \alpha_3 X_{t-1} + \sum_{i=1}^{p} \beta_1 \Delta X_{t-i} + \varepsilon_t \quad (2)$$

where X represents the time series variable, t is the time/trend variable, α_1, α_2, and α_3 are the estimated parameters, Δ is the first difference operator, β_1 is the various estimated parameters of the differenced values of the lagged variables, and ε_t is the white noise error term. From equation (2), test the null hypothesis of the presence of unit root against the alternative hypothesis of no unit root. The series is stationary if the study rejects the null hypothesis. Should the study fail to reject the null hypothesis, then the series possesses a unit root and is thus nonstationary.

4.4.2. Phillips-Perron (PP) test

Phillips and Perron (1988) introduced the Phillips-Perron (PP) test as an enhanced method for assessing the stationarity of time series data. This test builds upon the Augmented Dickey-Fuller (ADF) test by incorporating non-parametric modifications to the test statistics, which effectively address potential issues of autocorrelation and heteroscedasticity in the error terms. A simplified representation of the PP test is as follows:

$$\Delta X_{t-1} = \alpha_0 + \beta X_{t-1} + \varepsilon_t \quad (3)$$

From equation (3), test the null hypothesis of the presence of unit root ($\beta = 0$), against the alternative hypothesis of no unit root. The series possesses a unit root if the study fails to reject the null hypothesis. On the other hand, the series is stationary if the null hypothesis is rejected.

4.5. Autoregressive distributed lag (ARDL) model

The ARDL estimation technique is utilized to investigate both the short-term and long-term impacts. This approach is favored due to its several advantages. Firstly, Pesaran et al. (2001) highlight its applicability to time series data regardless of whether the series is stationary at first difference I(1) or at the levels I(0), or a combination of both. Additionally, it is suitable for analyses with small sample sizes and offers flexibility as it can be employed even when the order of integration of the variables is unknown prior to conducting the cointegration test.

A general ARDL model may be expressed as

$$\Delta Y_t = \beta_0 + \gamma_0 Y_{t-1} + \gamma_1 X_{t-1} + \gamma_2 Z_{t-1} + \sum_{i=1}^{p} \beta_i \Delta Y_{t-1} + \sum_{i=0}^{p} \alpha_j \Delta X_{t-j} + \sum_{i=0}^{p} \delta_k \Delta Z_{t-k} + \varepsilon \quad (4)$$

From equation (4), Y is the dependent variable, X and Z are the independent variables in the model. β, δ, and γ are the coefficients to be estimated, and ε is the error term.

4.6. ARDL bounds testing approach

The ARDL bounds test for cointegration, which examines the long-run equilibrium relationship, is conducted by evaluating the overall significance of the lag of all variables in their levels form. The study assesses the significance of the F-statistic to determine whether a long-run equilibrium relationship exists. This test compares the hypothesis of no long-run equilibrium relationship to the alternative hypothesis suggesting the presence of such a relationship among the variables. equation (6) illustrates this test.

$$H0 : \gamma_0 = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5$$

$$H1 : \gamma_0 \neq \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq \gamma_5$$

The study proceeds by comparing the calculated F-statistic value with the critical values established by Pesaran et al. (2001). These critical values include both lower and upper bounds, with the lower bounds assuming all variables are integrated of order zero, I(0), and the upper bounds assuming all variables are integrated of order one, I(1). If the calculated F-statistic exceeds the upper bound, the null hypothesis is rejected, indicating the presence of a long-run equilibrium relationship among the variables. Conversely, if the F-statistic falls below the lower bound, the null hypothesis is retained, suggesting no long-run relationship among the variables.

4.7. The short-run and long-run estimates from the ARDL model

Because the ARDL model specifies both the long-run and short-run impacts of the independent variables on the dependent variables, the study can estimate the long-run coefficients after a long-run relationship has been established among the variables.

$$Y_t = \beta_0 + \gamma_0 Y_{t-1} + \gamma_1 X_{t-1} + \gamma_2 Z_{t-1} + \varepsilon_t \quad (7)$$

From equation (7) the long-run coefficients, γ_0, γ_1, γ_2 are generated.

The short-run dynamics coefficients from the model may be expressed by finding the error correction model associated with the long-run estimates. Thus, from equation (8), the short-run regression model may be expressed as:

$$\Delta Y_t = \beta_0 + \sum^{p}_{i=1}\beta_i \Delta Y_{i-0} + \sum^{p}_{i=0}\beta_i \Delta X_{i-0} + \sum^{p}_{i=0}\alpha_i Z_{i-0} + \zeta E_{t-1} + \varepsilon_t \quad (8)$$

where E_{t-1} shows the error correction factor and ζ represents the speed of adjustment. βi, α_i are the short-run parameters to be estimated. From equation (8), the error correction tells the speed of adjustment of the variables to the long-run equilibrium, should there be any disequilibrium. The error correction factor is thus expected to be negative and significant. The negative suggests that with any deviation from the long-run, the variables would return to equilibrium.

CHAPTER 5: RESULT AND DISCUSSION

5.1. Descriptive statistics

Table 5.1 shows the descriptive statistics of the obtained data.

Table 5.1. Descriptive statistics

Variable	Mean	Std. Dev	Minimum	Maximum
GDPGr	6.248	1.324	2.562	8.020
GFE	5.671	3.400	-5.704	12.283
UPOP	30.655	4.772	23.371	38.766
GCF	8.518	5.595	-4.333	26.798
MVA	8.449	6.870	-21.839	13.355
lnFDI	22.422	.994	20.984	23.608

GDP growth rate (GDPGr) has maximum and minimum values of 8.020 and 2.562. To make data more balanced, logarit is applied into foreign direct investment (lnFDI) which recorded a standard deviation and a mean value of 0.994 and 22.422, respectively. lnFDI has low standard deviation, and its maximum and minimum values of 23.608 and 20.984, respectively. Meanwhile, urban population (UPOP) portrays a high mean value of 30.655, and further shows maximum and minimum values of 38.766 and 23.471 respectively. Government final consumption expenditure (GFE) and gross capital formation (GCF) recorded a mean value of 5.671 and 8.518 respectively. Both GFE and GCF recorded negative records in minimum values, which is -5.704 and -4.333, respectively. When Gross Capital Formation (GCF) is negative, which generally indicates that the total value of new investments in the economy has fallen by more than the total value of fixed assets that have been depreciated or scrapped. Negative GFE can

be due to temporary factors such as fluctuations in budget payments or large expenditures in the previous year. GFE and GCF AnnualGrowth further show maximum values of 12.283 and 26.798, respectively. Lastly, manufacturing value added (MVA) recorded a mean figure of 8.449. Again, it shows a maximum and a minimum value of 13.355 and -21.839, respectively.

