

**Final Report on** 

# The Impact of Foreign Direct Investment on Economic Growth: Empirical Evidence of Cambodia

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## ABSTRACT

Foreign Direct Investment (FDI) plays a pivotal role in the economic development of both developed and developing nations. For a developing country like Cambodia, attracting FDI is particularly crucial as it facilitates the transfer of advanced technology, fosters job creation, and introduces innovative ideas from more developed economies. This study employs a Vector Error Correction Model (VECM) to examine the long-term relationships between FDI and key macroeconomic variables in Cambodia. We forecast these variables from 2023 to 2030 based on historical growth patterns from 1996 to 2022, using data from the World Bank Database. The forecasts are categorized into maximum, median, and minimum growth scenarios, providing insights into potential future trends. Our findings indicate that FDI has a significant potential impact on future Gross Domestic Product (GDP), Gross Fixed Capital Formation (GFCF), and Trade Openness (TO). Based on these results, we offer strategic recommendations to enhance Cambodia's attractiveness to FDI, recognizing its critical role in driving economic growth.

Keywords: Cambodia, Economic Growth, Foreign Direct Investment.

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# LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller Test
ASEAN	The Association of Southeast Asian Nations
DCTS	Developing Countries Trading Scheme
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
IRFs	Impulse Response Functions
PP	Phillip Perron Test
R&D	Research and Development
ТО	Trade Openness
TVET	Technical and Vocational Education Training
UN	United Nations
UNCTAD	UN Trade and Development
VD	Variance Decomposition
VECM	Vector Error Correction Model
WDI	World Development Indicators

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## **CHAPTER 1: INTRODUCTION**

#### 1.1. Background

Foreign direct investment (hereafter FDI) has been identified as an important factor affecting economic growth. Many factors had play roles in increasing the capital formation and economic development. These factors are different depending on countries geopolitical landscape, technological progression and institutional structures. This study aims to investigate the relationship between foreign direct investment and the economic growth of Cambodia. At the same time, look at how each variables act and how it influences the FDI and the economic growth in the case of Cambodia.

As we can already guess, FDI has an important role in the development of developing countries and developed countries. Still, in the case of developing countries, FDI is crucial for the countries' order to take steps toward a prosperous future. One reason to which is why FDI play is necessary for the countries is that it helps in the transfer of advanced technologies, increases employment rates and uplifts the human capital of the host countries. Economic believe that FDI, by the use of advanced technologies and high standard management, puts pressure on domestic firms while making developing countries such labor management and training opportunities and thus give rise to the standard of the production function by the technology spillover.<sup>1</sup> Another reason is that FDI have proven to be an effective tool in supporting the development of public goods in developing countries. Developing countries often lack crucial financial resources. Rely heavily on FDI to fund essential services such as education, transportation systems, clean water, and waste disposal facilities, while private

<sup>&</sup>lt;sup>1</sup> Peter Thomas Bauer, Foreign Aid: Mend It or End It? (1991).

investors may be hesitant to invest in these areas due to uncertain economic returns. FDI can substitute for private capital in instances, providing funds for investment in public goods that the international capital market will not supply to those developing countries or would apply at a high interest rate.<sup>2</sup>

FDI stimulates the economy through many means, such as employment opportunities, technology and skill transfers, productivity gains, and sustainable growth in the long-term development of developing countries. It is also one of the main sources of foreign capital input into the host countries. It attracts innovative technology transfer, promotes international trade and management skills and supports the economic growth of the host countries. <sup>3</sup>

Cambodia is one the fast-growing in the ASEAN region, attracting FDI inflow since the 1980s when the country was transformed and known as a free market-oriented economy. Moreover, FDI had a significant positive impact on Cambodia's economy. Political stability, sound macroeconomic management, and the expansion of the regional economy as a whole made Cambodia an inviting destination for foreign investors. FDI inflows into the nation are mostly focused on labor-intensive manufacturing sectors, particularly apparel and footwear, as well as the travel and tourism industry. <sup>4</sup>

Since the developing countries' trading scheme entered into force on 19 June 2023, Cambodia, as a Least developed country, enjoy its "comprehensive preferences" For instance, tariff-free products with 0 percent equal to 99.8 percent and products with 0 percent to five percent equal to 0.2% tariff.<sup>5</sup> Therefore, countries like Cambodia can make use of this privilege because 99.8 percent of Cambodia's exports to the UK would be tariff-free under DCTS. Almost

<sup>&</sup>lt;sup>2</sup> The congress of united states, congressional budget office, *The role of foreign aid in development*, 1997.

<sup>&</sup>lt;sup>3</sup> UN, "world Investment Report 2008" UNCTAD.

<sup>&</sup>lt;sup>4</sup> UN, "World Investment report 2020." UNCTAD.

<sup>&</sup>lt;sup>5</sup> "Identify Tariffs by Product under the Developing Countries Trading Scheme (DCTS)," guidance document, June 2023, 3.

all of Cambodia's goods exported to the UK's market would have to face import taxes. In contrast, only 0.2 percent of the products might face a low tariff ranging from 0% to 5%, resulting in competitive advantages for Cambodia.