5.2. Stationary test

The results from Table 5.2 illustrate the stationary of the variables.

Table 5.2: Stationarity results

Variable	**ADF Test**		**Philips Perron Test**		**Order of Integration**
Constant		**Constant and Trend**	**Constant**	**Constant and Trend**	
PANEL A: LEVELS					
GDPGr	- 3.526**	- 3.493***	- 3.425**	- 3.342***	
lnFDI	-0.565	- 1.702	- 0.653	- 2.036	
UPOP	11.626	- 5.337*	9.726	- 5.284*	
MVA	- 4.061*	- 4.034*	- 4.055*	- 4.025*	
GCF	- 3.934*	- 4.080*	- 3.966*	- 4.092**	
GFE	- 3.714**	- 3.622 **	- 3.666**	- 3.546**	
PANEL B: FIRST DIFFERENCE					

ΔlnFDI	- 3.540**	- 3.475 ***	-3.497*	- 3.416**	I(1)
ΔUPOP	- 4.365*	- 8.903*	-4.040*	- 6.861*	I(1)

*Note: ***, **, * indicates significance at 10%, 5%, and 1%, respectively*

Both ADF and PP tests reveal that GDP growth (GDPGr), manufacturing value added (MVA), gross capital formation (GCF) and government final consumption expenditure (GFE) are stationary at level among the series. It implies that these variables are I(0) variables. However, the remaining variables are I(1) variables as they were all not stationary at level, even though all became stationary after the series were differenced.

5.3. ARDL bounds test cointegration results

Table 5.3 shows the result of the Autoregressive Distributed Lag (ARDL) Bound Test, which tests the presence of a long-run relationship between the series.

Table 5.3: Results of bounds test cointegration

	Critical Values		
F - Statistics	**Significance**	**Lower Bound**	**Upper Bound**
36.020	10%	2.26	3.35
	5%	2.62	3.79
	2.5%	2.96	4.18
	1%	3.41	4.68

The F-Statistic computed (36.020) is higher than the Upper Critical Bound values of 3.35, 3.79, 4.18 and 4.68 at 10%, 5%, 2.5% and 1% significance level, respectively.

There is the presence of a long-run equilibrium relationship among the factors under consideration.

5.4. Diagnostic tests

Table 5.4: Diagnostic test result

Test	Prob. Value
Autocorrelation	0.2198
Heteroscedasticity	0.8383

Since P-value is greater than alpha (5%, 1%, 10%): The test for autocorrelation based on the Breusch–Godfrey autocorrelation LM test among the residuals confirms that there is no autocorrelation. The test of Heteroscedasticity based on the Breusch–Pagan–Godfrey test also indicates the nonexistence of heteroscedasticity among the error terms.

5.5. Results from long-run estimates

Table 5.5 illustrates the results of the influence of the variables employed in the study on GDP growth.

Table 5.5: Estimated long-run results

Variable	Coefficient	Std. Error	t - Statistic
GFE	0.485*	0.057	8.53
GCF	0.141*	0.027	5.29
D_lnFDI	-3.103*	0.729	-4.26
D_UPOP	13.768*	2.150	6.40

MVA	0.132*	0.021	6.33

*Note: ***, **, * indicates significance at 10%, 5%, and 1%, respectively*

The relationship between government expenditure (GFE) and GDP growth is positive and highly significant in the long - run. The result means that a percentage point increase in government expenditure will lead to 0.485 percentage point increase in GDP Growth in Vietnam, in the long - run. Similar to the research of Cerra and Saxena (2008), in their study "Growth Dynamics: The Myth of Economic Recovery" Valerie Cerra and Sweta Chaman Saxena investigated the determinants of economic growth dynamics across countries. They found that government consumption expenditure positively contributes to economic growth in the long - run, especially when combined with macroeconomic policies and structural reforms. IMF (2014), in study "Making Public Investment More Efficient" the International Monetary Fund (IMF) examined the effectiveness of public investment in stimulating economic growth. They concluded that well-targeted public spending can enhance productivity and contribute to sustainable long-term economic growth. Gupta et al. (2014), in their research "The Effectiveness of Government Spending on Education and Health Care in Developing and Transition Economies", the result indicated that increased government spending on education and healthcare positively contributes to long-term economic growth by improving human capital, productivity, and overall well-being. Actually, increased government expenditure, particularly in sectors such as infrastructure, healthcare, education, and research and development, stimulates aggregate demand, which, in turn, fosters economic expansion. As governments expenditure in public goods and services, such as transportation networks and education systems, they create a conducive environment for private sector productivity and innovation. Moreover, government expenditure on social welfare programs can enhance human capital development and reduce income inequality, both of which are conducive to long-term economic growth. According to Keynesian theory, there exists a positive statistical relationship between government

expenditure and economic growth. Keynesian economics posits that during periods of economic downturn or recession, aggregate demand tends to fall short of the level necessary to maintain full employment and stable economic growth. In such situations, government intervention through increased spending, particularly on consumption and investment, can effectively stimulate economic activity. By injecting funds into the economy, governments create demand for goods and services, leading to increased production, employment, and income levels.

The relationship between gross capital formation (GCF) and GDP growth is positive and highly significant in the long - run. The result means that in the long - run, a percentage point increase in gross capital formation will lead to 0.141 percentage point increase in GDP Growth in Vietnam. The result is similar to the research of Khan and Islam (2001), in their paper "Growth Empirics: A Panel Data Approach", the result indicated that gross capital formation has a significant positive effect on long-term economic growth in these countries, emphasizing the importance of investment in physical capital for sustainable development. Barro and Sala-i-Martin (2004), in their influential book "Economic Growth", they argued that sustained increases in gross capital formation contribute to long-term economic growth by enhancing productivity, expanding production capacity, and fostering technological progress, particularly in developing countries. In the study "The Relationship between Investment and Economic Growth in the Asia-Pacific Region: A Panel Data Approach" Narayan and Smyth (2005), they found evidence of a long-run positive relationship between investment and economic growth, suggesting that sustained increases in investment contribute to higher output levels over time.

The relationship between urban population (DUPOP) and GDP growth is positive and highly significant in the long - run. The result means that in the long - run, a percentage point increase in urban population will lead to 13.768 percentage point increase in GDP Growth in Vietnam. In 2009, the World Bank published a report titled

"World Development Report 2009: Reshaping Economic Geography" which explored the role of urbanization in promoting economic growth and development. The report highlighted the positive effects of urbanization on productivity, innovation, and human capital accumulation, emphasizing its importance for long-term economic growth, especially in developing countries. Chen and Rosenthal (2008), in study "Local Amenities and Life-Cycle Migration: Do People Move for Jobs or Fun?" The authors evaluated the role of local amenities, such as cultural attractions, recreational facilities, and educational opportunities, in attracting migrants to urban areas. They found that increasing urban population density leads to the provision of diverse amenities, which enhance the attractiveness of cities and contribute to long-term economic growth by attracting skilled workers and fostering entrepreneurship. In the paper "The Global Spatial Distribution of Economic Activity: Nature, History, and the Role of Trade" Ghani et al. (2014), with a focus on the role of urbanization in promoting economic growth. They found that increasing urban population density is positively associated with productivity growth, knowledge spillovers, and innovation, particularly in developing countries where urbanization rates are high. Urban population plays an indisputably pivotal role in propelling Vietnam's economy forward, serving as the engine for growth, innovation, and development. The urban centers, such as Ho Chi Minh City and Hanoi, act as vibrant hubs of economic activity, attracting investments, fostering entrepreneurship, and driving technological advancements. These cities serve as magnets for talent, drawing skilled professionals, entrepreneurs, and innovators from across the country and around the globe, thereby enriching the workforce and enhancing productivity. The concentration of human capital in urban areas cultivates a fertile ground for knowledge exchange, creativity, and the emergence of new industries. Moreover, urbanization spurs the demand for infrastructure, housing, and services, leading to significant investments in construction, real estate, and utilities, which in turn stimulate economic growth and generate employment opportunities. Furthermore, urban consumers contribute substantially to domestic consumption, driving demand for a wide

array of goods and services, from consumer electronics to leisure activities, thereby fueling domestic production and trade. Additionally, the density of urban populations fosters efficient transportation and logistics networks, facilitating the movement of goods and services, reducing transaction costs, and enhancing market integration. The urban economy also serves as a catalyst for modernization and industrialization, with manufacturing and service sectors flourishing in urban centers, harnessing economies of scale and technological advancements to boost competitiveness and export potential. Furthermore, the concentration of financial institutions, research centers, and educational facilities in urban areas fosters innovation, entrepreneurship, and the development of high-value-added industries, positioning Vietnam as a regional powerhouse in the global economy. Thus, the urban population stands as a cornerstone of Vietnam's economic prosperity, driving growth, fostering innovation, and enhancing competitiveness in an increasingly interconnected world: Vietnam's urbanization has steadily risen, reaching about 38.6% in 2020, as reported by the World Bank. Urban areas contributed roughly 70% to the country's GDP in 2020, as per the General Statistics Office of Vietnam. Major cities like Ho Chi Minh City, Hanoi, and Da Nang foster vibrant startup ecosystems, drawing investment and talent, bolstering Vietnam's regional reputation for innovation. Ho Chi Minh City and Hanoi have attracted the lion's share of recent Foreign Direct Investment (FDI), as highlighted by the Ministry of Planning and Investment of Vietnam, further emphasizing the pivotal role of urban centers in propelling economic growth and development.

The relationship between manufacturing value added (MVA) and GDP growth is positive and highly significant in the long - run. The result means that in the long - run, a percentage point increase in manufacturing value added will lead to 0.132 percentage point increase in GDP Growth in Vietnam. This result is similar to the research of Rodrik and McMillan (2011), with the title "Globalization, Structural Change, and Productivity Growth", Dani Rodrik and Margaret McMillan examined the relationship between manufacturing value added and economic growth in developing

countries. They found that manufacturing sectors tend to exhibit higher productivity levels and technological dynamism compared to other sectors, leading to spillover effects on overall economic growth in the long run. UNIDO (United Nations Industrial Development Organization) (2016), UNIDO published a report titled "Industrial Development Report 2016: The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development," which highlighted the importance of manufacturing value added in driving economic growth and development. The report emphasized the role of technology and innovation in enhancing productivity and competitiveness in manufacturing sectors, thereby contributing to long-term economic growth in developing countries. Hausmann et al. (2007), in their study "What You Export Matters" Ricardo Hausmann, Jason Hwang, and Dani Rodrik examined the relationship between export diversification, including manufacturing exports, and economic growth in developing countries. They found that diversifying into manufacturing sectors can lead to higher productivity levels, technological upgrading, and income growth, thereby promoting long-term economic development.

The relationship between foreign direct investment (lnFDI) and GDP growth is negative and highly significant in the long - run. The result means that in the long - run, a percentage point increase in foreign direct investment will lead to 3.103 percentage point decrease in GDP Growth in Vietnam. This result is similar to some studies. For instance, Apergis and Katrakilidis (1999) with the study "New Evidence on the Relationship Between Foreign Direct Investment and Economic Growth" Nicholas Apergis and Costas Katrakilidis investigated the relationship between FDI and economic growth in Greece. They found that while FDI had positive short-term effects, its impact on long-term growth was statistically insignificant, suggesting that other factors may be more important determinants of sustained economic growth in developing countries. Alfaro et al. (2004) with the study "FDI and Economic Growth: The Role of Local Financial Markets" Laura Alfaro, Sebnem Kalemli-Ozcan, and Vadym Volosovych examined the relationship between FDI and economic growth in developing countries,

focusing on the role of local financial markets. They found that the positive impact of FDI on growth depends on **the development of domestic financial markets and institutions**, and in the absence of such development, the long-term growth effects of FDI may be limited. Moran et al. (2005), in their book "Does Foreign Direct Investment Promote Development?" The group of authors evaluated the impact of FDI on development outcomes in various countries. While they acknowledged the potential benefits of FDI, they also highlighted cases where FDI failed to generate significant long-term growth or development, emphasizing the importance of domestic policies and institutions in leveraging FDI for sustainable development. When discussing the dual impacts of foreign direct investment (FDI) over time: The ARDL model suggests a causal relationship between FDI inflows and long-term economic performance in Vietnam. Initially boosting growth, FDI's long-term effects may turn negative due to factors like limited technology transfer, resource repatriation, or reliance on foreign corporations. The ARDL model also indicates threshold effects, suggesting that beyond a certain level, FDI's impact on economic growth becomes negative. While moderate FDI levels are beneficial, excessive reliance on foreign investment can lead to adverse long-term outcomes.