Furthermore, Cambodia and The UK bilateral trade reached over 589 million dollars, and 90 per cent of the trade was exported from Cambodia to the UK from January to August of 2023, with \$ 312 million from clothing accessories (knitted or crocheted), \$98 million from clothing accessories (not knitted or crocheted), \$49 million in footwear and vehicles other than railway or tramway rolling-stock and part making up to \$23 million exported from Cambodia.<sup>6</sup>

This study aims to verify the impact of the FDI on the economic growth in Cambodia from 1996 to 2022. However, there have indeed been studies similar to this topic before, but the results are still ambiguous and irrelevant. Therefore, this study is an attempt to find FDI's impact on economic growth along with trade openness and gross fixed capital formation. Particularly, the case of Cambodia.

We apply the VECM model to understand the relationship between macroeconomic variables, especially GDP and FDI, in the long run. To ensure the robustness of the model, we also conduct diagnostic tests.

The rest of the is structured as follows in chapter I states the research questions, then come the significance of the study and finally, the scope and limitations. In Chapter 2, literature reviews will be discussed along with the theoretical framework and empirical studies. The methodology is in chapter 3. Results and discussion are in chapter 4. The final chapter is the conclusion and recommendation.

<sup>&</sup>lt;sup>6</sup> General Department of Customs and Excise of Cambodia.

#### 1.2. Research Questions

In order to achieve the main objectives of this study. The study will attempt to answer the following questions:

1. What benefits does FDI bring to Cambodia's economic growth?

2. Does the FDI impact Cambodia's economic growth?

3. Can the growth of FDI be used to predict changes in GDP, GFCF, and TO?

#### 1.3. Significance of the Study

The study will contribute to both the academic literature and policy recommendation. For academic contribution, the study will contribute to the existing body of knowledge, providing empirical evidence from other developed countries and similarly developing countries. Overall, this study will mainly focus specifically on Cambodia, a country that has received limited attention in FDI literature. Furthermore, the study will offer recommendations for Cambodia's policy that could drive sustainable economic growth in the country and potentially in similar developing countries. Thus, the results indicate that FDI has the potential to significantly contribute to Cambodia's economic growth.

#### 1.4. Scope and Limitation

The study will investigate the impacts and contribution of FDI inflows on economic growth in Cambodia from 1996 to 2022. However, Due to the limited sample size, Data accessibility, and few variables being used, the findings and statistical tests in the study are also constrained. They should be studied further in future work when more time-series data and other relevant indicators are available.

## **CHAPTER 2: LITERATURE REVIEW**

#### 2.1. Introduction

Foreign direct investment (FDI) has long been recognized as a critical driver of economic growth, particularly in developing countries. As globalization intensifies, countries like Cambodia have increasingly relied on FDI to spur economic development, enhance productivity, and integrate into the global economy.<sup>7</sup> Over the past few decades, Cambodia has undergone significant economic transformation, with FDI playing a pivotal role in sectors such as manufacturing, tourism, and agriculture. This influx of foreign capital has the potential to contribute to economic growth by providing access to advanced technologies, improving human capital, and increasing competitiveness. However, the relationship between FDI and economic growth is complex and influenced by various factors, including trade openness, government policies, and the level of domestic investment.

Trade openness (hereafter TO) is another crucial factor that influences economic growth. By reducing trade barriers and encouraging international trade, countries can benefit from increased competition, access to larger markets, and a more efficient allocation of resources.<sup>8</sup> Gross fixed capital formation (GFCF), representing investments in infrastructure, machinery, and equipment, is also vital for sustained economic growth. These investments contribute to higher productivity levels, technological advancements, and improved living standards. This literature review aims to explore the empirical evidence on the impact of FDI, trade openness, and GFCF on economic growth, with a particular focus on Cambodia.

<sup>&</sup>lt;sup>7</sup> Jadhav, Pravin. "The Impact of Foreign Direct Investment on the Economic Growth of Developing Countries (2000-2010)." August 12, 2012. https://doi.org/doi:10.2139/ssrn.1941665.

<sup>&</sup>lt;sup>8</sup> Qiang Wang et al., (2023). Free trade and carbon emissions revisited: The asymmetric impacts of trade diversification and trade openness (Sustainable Development, 2023)

The primary purpose of this literature review is to synthesize existing research on the impact of FDI, trade openness, and GFCF on economic growth, highlighting the key findings and identifying gaps in the current body of knowledge. By examining the diverse perspectives and methodologies used in previous studies, this review seeks to provide a comprehensive understanding of how these factors interact to influence economic development. Moreover, the review aims to contextualize these findings within the Cambodian economy, offering insights into the specific challenges and opportunities that the country faces in leveraging FDI for sustainable growth.

Additionally, this review will serve as a foundation for the empirical analysis conducted in this study. By critically evaluating the existing literature, the review will help identify the most relevant theories, models, and empirical strategies that can be applied to the Cambodian context and other similar developing countries. Ultimately, the purpose of this literature review is to establish a solid theoretical and empirical basis for assessing the impact of FDI on Cambodia's economic growth and to inform policy recommendations that can enhance the country's development trajectory.

## 2.2. Theoretical Framework

In order to explain the impact of FDI on Economic growth in the host country, we need to understand the histories behind the theories. This section discusses the foundational economic theories that explain the relationship between FDI, trade openness, GFCF and economic growth. The theoretical and empirical studies are reviewed in this chapter.

#### The Classical Theory of Economic Growth

Classical growth theory, primarily developed during the 18<sup>th</sup> and early 19<sup>th</sup> centuries, argued that the accumulation of capital, labor and land drives economic growth. The Theory is

rooted in the work of early economist such as Adam Smith, David Ricardo, and Thomas Malthus.