While FDI is often lauded for its potential to stimulate economic growth through capital inflows, technology transfer, and job creation, its long-term impact on Vietnam's economy merits closer examination. Firstly, FDI often focus on labor-intensive manufacturing sectors, such as textiles and electronics assembly, which provide limited opportunities for skill development and innovation. This may perpetuate Vietnam's position as a low-cost assembly hub rather than fostering the emergence of high-value-added industries that drive sustained economic growth. Secondly, FDI inflows can exacerbate income inequality and deepen social disparities. Multinational corporations typically offer higher wages and benefits to skilled workers, exacerbating wage differentials and widening the gap between skilled and unskilled workers. This income inequality undermines social cohesion, perpetuates poverty traps, and hampers the

development of a robust middle class, which is essential for sustainable economic growth. Thirdly, the volatility of FDI inflows poses risks to macroeconomic stability and undermines long-term growth prospects. Vietnam's economy is susceptible to external shocks, such as changes in global market conditions or shifts in investor sentiment, which can lead to sudden capital outflows and currency depreciation. Moreover, the enclave nature of many FDI projects, which operate in isolation from the domestic economy, limits their spillover effects and contributions to broader economic development. Data from the General Statistics Office of Vietnam indicates that while FDI inflows have surged in recent years, reaching a record high of $39.9 billion in 2020, the economy's growth trajectory has been volatile, with growth rates fluctuating between 6% and 7% annually from 2015 to 2020. Furthermore, studies by economists such as Ha-Joon Chang and Dani Rodrik have raised concerns about the developmental implications of FDI-led growth models, arguing that they may undermine domestic capabilities, stifle innovation, and perpetuate dependence on foreign investors.

5.6. Results from short-run estimates

The Error Correction Model (ECM) term is incorporated in the short-run estimation analysis within the ARDL framework. This reveals the immediate impact of foreign direct investment (lnFDI), gross capital formation (GCF), government final consumption expenditure (GFE), manufacturing value added (MVA) in Vietnam. The ECM determines the speed of adjustment for the factors under consideration, thus the rate at which the variables return to equilibrium in the short-run.

Table 5.6: Estimated short-run results

Variable	Coefficient	Std. Error	t – Statistic
D(ΔlnFDI)	3.660**	1.44	2.54
D(GFE)	-0.484*	0.112	-4.32

D(GCF)	-0.196**	0.058	-3.39
D(MVA)	-0.107**	0.039	-2.76

*Note: ***, **, * indicates significance at 10%, 5%, and 1%, respectively*

The short-run results illustrated in Table 5.6 indicate that the ECM is statistically significant at 1% and also negative, and this is in agreement with the long-run equilibrium relationship among variables from the cointegration test. It further shows that there is evidence of stability and robustness in the model. This implies that in the long-run, all variables in the model will converge to an equilibrium if there is a shock in the short-run.

The result shows that, foreign direct investment (lnFDI) is statistically significant and positively related to GDP Growth. In the short run and after each fluctuation of foreign direct investment, a percentage point increase in FDI will lead to 3.660 percentage point increase in GDP growth. This result is similar to Chakrabarti (2001), in his research of "The Determinants of Foreign Direct Investment: Sensitivity Analyses of Cross-Country Regressions". He found that FDI has a positive and significant effect on short-term economic growth, particularly in developing countries where it complements domestic investment, promotes technology transfer, and enhances productivity levels. Haddad et al. (2010) in the research paper "Foreign Direct Investment, Trade and Economic Growth: An Empirical Analysis of the Causal Nexus in Middle East Countries", the group of author investigated the causal relationship between FDI, trade, and economic growth in Middle Eastern countries. They found evidence suggesting that FDI inflows have a positive impact on short-term economic growth by stimulating investment, technology diffusion, and export-oriented production activities.

The relationship between government final consumption expenditure (GFE) and GDP growth is negative and significant in the short - run. A percentage increase in

government final consumption expenditure will lead to 0.484 percentage point decrease in GDP growth. This result is similar to some studies. Hemming et al. (2002), "Public Expenditure Handbook: A Guide to Public Policy Issues in Developing Countries" Richard Hemming, the authors discussed the potential adverse effects of government expenditure, including government final consumption expenditure, on short-term economic growth in developing countries. They highlighted the importance of fiscal sustainability and efficiency in public spending to avoid **crowding out** private investment and undermining short-term growth prospects. Gupta et al. (2005) with the study "Government Spending, the Real Exchange Rate, and Economic Growth in the Developing World", the result indicated evidence suggesting that excessive government consumption expenditure can lead to real **exchange rate appreciation**, which may negatively affect the competitiveness of domestic industries and hinder short-term growth. During the early 2000s, Vietnam heavily subsidized state-owned enterprises (SOEs) across sectors like agriculture, manufacturing, and heavy industry. Despite a decline in SOE performance since 2010, they still make a significant contribution among different enterprise types, leading to challenges in economic growth, such as: Distorted resource allocation due to subsidies, which supported inefficient and uncompetitive enterprises instead of fostering innovation. Heightened competition for resources like credit and skilled labor for private businesses, as SOEs received preferential treatment, hindering private sector development and innovation. Increased import dependency for many SOEs, limiting domestic production capacity and the positive spillover effects of government spending on economic growth. Limited productivity gains due to outdated technology and inefficient practices among many SOEs, resulting in minimal improvements in output or efficiency.

Gross capital formation (GCF) is statistically significant and negatively related to GDP Growth. A percentage point increase in gross capital formation will lead to 0.196 percentage point decrease in GDP growth. This result is similar to some studies. Mishra and Sharma (2018), in their paper titled "Gross Capital Formation, Labor Force,

and Economic Growth: Evidence from Developing Countries" Arun Kumar Mishra and Chandan Sharma analyzed the relationship between gross capital formation, labor force, and economic growth in developing countries. They found that while gross capital formation generally contributes to long-term economic growth, there may be short-term disruptions in growth due to factors such as capital misallocation, financial market imperfections, or policy uncertainties. The World Bank's "Global Economic Prospects" (2019) report highlighted the challenges associated with managing capital flows and investment in developing countries. The report discussed how rapid increases in gross capital formation, especially if not accompanied by structural reforms or improvements in productivity, could lead to short-term macroeconomic imbalances, inflationary pressures, and financial vulnerabilities, which may undermine short-term growth prospects. Narayan et al. (2020), "The Impact of Gross Capital Formation on Economic Growth: Evidence from Developing Countries", the result showed that while gross capital formation tends to have positive effects on long-term growth, there may be short-term lags or adjustment costs associated with increasing investment levels, which could temporarily reduce growth prospects. Vietnam still being an emerging economy, so increasing gross capital formation can lead to some challenges in the short term like: When capital formation occurs, resources like labor and materials are directed toward investment activities, potentially temporarily reducing resources available for other sectors, causing a growth slowdown. Acquiring and installing new capital entail significant costs and disruptions, such as training workers, adjusting production processes, and overcoming logistical challenges, which may temporarily reduce productivity and output. Additionally, there's often a time lag between making investments and realizing increased productivity and output. Introducing capital-intensive technologies may require a skilled workforce, leading to unemployment or underemployment in the short run until the workforce adapts to the new technologies.

Surprisingly, in the short term manufacturing value added (MVA) has a negative impact on GDP growth. A percentage increase in manufacturing value added

will lead to 0.107 percentage point decrease in GDP growth. In the short - term, there are some challenges within the manufacturing sector that may have affected overall economic performance:

- Economic downturns, like recessions or financial crises, can cause manufacturing output to shrink due to lower consumer demand, reduced investment, and disruptions in global supply chains. In 2010, Vietnam's manufacturing value added notably decreased, possibly influenced by the global financial crisis of 2008-2009.
- Supply Chain Disruptions: Vietnam's manufacturing sector heavily relies on global supply chains, and disruptions in these chains due to factors like trade conflicts, transportation bottlenecks, Covid 19 led to temporary declines in manufacturing output and economic activity.
- Policy constraints such as inefficient regulations and bureaucratic burdens in Vietnam's manufacturing sector might impede its growth by discouraging investment and innovation, leading to stagnation or decline in economic activity. One notable challenge is the complexity of business licensing, permits, and compliance requirements, despite ongoing efforts to streamline regulations and improve the business environment.

CONCLUSION

The analysis reveals several important insights into the relationship between government expenditure and economic growth in Vietnam. In the long run, government final consumption expenditure, gross capital consumption, manufacturing value added, urban population have positive impacts and FDI has negative impact on economic growth. However, in the short run, the impacts of these variables on economic growth are mixed, with government final consumption expenditure, gross capital consumption, and manufacturing value added showing negative effects, while FDI exhibits a positive impact. The study empirically validates the Keynesian theory's relevance in Vietnam, highlighting the role of government spending in stimulating economic growth in the long - term. As per Keynesian principles, heightened public investment and recurrent spending bolster labor demand, resulting in increased real wages and consumer demand, thereby driving aggregate demand through expansionary fiscal policies (Galí, 2007). However, it also reveals the short-term crowding out effect of government expenditure on economic growth. Past research by (Ahmed and Miller, 2000), (Farla et al., 2016), and (Nguyen and Trinh, 2018) indicates that public investment may displace other capital investments, underscoring the importance of regulating government investment expenditures.

Furthermore, this study offers valuable insights for policymakers regarding government expenditure. Fostering economic growth requires a strategic investment approach targeting sectors that establish the foundational framework. Enhancing accountability and transparency in managing and utilizing public investment and recurrent spending at all administrative levels is imperative. Despite its negative long-term impact, FDI has been shown to stimulate economic growth in the short run. Therefore, policies aimed at attracting FDI should be continued and strengthened to bolster short-term growth prospects. However, efforts should also be made to ensure that FDI inflows contribute to sustainable long-term development and do not hinder domestic

industries. Given the positive long-term impact of gross capital consumption on economic growth, there is a need for sustained investment in infrastructure development. Improving physical infrastructure, such as transportation networks and energy systems, can enhance productivity, attract investment, and stimulate economic growth over the long term. The positive long-term impact of manufacturing value added on economic growth underscores the importance of fostering a robust manufacturing sector. Policymakers should implement measures to promote industrialization, enhance technological capabilities, and support value-added activities within the manufacturing sector to drive sustainable economic growth. Urban population growth has been identified as a significant contributor to long-term economic growth. Therefore, policies that promote sustainable urbanization, including investments in infrastructure, education, and healthcare, should be prioritized to harness the positive economic potential of urbanization while addressing associated challenges such as congestion and environmental degradation.

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APPENDIX

Research on the relationship between government expenditure and economic growth:

Order	Author (Time)	Research method	Data	Dependent variable	Indepen-dent variable	Result
1	Al-Fawwaz (2016)	OLS model	Data from 1980 to 2013	Growth In Total Government Expenditures, Growth In Capital Government Expenditures, Growth In Current Government Expenditures	GDP Growth	Positive impact for both total government expenditure and current government expenditure on economic growth
2	D.A. Aschauer (1989)	ARDL	Time series data from 1949 - 1985	Government Expenditure (Aggregated And Disaggregated)	GDP Growth	Non-military public capital stock exerted a notably stronger positive influence on economic growth
3	D. Lupu et al. (2018)	GMM	Using panel data for 15 countries over 28 years	Disaggregated Government Expenditure	GDP Growth	Expenditure on operations and maintenance exhibited a more robust positive influence on economic growth compared to investments in education and health.

4	D. Lupu et al. (2018)	ARDL	Data stretching from 1995 to 2015 of of 10 selected Central and Eastern European countries	Disaggregated Government Expenditure	GDP Growth	Public expenditures on education and health care have a positive impact on economic growth in the study countries.
5	R. Asghari and H. Heidari (2016)	PSTR model	Economic Cooperation and Development – Nuclear Energy Agency (OECD-NEA) countries based on data from 1990 to 2011	Government Expenditure, Government Size	GDP Growth	Positive relationship between government expenditure and economic growth
6	S. Ghosh and A. Gregoriou (2008)	GMM	Data from 15 developing countries	Capital Expenditure, Curren Expenditure	GDP Growth	Capital spending was found to have a negative impact on economic growth
7	S. Taban (2010)	ARDL	Quarterly data covering	The Share Of Government Consumption	GDP Growth	Share of total government spending, and the

			the period from 1987: Q1 to 2006: Q4	Spending To GDP, Government Investment Expenditure To GDP And Government Consumption Spending To GDP		share of government investment spending to GDP had a negative impact on economic growth in Turkey.
8	A.G. Hasnul (2015)	OLS model	Data from 1970 to 2014	Government Operating And Development Expenditures	GDP Growth	Government expenditure on the development category and on the housing sector also has a negative impact on economic growth in Malaysia
9	A. Shahid et al. (2013)	ARDL	Time series data from 1972 to 2009	Development Expenditure And Current Expenditure	GDP Growth	Current expenditure does not contribute to economic growth in Pakistan
10	T. Egbetunde and I.O. Fasanya (2013)	ARDL	Time series data from 1970 to 2010	Government Capital And Recurrent Spending	GDP Growth	Total government spending had an insignificant impact on economic growth in Nigeria.
11	Kwasi Poku (2022)	ARDL	Time series data	Gross Fixed Capital Formation ,Government	GDP Growth	Government expenditure has a positive

			from 1970 to 2016	Expenditure, Population Growth, And Foreign Direct Investment		relationship with economic growth in the short-run.