Adam Smith, often referred to as the father of classical economists, emphasized the importance of capital accumulation and division of labor in driving productivity and economic growth. In his work, *The Wealth of Nations,* Smith argued that the "invisible hand" of the market, driven by self-interest and competition, leads to efficient resource allocation and consequently economic growth. <sup>9</sup>

David Ricardo further elaborates on Smith's ideas, especially in relation to land and rent. In order to promote economic growth, trade and specialization are important. Ricardo's theory of comparative advantages suggests that nations should concentrate on manufacturing items in which they are relatively efficient. <sup>10</sup> He also introduced the concept of diminishing return to land, suggesting that as more labor and capital are applied to land, the additional output produced would eventually decrease, thus constraining long-term growth.

On the other hand, Thomas Malthus's theory of population introduced a more pessimistic viewpoint. According to Malthus, as resources become limited, population growth will eventually surpass food supply, creating a situation where overpopulation will slow economic progress.<sup>11</sup>

#### The Neoclassical Growth Theory (Solow-Swan Model)

Neoclassical growth theory, developed in the mid-20th century by economists Robert Solow and Trevor Swan, focuses on the long-term determinants of economic growth. The Solow-Swan model asserts that economic growth is driven by three key factors: labor, capital,

<sup>&</sup>lt;sup>9</sup> Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations (London: W. Strahan and T. Cadell, 1776), 12.

<sup>&</sup>lt;sup>10</sup> David Ricardo, On the Principles of Political Economy and Taxation (London: John Murray, 1817), 50-55.

<sup>&</sup>lt;sup>11</sup> Thomas Robert Malthus, An Essay on the Principle of Population (London: J. Johnson, 1798), 18-20.

and technology. The theory posits that while capital accumulation and labor contribute to development, their impact diminishes over time due to the law of diminishing returns. In the long run, sustained economic growth is primarily driven by technological progress, which enhances productivity and offsets the diminishing returns to capital. <sup>12</sup> The model also highlights the importance of savings and investment, suggesting that higher savings rates lead to greater capital accumulation, which in turn boosts economic growth until diminishing returns set in.<sup>13</sup>

According to this growth hypothesis, economic growth is influenced by both the amount of capital that accumulates inside an economy and how individuals use it. Further, the relationship between the capital and labor of an economy determines its output. Finally, technology is thought to increase labor productivity and increase the output capabilities labor.<sup>14</sup>

#### The Endogenous Growth Theory (New Growth Theory)

Growth theory's core premise is that new products, new markets, or new procedures must constantly increase technological knowledge in order to maintain a long-term positive growth rate of output per capita. The proposition can be demonstrated using the neoclassical growth model developed by Solow (1965) and Swan (1956), which shows that if there is no progression in the field of technology, then the growth of the economy will eventually disappear. <sup>15</sup> Moreover, Endogenous growth theory was developed by economists such as Paul Romer and Robert Lucas in the 1980s. Romer and Lucas claimed that economic growth is primarily driven by factors within the economy rather than external technological progress. The theory

<sup>&</sup>lt;sup>12</sup> Robert M. Solow, "A Contribution to the Theory of Economic Growth," The Quarterly Journal of Economics 70, no. 1 (1956): 65-94.

<sup>&</sup>lt;sup>13</sup> Trevor Swan, "Economic Growth and Capital Accumulation," Economic Record 32, no. 2 (1956): 334-361.

<sup>&</sup>lt;sup>14</sup> Simon Fraser University. "Chapter 1 Neoclassical Growth Theory," Pages 2-4.

<sup>&</sup>lt;sup>15</sup> Aghion, Philippe, Peter Howitt, Maxine Brant-Collett, and Cecilia García-Peñalosa. Endogenous growth theory. MIT press, 1998.

highlights the role of human capital, knowledge and innovation that influence the economic growth. Unlike the Solow-Swan model, endogenous growth theory suggests that investment in education, research and development can lead to sustained economic growth without the constraints of diminishing returns. <sup>16</sup> This Theory also noted the importance of government policies in fostering an environment conducive to innovation and long-term growth.<sup>17</sup>

Several studies have focused on the effect of technological change on economic growth, Specifically the work of Helpman (1991) and Barro and Martin (1995). In the studies, the rate of increase in less developed countries depends on how they are able to utilize the advanced technologies that developed countries have. Thereforth, by adapting to the new technologies and Ideas, these developing countries can catch up to most developed countries. As a result, FDI is seen as an essential driver for transferring new ideas and Technologies to the least developing countries.

#### **Dependency Theory**

Dependency Theory offers an alternative perspective toward economic development compared to mainstream theories like endogenous growth theory. Led by researchers like Raúl Prebisch, André Gunder Frank, and Immanuel Wallerstein, Dependency Theory emerged mostly in the 1960s and 1970s. This theory argues that the overly dependent of developing countries on developed countries is what hinders and often constrains their growth.

Dependency theory assume that the global economy is divided into a "core" of wealthy, industrialized nations and a "periphery" of poorer, developing countries. The core countries exploit the periphery through unequal trade relations in which the developing countries export

<sup>&</sup>lt;sup>16</sup> Paul Romer, "Endogenous Technological Change," Journal of Political Economy 98, no. 5 (1990): S71-S102.