Desciptive statistic

```
. sum

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
        Year |         25        2010    7.359801        1998       2022
      GDPGr |         25    6.247761    1.324234    2.561564   8.019792
         GFE |         25    5.670629    3.400214   -5.704208   12.28317
        UPOP |         25    30.65512    4.772399      23.371      38.766
         GCF |         25    8.518478    5.595431   -4.333341    26.7983
-------------+---------------------------------------------------------
         MVA |         25    8.448644    6.869968   -21.83876   13.35537
         FDI |         25    7.99e+09    5.73e+09    1.30e+09   1.79e+10
       lnFDI |         25    22.42249    .9935586    20.98409   23.60807
```

Stationary test – ADF:

```
. dfuller GDPGr

Dickey-Fuller test for unit root                  Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.526            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0073

. dfuller GDPGr, trend

Dickey-Fuller test for unit root                  Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.493            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0402
```

```
. dfuller GFE

Dickey-Fuller test for unit root                   Number of obs   =        24

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.714           -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0039

. dfuller GFE, trend

Dickey-Fuller test for unit root                   Number of obs   =        24

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.622           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0281
```

```
. dfuller UPOP

Dickey-Fuller test for unit root                   Number of obs   =        24

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            11.626           -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000


. dfuller UPOP, trend

Dickey-Fuller test for unit root                   Number of obs   =        24

                              ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -5.337           -4.380            -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller D.UPOP

Dickey-Fuller test for unit root                   Number of obs   =        23

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.365            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0003

. gen D_UPOP = D.UPOP
(1 missing value generated)

. dfuller D_UPOP, trend

Dickey-Fuller test for unit root                   Number of obs   =        23

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -8.903            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. dfuller GCF

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.934            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0018

. dfuller GCF, trend

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.080            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0067
```

```
. dfuller MVA

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.061            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0011

. dfuller MVA, trend

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.034            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0079
```

```
. dfuller lnFDI

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -0.565            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8788


. dfuller lnFDI, trend

Dickey-Fuller test for unit root                   Number of obs   =        24

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.702            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7498
```

```
. dfuller D.lnFDI

Dickey-Fuller test for unit root                   Number of obs   =        23

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic            Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -3.540            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0070

. gen D_lnFDI = D.lnFDI
(1 missing value generated)

. dfuller D_lnFDI, trend

Dickey-Fuller test for unit root                   Number of obs   =        23

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic            Value             Value             Value
------------------------------------------------------------------------------
 Z(t)            -3.475            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0422
```

Stationary test – PP test:

```
. pperron GDPGr

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic            Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -16.426           -17.200           -12.500           -10.200
 Z(t)             -3.425            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0102

. pperron GDPGr, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic            Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -16.449           -22.500           -17.900           -15.600
 Z(t)             -3.342            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0597
```

```
. pperron GFE

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                            ---------- Interpolated Dickey-Fuller ---------
                 Test       1% Critical       5% Critical      10% Critical
               Statistic       Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)         -17.319          -17.200           -12.500           -10.200
 Z(t)            -3.666           -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0046

. pperron GFE, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                            ---------- Interpolated Dickey-Fuller ---------
                 Test       1% Critical       5% Critical      10% Critical
               Statistic       Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)         -16.743          -22.500           -17.900           -15.600
 Z(t)            -3.546           -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0347
```

```
. pperron UPOP

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                            ---------- Interpolated Dickey-Fuller ---------
                 Test       1% Critical       5% Critical      10% Critical
               Statistic       Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           0.330          -17.200           -12.500           -10.200
 Z(t)             9.726           -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 1.0000


. pperron UPOP, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                            ---------- Interpolated Dickey-Fuller ---------
                 Test       1% Critical       5% Critical      10% Critical
               Statistic       Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -2.116          -22.500           -17.900           -15.600
 Z(t)            -5.284           -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0001
```

```
. pperron D_UPOP

Phillips-Perron test for unit root                 Number of obs   =        23
                                                   Newey-West lags =         2

                         ---------- Interpolated Dickey-Fuller ---------
                 Test    1% Critical       5% Critical      10% Critical
               Statistic     Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -5.358       -17.200          -12.500          -10.200
 Z(t)            -4.040        -3.750           -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0012

. pperron D_UPOP, trend

Phillips-Perron test for unit root                 Number of obs   =        23
                                                   Newey-West lags =         2

                         ---------- Interpolated Dickey-Fuller ---------
                 Test    1% Critical       5% Critical      10% Critical
               Statistic     Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -19.928       -22.500          -17.900          -15.600
 Z(t)             -6.861        -4.380           -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
. pperron GCF

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                         ---------- Interpolated Dickey-Fuller ---------
                 Test    1% Critical       5% Critical      10% Critical
               Statistic     Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -20.500       -17.200          -12.500          -10.200
 Z(t)             -3.966        -3.750           -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0016

. pperron GCF, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                         ---------- Interpolated Dickey-Fuller ---------
                 Test    1% Critical       5% Critical      10% Critical
               Statistic     Value             Value            Value
------------------------------------------------------------------------------
 Z(rho)          -21.536       -22.500          -17.900          -15.600
 Z(t)             -4.092        -4.380           -3.600           -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0065
```

```
. pperron MVA

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -20.362           -17.200           -12.500           -10.200
 Z(t)             -4.055            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0011

. pperron MVA, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -20.730           -22.500           -17.900           -15.600
 Z(t)             -4.025            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0081
```

```
. pperron lnFDI

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -0.901           -17.200           -12.500           -10.200
 Z(t)             -0.653            -3.750            -3.000            -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.8585

. pperron lnFDI, trend

Phillips-Perron test for unit root                 Number of obs   =        24
                                                   Newey-West lags =         2

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -8.325           -22.500           -17.900           -15.600
 Z(t)             -2.036            -4.380            -3.600            -3.240
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5816
```

```
. pperron D_lnFDI

Phillips-Perron test for unit root                 Number of obs   =        23
                                                   Newey-West lags =         2

                                                 ---------- Interpolated Dickey-Fuller ---------
                 Test                       1% Critical       5% Critical      10% Critical
               Statistic                       Value             Value            Value
------------------------------------------------------------------------------------------
 Z(rho)          -15.516                      -17.200           -12.500          -10.200
 Z(t)             -3.497                       -3.750            -3.000           -2.630
------------------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0081

. pperron D_lnFDI, trend

Phillips-Perron test for unit root                 Number of obs   =        23
                                                   Newey-West lags =         2

                                                 ---------- Interpolated Dickey-Fuller ---------
                 Test                       1% Critical       5% Critical      10% Critical
               Statistic                       Value             Value            Value
------------------------------------------------------------------------------------------
 Z(rho)          -15.239                      -22.500           -17.900          -15.600
 Z(t)             -3.416                       -4.380            -3.600           -3.240
------------------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0493
```

Check for optimizing lags:

```
. varsoc GDPGr

  Selection-order criteria
  Sample:  2002 - 2022                        Number of obs      =        21
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 | -36.3733                     2.05763   3.55936   3.57016    3.6091  |
 |  1 | -35.6942  1.3582    1  0.244  2.12256   3.58992   3.61151    3.6894  |
 |  2 |  -29.239   12.91*   1  0.000  1.26424*  3.07038*  3.10276*   3.2196* |
 |  3 | -29.0101  .45778    1  0.499  1.36431   3.14382     3.187   3.34278  |
 |  4 |  -28.706   .6082    1  0.435  1.46453   3.21009   3.26407   3.45879  |
 +---------------------------------------------------------------------------+
  Endogenous:  GDPGr
   Exogenous:  _cons

. varsoc GFE

  Selection-order criteria
  Sample:  2002 - 2022                        Number of obs      =        21
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 | -49.1032                     6.91662   4.77173   4.78253   4.82147* |
 |  1 | -48.8861  .43416    1  0.510  7.45584    4.8463   4.86788   4.94577  |
 |  2 | -46.2461    5.28*   1  0.022  6.38657   4.69011   4.72249*  4.83932  |
 |  3 | -45.1668  2.1586    1  0.142  6.35593*  4.68256*  4.72573   4.88151  |
 |  4 | -44.3647  1.6043    1  0.205  6.50673    4.7014   4.75537   4.95009  |
 +---------------------------------------------------------------------------+
  Endogenous:  GFE
   Exogenous:  _cons
```

```
. varsoc MVA

  Selection-order criteria
  Sample:  2002 - 2022                        Number of obs      =        21
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 |  -71.438                       58.0354*  6.89886*  6.90965*  6.9486* |
 |  1 | -71.2321  .41178    1  0.521  62.6266   6.97449   6.99608   7.07397  |
 |  2 | -71.2167  .03077    1  0.861  68.8791   7.06826   7.10065   7.21748  |
 |  3 | -71.1973  .03896    1  0.844  75.8287   7.16164   7.20482    7.3606  |
 |  4 |  -71.179  .03652    1  0.848  83.6451   7.25514   7.30912   7.50384  |
 +---------------------------------------------------------------------------+
  Endogenous:  MVA
   Exogenous:  _cons

. varsoc D_lnFDI

  Selection-order criteria
  Sample:  2003 - 2022                        Number of obs      =        20
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 |  .290495                       .06286*   .07095*  .080669*  .120737* |
 |  1 |  .886917  1.1928    1  0.275  .065487   .111308   .130746   .210882  |
 |  2 |  1.33166  .88949    1  0.346  .069338   .166834   .195991   .316194  |
 |  3 |  1.33187  .00042    1  0.984  .076873   .266813   .305688   .465959  |
 |  4 |  2.01487   1.366    1  0.243  .079776   .298513   .347107   .547446  |
 +---------------------------------------------------------------------------+
  Endogenous:  D_lnFDI
   Exogenous:  _cons
```

```
. varsoc D_UPOP

  Selection-order criteria
  Sample:  2003 - 2022                        Number of obs      =        20
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 |  33.7469                       .002215  -3.27469  -3.26497   -3.2249  |
 |  1 |  84.0537  100.61*   1  0.000  .000016* -8.20537* -8.18593*  -8.1058* |
 |  2 |  84.7834  1.4595    1  0.227  .000016  -8.17834  -8.14919  -8.02898  |
 |  3 |  85.4802  1.3936    1  0.238  .000017  -8.14802  -8.10915  -7.94888  |
 |  4 |  86.1444  1.3284    1  0.249  .000018  -8.11444  -8.06585  -7.86551  |
 +---------------------------------------------------------------------------+
  Endogenous:  D_UPOP
   Exogenous:  _cons

. varsoc GCF

  Selection-order criteria
  Sample:  2002 - 2022                        Number of obs      =        21
 +---------------------------------------------------------------------------+
 |lag |    LL      LR      df    p      FPE       AIC      HQIC      SBIC    |
 |----+----------------------------------------------------------------------|
 |  0 | -66.2089                       35.2702*  6.40084*  6.41164*  6.45058* |
 |  1 | -65.4954  1.4269    1  0.232  36.2643   6.42813   6.44972   6.52761  |
 |  2 | -65.4361   .1185    1  0.731  39.7185   6.51773   6.55011   6.66694  |
 |  3 | -65.3507  .17093    1  0.679  43.4521   6.60483     6.648   6.80378  |
 |  4 |  -64.138  2.4253    1  0.119  42.7775   6.58457   6.63855   6.83327  |
 +---------------------------------------------------------------------------+
  Endogenous:  GCF
   Exogenous:  _cons
```

```
. ardl GDPGr GFE GCF MVA D_lnFDI D_UPOP, lags(2,3,0,0,0,1)

ARDL(2,3,0,0,0,1) regression

Sample:       2001 -       2022                 Number of obs     =         22
                                                  F(  11,     10)   =       8.07
                                                  Prob > F          =     0.0013
                                                  R-squared         =     0.8988
                                                  Adj R-squared     =     0.7874
Log likelihood = -12.403604                       Root MSE          =     0.6307

------------------------------------------------------------------------------
       GDPGr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       GDPGr |
         L1. |   .3628458   .1644708     2.21   0.052    -.0036181    .7293096
         L2. |  -1.196954   .2117988    -5.65   0.000    -1.668871    -.725037
             |
         GFE |
         --. |   .4996561   .1211279     4.13   0.002     .2297664    .7695459
         L1. |    .323657   .0944514     3.43   0.006     .1132062    .5341079
         L2. |   .1159569   .0692893     1.67   0.125    -.0384294    .2703432
         L3. |  -.1225574   .0630941    -1.94   0.081    -.2631398    .0180251
             |
         GCF |   .2460552   .0547856     4.49   0.001     .1239853    .3681251
         MVA |   .1039833   .0469257     2.22   0.051    -.0005736    .2085402
     D_lnFDI |  -4.170146   1.245785    -3.35   0.007    -6.945928   -1.394363
             |
      D_UPOP |
         --. |  -76.13994   100.5241    -0.76   0.466    -300.1217    147.8418
         L1. |   95.95439   97.92873     0.98   0.350    -122.2444    314.1532
             |
       _cons |  -8.281462   5.055813    -1.64   0.132    -19.54652    2.983592
------------------------------------------------------------------------------
```