<sup>&</sup>lt;sup>17</sup> Robert E. Lucas Jr., "On the Mechanics of Economic Development," Journal of Monetary Economics 22, no. 1 (1988): 3-42.

raw materials and import manufactured goods. The relationship leads to a cycle of dependence, where poorer countries are unable to develop their industries and are kept in a state of economic subordination.<sup>18</sup>

#### Key concepts of Dependency Theory:

- Unequal Exchange: Dependency theorists argued that trade between developed and developing countries is inherently biased. Developing countries are frequently limited to producing low-value raw resources, while developed countries possess the technological and industrial capabilities for manufacturing valuable products.<sup>19</sup>
- 2. Historical Context: Dependency theorist emphasize this historical context of colonialism and Imperialism in shaping the global economic order. They argue that the legacy of colonial exploitation established patterns of financial dependence that persisted in the post-colonial era. This historical perspective challenges the notion that developing countries can "catch up" by adopting the economic policy of the developed nations.<sup>20</sup>
- 3. Structural constraint: According to the Dependency theory, developing nations face structural limitations imposed by the global economic systems, which hinder their progress toward sustainable development. These limitations include the need for outside funding, the state of technology and the dominance of international firms that put profit ahead of regional.<sup>21</sup>

<sup>&</sup>lt;sup>18</sup> Raúl Prebisch, "The Economic Development of Latin America and Its Principal Problems," Economic Bulletin for Latin America 7, no. 1 (1950): 1-22.

<sup>&</sup>lt;sup>19</sup> André Gunder Frank, Capitalism and Underdevelopment in Latin America: Historical Studies of Chile and Brazil (New York: Monthly Review Press, 1967).

<sup>&</sup>lt;sup>20</sup> Immanuel Wallerstein, The Modern World-System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century (New York: Academic Press, 1974).

<sup>&</sup>lt;sup>21</sup> Theotonio Dos Santos, "The Structure of Dependence," American Economic Review 60, no. 2 (1970): 231-236.

While Dependency theory gives a critical lens on global economic relations, it has also faced critiques, critics argue that the theory underestimates the potential for economic growth and development within the global capitalist systems. They also point out that some countries have successfully transitioned from peripheral to semi-peripheral or core status by integrating into the international economy, as seen in the cases of East Asian economies like South Korea and Taiwan.<sup>22</sup>

#### 2.3. Empirical Studies

This section provides an overview of empirical studies on the effect of FDI, Trade openness, and GFCF on economic growth. The literature review is divided into two main categories for easy reading: Studies that show a positive impact on economic growth and studies that present negative or mixed results. The results of these findings are shown in the paper, which also spotlights the crucial variable of whether or not FDI, Trade openness, GFCF and other variables contribute to economic growth.

#### **Positive impact**

FDI has been the main topic of discussion when it comes to the growth of the economy in countries—according to the findings by researchers Borensztein, De Gregorio, and LEE (1998) discovered that FDI has a significant positive impact on economic growth, most important in countries with high levels of human capital. They argue that FDI enhances technological progress and productivity. But its effectiveness depends on how well the host countries can absorb it.<sup>23</sup> Moreover, Alfaro et al. (2004) point out that the importance of financial markets in maximizing the benefits of FDI. Their cross-country regression analysis

<sup>&</sup>lt;sup>22</sup> Peter Evans, Dependent Development: The Alliance of Multinational, State, and Local Capital in Brazil (Princeton: Princeton University Press, 1979).

<sup>&</sup>lt;sup>23</sup> Eduardo Borensztein, José De Gregorio, and Jong-Wha Lee, "How Does Foreign Direct Investment Affect Economic Growth?" Journal of International Economics 45, no. 1 (1998): 115-135.

suggests that FDI contributes positively to economic growth, particularly in countries well developed financial systems. The authors stress that, in particular, for industries associated with technology and innovation, financial development is essential to maximizing the growth effects of foreign direct investment.<sup>24</sup> Additionally, Carkovic and Levine's study on FDI and its impact on economic growth, using the Generalized Method of Moments (GMM), highlights the crucial role of financial and technological infrastructure in driving economic growth.<sup>25</sup>

The interaction between FDI, TO, and technological innovation is another critical factor in promoting economic growth. Balasubramanyam, Salisu, and Sapsford (1996) state that FDI positively affects the economy, especially in countries with export-oriented policies and robust technological infrastructure. Their cross-sectional analysis shows that the benefits of FDI are make best use in environments where trade policies are open and conducive to international business, enabling technology transfer and innovation.<sup>26</sup>

Li and Liu (2005) demonstrated that the connect between FDI and economic growth is increasingly endogenous, with technology and innovation playing a crucial role. By using dynamic panel data analysis, they found that the positive effects of FDI are magnified in countries with above-average levels of skills, knowledge, and health in humans. They are making awareness of the essentials of education and innovation in amplifying the benefits of FDI.<sup>27</sup> Furthermore, Evidence of the positive growth in the economic cause by FDI, TO and technological innovation is given by Kose, Prasad, and Terrones (2009). Their study provides

<sup>&</sup>lt;sup>24</sup> Laura Alfaro et al., "FDI and Economic Growth: The Role of Local Financial Markets," Journal of International Economics 64, no. 1 (2004): 89-112.

<sup>&</sup>lt;sup>25</sup> Maria Carkovic and Ross Levine, "Does Foreign Direct Investment Accelerate Economic Growth?" Does Foreign Direct Investment Promote Development? ed. Theodore H. Moran, Edward M. Graham, and Magnus Blomström (Washington, DC: Institute for International Economics, 2005), 195-220.

<sup>&</sup>lt;sup>26</sup> V. N. Balasubramanyam, M. Salisu, and David Sapsford, "Foreign Direct Investment and Growth in EP and IS Countries," The Economic Journal 106, no. 434 (1996): 92-105.

<sup>&</sup>lt;sup>27</sup> Xiaoying Li and Xiaming Liu, "Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship," World Development 33, no. 3 (2005): 393-407.

the result of TO and financial integration's positive impact by facilitating capital inflows, technology transfer, and innovation diffusion.<sup>28</sup>Similarly, Chowdhury and Mavrotas (2006) conducted Granger causality tests. They found that FDI, most of the time related to technological advancement, has a significant impact on economic growth, and FDI is the cause of GDP growth.<sup>29</sup>

Makki and Somwaru (2004) investigate how TO, technology advancement, and FDI contribute to promoting economic growth. The result from their simultaneous equations model shows that nations with advancement in technology, substantial FDI, and open trade policies are quicker to growth, proving the correction between these variables.<sup>30</sup> However, researchers such as Herzer, Klasen, and Nowak-Lehmann support the positive impact of FDI growth in particularly low in some countries where technology has a major role, and the evidence from their panel cointegration analysis proves that FDI does indeed promote economic development. They warn that if not carefully managed it may also exacerbate income inequality. <sup>31</sup>

Human capital is also a main driver in enhancing the positive impact of FDI on economic growth emphasize by professor SEETANAH. His panel data investigation suggests that investment in education and innovation is not only needed but is necessary for realizing the full beenfits of FDI and trade, notably in developing countries.<sup>32</sup>

#### Negative or Maxed impact

<sup>&</sup>lt;sup>28</sup> M. Ayhan Kose, Eswar Prasad, and Marco E. Terrones, "Does Openness to International Financial Flows Raise Productivity Growth?" Journal of International Money and Finance 28, no. 4 (2009): 554-580.

 <sup>&</sup>lt;sup>29</sup> Abdur Chowdhury and George Mavrotas, "FDI and Growth: What Causes What?" World Economy 29, no. 1 (2006): 9-19.
 <sup>30</sup> Shiva S. Makki and Agapi Somwaru, "Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries," American Journal of Agricultural Economics 86, no. 3 (2004): 795-801.

<sup>&</sup>lt;sup>31</sup> Dierk Herzer, Stephan Klasen, and Felicitas Nowak-Lehmann, "In Search of FDI-led Growth in Developing Countries: The Way Forward," Economic Modelling 25, no. 5 (2008): 793-810.

<sup>&</sup>lt;sup>32</sup> Boopen Seetanah, "The Economic Importance of Education, Human Capital and Technology in the FDI Growth Nexus," Journal of International Development 21, no. 2 (2009): 287-312.

While many studies have reported positive effects of FDI, TO, GFCF, Human capital, technology and innovation on economic growth, others have found negative or mixed results, often emphasizing the conditional nature of these impacts. For instance, Akinlo (2004) presents evidence of the varying effects of FDI on growth in African countries, showing that while FDI has a positive effect in some cases, its impact is insignificant in countries with low levels of human capital and technology availability.<sup>33</sup>

On the other hand, in the case of Jordan, researchers by the name of Louzi and Abadi provide a mixed view. They find no significant long-term relationship between FDI and economic growth in Jordan; using their time-series analysis, it suggests that the benefits of FDI and economic growth may have been overestimated due to the absence of complementary domestic policies and technological infrastructure.<sup>34</sup> In addition, Carkovic and Levine (2002) challenge the positive narrative by finding no robust link between FDI and economic growth once endogeneity is controlled for. Their finding implies that previous may have given too much credit to FDI in boosting economic growth as the result of methodological issues and the lack of focus on technological factors.<sup>35</sup>

Görg and Greenaway (2004) conducted a meta-analysis and found that the impact of FDI on the economy is mixed. Though FDI can lead to technology and productivity spillover, this outcome is not guaranteed and varies depending on the host country's ability to absorb the knowledge that has been spillover.<sup>36</sup>

<sup>&</sup>lt;sup>33</sup> A. Enisan Akinlo, "Foreign Direct Investment and Growth in Nigeria: An Empirical Investigation," Journal of Policy Modeling 26, no. 5 (2004): 627-639.

<sup>&</sup>lt;sup>34</sup> Basem M. Louzi and Ali H. Abadi, "The Impact of Foreign Direct Investment on Economic Growth in Jordan," Journal of Social Sciences 7, no. 1 (2011): 228-232.

<sup>&</sup>lt;sup>35</sup> Carkovic and Levine, "Does Foreign Direct Investment Accelerate Economic Growth?" 195-220.

<sup>&</sup>lt;sup>36</sup> Holger Görg and David Greenaway, "Much Ado about Nothing? Do Domestic Firms Really Benefit from Foreign Direct Investment?" World Bank Research Observer 19, no. 2 (2004): 171-197.