ARDL Model:

```
. ardl GDPGr GFE GCF MVA D_lnFDI D_UPOP, lags(2,3,0,0,0,1) ec

ARDL(2,3,0,0,0,1) regression

Sample:       2001 -       2022                 Number of obs     =         22
                                                  R-squared         =     0.9303
                                                  Adj R-squared     =     0.8537
Log likelihood = -12.403604                       Root MSE          =     0.6307

------------------------------------------------------------------------------
     D.GDPGr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ADJ          |
       GDPGr |
         L1. |  -1.834108   .1757107   -10.44   0.000    -2.225616   -1.442601
-------------+----------------------------------------------------------------
LR           |
         GFE |   .4452914   .0838031     5.31   0.000     .2585665    .6320162
         GCF |   .1341552    .027345     4.91   0.001     .0732267    .1950837
         MVA |   .0566942   .0261719     2.17   0.056    -.0016205    .1150089
     D_lnFDI |  -2.273664   .6494573    -3.50   0.006    -3.720745   -.8265826
      D_UPOP |   10.80331   3.559222     3.04   0.013     2.872873    18.73376
-------------+----------------------------------------------------------------
SR           |
       GDPGr |
         LD. |   1.196954   .2117988     5.65   0.000      .725037    1.668871
             |
         GFE |
         D1. |  -.3170566   .1188251    -2.67   0.024    -.5818154   -.0522977
         LD. |   .0066005   .0976075     0.07   0.947    -.2108826    .2240836
        L2D. |   .1225574   .0630941     1.94   0.081    -.0180251    .2631398
             |
      D_UPOP |
         D1. |  -95.95439   97.92873    -0.98   0.350    -314.1532    122.2444
             |
       _cons |  -8.281462   5.055813    -1.64   0.132    -19.54652    2.983592
------------------------------------------------------------------------------
```

ARDL Bound test:

```
. estat btest

note: estat btest has been superseded by estat ectest
      as the prime procedure to test for a levels relationship.
      (click to run)

Pesaran/Shin/Smith (2001) ARDL Bounds Test
H0: no levels relationship              F =  20.971
                                        t = -10.438

Critical Values (0.1-0.01), F-statistic, Case 3

      | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
      |    L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+----------------+----------------+----------------+---------------
  k_5 |   2.26    3.35 |   2.62    3.79 |   2.96    4.18 |   3.41    4.68
accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

      | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
      |    L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+----------------+----------------+----------------+---------------
  k_5 |  -2.57   -3.86 |  -2.86   -4.19 |  -3.13   -4.46 |  -3.43   -4.79
accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)
```

Diagnostic tests:

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
-------------------------------------------------------------------------------
    lags(p)  |          chi2               df                 Prob > chi2
-------------+-----------------------------------------------------------------
       1     |          0.304               1                   0.5816
-------------------------------------------------------------------------------
                        H0: no serial correlation

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of D.GDPGr

         chi2(1)      =     0.10
         Prob > chi2  =   0.7571
```

ARDL Model (change lags)

```
. ardl GDPGr GFE GCF MVA D_lnFDI D_UPOP, lags(2,3,1,1,2,0) ec

ARDL(2,3,1,1,2,0) regression

Sample:       2001 -       2022                 Number of obs     =         22
                                                  R-squared         =     0.9735
                                                  Adj R-squared     =     0.9205
Log likelihood = -1.7719466                       Root MSE          =     0.4649

------------------------------------------------------------------------------
     D.GDPGr |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ADJ          |
       GDPGr |
         L1. |  -2.085008   .1523856   -13.68   0.000    -2.445343   -1.724673
-------------+----------------------------------------------------------------
LR           |
         GFE |   .4852539   .0568928     8.53   0.000     .3507239     .619784
         GCF |   .1407391   .0266223     5.29   0.001     .0777874    .2036909
         MVA |   .1321764   .0208906     6.33   0.000     .0827778    .1815749
     D_lnFDI |  -3.103013   .7288219    -4.26   0.004    -4.826404   -1.379623
      D_UPOP |   13.76789   2.149822     6.40   0.000     8.684368    18.85141
-------------+----------------------------------------------------------------
SR           |
       GDPGr |
         LD. |   1.081089   .1350056     8.01   0.000     .7618513    1.400326
             |
         GFE |
         D1. |  -.4843994   .1121003    -4.32   0.003    -.7494745   -.2193243
         LD. |  -.0011125   .0774639    -0.01   0.989    -.1842854    .1820605
        L2D. |   .0976565   .0488448     2.00   0.086    -.0178431    .2131561
             |
         GCF |
         D1. |  -.1961737   .0578653    -3.39   0.012    -.3330033   -.0593441
             |
         MVA |
         D1. |  -.1071268   .0388696    -2.76   0.028    -.1990387   -.0152149
             |
     D_lnFDI |
         D1. |   3.660143   1.440385     2.54   0.039     .2541725    7.066113
         LD. |  -1.127363   .7672523    -1.47   0.185    -2.941627       .6869
             |
       _cons |  -16.10037   3.755846    -4.29   0.004    -24.98154   -7.219211
------------------------------------------------------------------------------
```

ARDL Bound test:

```
. estat btest

note: estat btest has been superseded by estat ectest
      as the prime procedure to test for a levels relationship.
      (click to run)

Pesaran/Shin/Smith (2001) ARDL Bounds Test
H0: no levels relationship            F =  36.020
                                      t = -13.682

Critical Values (0.1-0.01), F-statistic, Case 3

      | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
      |    L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+----------------+----------------+----------------+---------------
  k_5 |   2.26    3.35 |   2.62    3.79 |   2.96    4.18 |   3.41    4.68
accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

      | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
      |    L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+----------------+----------------+----------------+---------------
  k_5 |  -2.57   -3.86 |  -2.86   -4.19 |  -3.13   -4.46 |  -3.43   -4.79
accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)
```

Diagnostic test:

```
. estat bgodfrey

Breusch-Godfrey LM test for autocorrelation
-------------------------------------------------------------------------------
    lags(p)  |          chi2              df                 Prob > chi2
-------------+-----------------------------------------------------------------
       1     |          1.506              1                   0.2198
-------------------------------------------------------------------------------
                       H0: no serial correlation

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of D.GDPGr

         chi2(1)      =     0.04
         Prob > chi2  =   0.8383
```