Blomström, Lipsey, and Zejan (1994) provide further evidence of the conditional impact of FDI on growth. Their cross-country regression analysis shows that while FDI has a positive effect on growth in countries with higher levels of human capital and technological capability, its impact is less or even negative when it comes to developing countries that lack these attributes.<sup>37</sup>

In some cases, Herzer (2012) find negative effects of FDI. The use of his time-series analysis reveals that FDI can have a negative impact when it crowds out domestic investment or leads to an increase of inequality in income if not properly governed.<sup>38</sup> Another negative impact of FDI on economic growth is studied by Kumar and Pradhan (2002). They give the result based on their panel data analysis, which shows that FDI could lead to market distortion, degrade domestic industries and fail to create noteworthy technological spillovers.<sup>39</sup>

Taking a quick look into trade openness, Rodrik (1998) points out the negative impact on economic growth and argues that interests are not automatic. Furthermore, his analysis reveals that TO can lead to volatility and slower growth without strong institutions, sound macroeconomic policies and technological readiness.<sup>40</sup>

The empirical studies on the impact of FDI, TO, human capital, GFCF, technology, and innovation on economic growth present a complex, nuanced and still controversial. While many studies have proven the positive effects of these variables in improving economic development, especially when complemented by factors such as human capital and technological

<sup>&</sup>lt;sup>37</sup> Magnus Blomström, Robert E. Lipsey, and Mario Zejan, "What Explains Growth in Developing Countries?" In

Convergence of Productivity: Cross-national Studies and Historical Evidence, ed. William J. Baumol, Richard R. Nelson, and Edward N. Wolff (New York: Oxford University Press, 1994), 243-259.

<sup>&</sup>lt;sup>38</sup> Dierk Herzer, "How Does FDI Really Affect Developing Countries' Growth?" Review of International Economics 20, no. 2 (2012): 396-414.

<sup>&</sup>lt;sup>39</sup> Nagesh Kumar and R. N. Pradhan, "FDI, Externalities, and Economic Growth in Developing Countries: Some Empirical Explorations and Implications for WTO Negotiations on Investment" (New Delhi: Research and Information System for the Non-aligned and Other Developing Countries, 2002).

<sup>&</sup>lt;sup>40</sup> Dani Rodrik, "Trade Policy and Economic Performance in Sub-Saharan Africa," NBER Working Paper no. 6562 (1998).

advancement, other few warn about the overestimation of their benefits. The effectiveness of these variables depends on the policies, institutional quality and the readiness to adapt to new technology of the host country.

## **CHAPTER 3: METHODOLOGY**

#### 3.1. Introduction

The Vector Error Correction Model (VECM) is an essential tool for analyzing time series data, particularly in macroeconomics, as it captures both long-term equilibrium relationships and short-term dynamics between variables. This capability makes VECM invaluable for economists and policymakers, as it provides a comprehensive view of how economic factors interact over time, aiding in the development of informed policies and strategic decisions.

Accurate data selection and preparation are crucial for effective VECM analysis. For instance, using constant values for Real Gross Domestic Product (GDP) and Gross Fixed Capital Formation (GFCF), adjusted for inflation, ensures a clear understanding of real economic trends by removing the effects of changing price levels. Additionally, measuring Foreign Direct Investment (FDI) inflows in Balance of Payments (BoP) current dollars provides a standardized view of international investments, facilitating comparisons and insights into their impact on the host economy. Properly adjusted data enhance the reliability of VECM findings, leading to more accurate assessments of economic relationships and better policy-making.

#### 3.2. Research Process



**Figure 1. VECM Structure** 

Figure 1 shows the VECM structure of our research framework. We begin by conducting descriptive statistics to provide an overview of the dataset through time series analysis. It follows diagnostic tests of the VECM to ensure the robustness of the time series model. Finally, we assess shock innovations and perform scenario forecasting to understand potential future outcomes.

Descriptive statistics are crucial for determining whether the number of observations is sufficient for modeling. Additionally, they provide valuable information about the maximum, mean, and minimum values without the need to examine the raw data, saving considerable time.

In time series analysis, testing for a unit root is essential to ensure the consistency of the variables. In this section, we use two tests: the Augmented Dickey-Fuller (ADF) Test and the Phillips-Perron (PP) Test. The Phillips-Perron Test is essentially a modification of the ADF Test.

Lag selection is another critical step in time series analysis because it directly impacts the accuracy and reliability of the results.

The Johansen Cointegration Test is used to determine whether the variables are cointegrated. If they are, it indicates that the variables share a long-term relationship. For example, if FDI increases, GDP is likely to increase as well.

The Vector Error Correction Model (VECM) is a comprehensive tool that illustrates the percentage change in the dependent and independent variables. We used percentage changes in this case to make the interpretation easier for readers. Moreover, VECM has the ability to test both short- and long-term relationships, which is particularly useful for understanding economic dynamics.

Short run

$$\Delta LGDP_{t} = \tau ECT_{t-1} + \sum \gamma_{i} \Delta Y_{t-i} + \mu + \tau t + \epsilon_{t} (1)$$

Where:

 $ECT_{t-1}$  is the error correction term from the long-run relationship  $\gamma_i$  are the coefficients for the lagged differences of the variables  $\mu$  is the constant term t is the trend component  $\tau$  is the coefficient

 $\epsilon_t$  is the error term

#### Long run

$$LGDP_{t} = \alpha_{0} + \alpha_{1}LFDI_{t} + \alpha_{2}LGFCF_{t} + \alpha_{3}LTO_{t} + \epsilon_{t} (2)$$

Where:

 $\alpha_0$  is the intercept (often set to 1 for normalization

 $\alpha_1, \alpha_3, \alpha_3$  are the long-run coefficients for LFDI, LGFCF, and LTO respectively

 $\epsilon_t$  is the error term

The impulse-response function is a key tool in analyzing a Vector Autoregression (VAR) system. It allows us to study the impact of a shock or impulse in one variable on other variables within the system. In essence, it helps us understand how a sudden change in one variable propagates through the system and affects other variables over time.

On the other hand, variance decomposition helps us understand how variables change over time, showing the percentage contribution of each variable in explaining the changes in the other variables within the system.

Diagnostic tests are essential for determining the validity of the data, involving three key tests: the Autocorrelation LM Test, the Normality Test, and the White Heteroscedasticity Test.

The autocorrelation test ensures that no other variables are influencing the variable of interest. For instance, we want to ensure that no other variables are affecting a particular factor, as this would compromise the results.

The normality test checks whether the distribution of the variables follows a normal (bell-shaped) curve.

$$JB = \frac{n}{6} \left( S^2 + \frac{(k-3)^2}{4} \right)$$
(3)

Where:

n = number of observations

#### S = skewness

K = kurtosis of the data

Heteroscedasticity testing is used to check whether the variance of errors remains constant or if it is affected by other variables, which could compromise the reliability of the model.

Forecasting is crucial in time series analysis as it helps us understand the behavior of macroeconomic variables. By incorporating these variables into models, we can develop insightful policies that effectively target growth.

## 3.3. Data Description and Selection

#### Table 1: Data description

Variable	Description	Measure	Source
GDP	It is a measure of a country's total economic output adjusted for inflation using 2010 prices, expressed in US dollars.	Constant 2010 US\$	WDI (2023)
FDI	It is the net amount of foreign direct investment received by a country in a given period, measured in US dollars at current prices.	BoP, Current US\$	WDI (2023)

GFCF	It is the total value of	Constant 2010 US\$	WDI (2023)
	investment in fixed assets		
	(such as buildings,		
	machinery, and		
	equipment) within a		
	country, adjusted for		
	inflation using constant		
	2010 US dollar prices.		
ТО	It is a measure of a	-	WDI (2023)
	country's integration into		
	the global economy,		
	typically expressed as the		
	sum of exports and		
	imports as a percentage		
	of GDP.		

#### **Data selection**

#### **Dependent Variable**

GDP is the dependent variable we have chosen for the econometric model, as we aim to understand the impact of various independent variables—particularly FDI (Foreign Direct Investment), GFCF (Gross Fixed Capital Formation), and TO (Trade Openness)—on GDP. GDP serves as the primary variable because it reflects the overall health and capacity of the country's economy.

#### **Independent Variables**

FDI is the key independent variable in our study, as we seek to explore its relationship with GDP across multiple dimensions. FDI contributes to economic growth by improving the host country's capital stock and productivity, with technology transfer being a central factor.<sup>41</sup> Large companies from developed nations bring advanced technologies when they invest in the host country.<sup>42</sup> FDI also reduces unemployment by creating jobs, enhances human capital through training, and improves institutional efficiency, such as better protection of property rights, reduced tax rates, and a more favorable regulatory environment.<sup>43</sup>

Gross Fixed Capital Formation (GFCF) is a vital driver of economic growth, influencing various aspects of the economy.<sup>44</sup> It enhances production capacity, boosts domestic expenditure, and lowers production costs by improving infrastructure and technology.<sup>45</sup> Additionally, GFCF increases labor productivity through technological advancements, enabling the development of new and higher-quality products.<sup>46</sup> It also helps bridge the technological gap with advanced economies, allowing countries to improve their position in international trade. Overall, GFCF plays a critical role in fostering economic development and competitiveness.<sup>47</sup>

Trade openness (TO) drives long-term economic growth by fostering international cooperation, enabling technology transfer, and encouraging innovation.<sup>48</sup> It reduces duplication of ideas, expands market access, and increases competition, pushing firms to enhance efficiency.<sup>49</sup> TO also allows countries to specialize in areas of comparative advantage,

<sup>&</sup>lt;sup>41</sup> Finance and Development | F&D. "Finance and Development," June 1, 2001.

https://www.imf.org/external/pubs/ft/fandd/2001/06/loungani.htm.

<sup>&</sup>lt;sup>42</sup> Finance and Development | F&D. "Finance and Development," March 1, 1999.

https://www.imf.org/external/pubs/ft/fandd/1999/03/mallampa.htm.

<sup>&</sup>lt;sup>43</sup> Borensztein, Eduardo, Jose De Gregorio, and Jong-Wha Lee. "How does foreign direct investment affect economic growth?." Journal of international Economics 45, no. 1 (1998): 115-135.

<sup>&</sup>lt;sup>44</sup> Ali, G. U. L. Z. A. R. "Gross fixed capital formation & economic growth of Pakistan." Journal of Research in Humanities, Arts and Literature Applied 1, no. 2 (2015): 21-30.

<sup>&</sup>lt;sup>45</sup> Sallam, Mohamed AM. "Factors promoting economic growth in Egypt: Evidence from ARDL approach." *Journal of Business and Economics* 7, no. 11 (2016): 1842-1852.

<sup>&</sup>lt;sup>46</sup> Owolabi-Merus, Olasunkanmi. "Infrastructure development and economic growth nexus in Nigeria." International Journal of Academic Research in Business and Social Sciences 5, no. 1 (2015): 376.

<sup>&</sup>lt;sup>47</sup> Johnston, Kyle A., and Miguel D. Ramirez. "Foreign direct investment and economic growth in Cote D'Ivoire: a time series analysis." (2015).

<sup>&</sup>lt;sup>48</sup> Keho, Y., and M. G. Wang. "The impact of trade openness on economic growth: The case of Cote d'Ivoire. Cogent Economics & Finance, 5 (1), 1332820." (2017).

<sup>&</sup>lt;sup>49</sup> Pigka-Balanika, Vasiliki. "The impact of trade openness on economic growth." Evidence in Developing Countries", Erasmus School of Economics 2, no. 3 (2013): 1-32.

producing goods more efficiently at lower costs.<sup>50</sup> By investing in research and development (R&D), nations shift towards higher-value products, especially in those rich in human capital, further accelerating growth.<sup>51</sup> Trade liberalization benefits developing countries by granting access to global knowledge and markets, while reducing barriers fosters local R&D and innovation, boosting overall economic performance.<sup>52</sup>

<sup>&</sup>lt;sup>50</sup> Nguyen, My-Linh Thi, and Toan Ngoc Bui. "Trade openness and economic growth: A study on Asean-6." Economies 9, no. 3 (2021): 113.

 <sup>&</sup>lt;sup>51</sup> Dao, Anh Tung. "Trade openness and economic growth." (2014).
 <sup>52</sup> Hye, Qazi Muhammad Adnan, and Wee-Yeap Lau. "Trade openness and economic growth: empirical evidence from India." Journal of Business Economics and Management 16, no. 1 (2015): 188-205.

## **CHAPTER 4: RESULT AND DISCUSSION**

#### 4.1. Introduction

This section presents the results obtained from EViews 13.0 Enterprise. It begins by describing the descriptive statistics for both the level and logarithmic forms of the data. Following that, the unit root test is conducted to ensure that the macroeconomic variables are stationary. Next, the lag selection criteria are applied to ensure data accuracy when analyzing the Johansen Cointegration Test and the Vector Error Correction Model (VECM).

The Johansen Cointegration Test is then used to examine the long-term relationships between the macroeconomic variables. Afterward, the Vector Error Correction Model (VECM) is used to analyze both the short- and long-term relationships between the dependent and independent variables. Impulse response functions and variance decomposition are included to assess the effects of innovation shocks on the variables. Lastly, residual tests are performed to evaluate the overall fit and validity of the model.

#### 4.2. Descriptive Statistic

The descriptive statistics include both the level form and the logarithmic form. The difference between them lies in the conversion to the natural logarithm, which makes the data easier to interpret and more understandable. Descriptive statistics are valuable because they allow you to condense large datasets into a more digestible form. For instance, if you have income data for a million individuals, presenting the entire dataset would be overwhelming and uninformative. However, by summarizing the data—such as calculating the average wage or median income—you provide a clear and comprehensible overview, making the information much easier to understand.

	YEAR	GDP	FDI	GFCF	ТО
Mean	2009	13.3 B	1.4 B	2.8 B	98.64
Median	2009	12 B	928 M	2.3 B	97.49
Maximum	2022	25 B	3.7 B	7.5 B	176.57
Minimum	1996	4.4 B	81580651	475 M	39.81
Std. Dev.	8	6.8 B	1.3 B	2 B	36.79
Skewness	4.97 x 10 <sup>-17</sup>	0.31	0.54	0.76	0.11
Kurtosis	1.80	1.78	1.85	2.47	2.11
Jaque-Bera	1.63	2.1	2.80	2.89	0.95
Probability	0.44	0.34	0.25	0.24	0.62
Observations	27	27	27	27	27

## Table 2: Descriptive statistic in level form

Source: Authors' calculation

Table 3:	Descriptive	statistic in	logarithm	form
Table 5.	Descriptive	statistic m	105ai iunin	IUI

	YEAR	LGDP	LFDI	LGFCF	LTO
Mean	2009	23.17	20.41	21.45	4.52
Median	2009	23.21	20.65	21.55	4.58
Maximum	2022	23.94	22.02	22.73	5.17
Minimum	1996	22.20	18.22	19.98	3.68
Std. Dev.	7.94	0.57	1.35	0.82	0.41
Skewness	4.97 x 10 <sup>-17</sup>	-0.26	-0.32	-0.24	-0.5
Kurtosis	1.80	1.79	1.54	1.95	2.28
Jaque-Bera	1.63	1.95	2.86	1.5	1.73
Probability	0.44	0.38	0.24	0.47	0.42
Observations	27	27	27	27	27

Source: Authors' calculation

#### 4.3. Unit Root Test

The unit root test is crucial when dealing with non-stationary data, which is common in most macroeconomic models. Non-stationary data can lead to misleading results, so a unit root test is necessary to address these issues. The most commonly used tests are the Augmented Dickey-Fuller (ADF) Test and the Phillips-Perron (PP) Test, both of which are capable of testing the stationarity of macroeconomic variables.

The Dickey-Fuller test originated from the work of David Dickey and Wayne Fuller, who published their findings in the 1970s. Due to the limitations of the original simple autoregressive model, the test was later developed into the Augmented Dickey-Fuller (ADF) test, which can handle more complex macroeconomic variables.

The Phillips-Perron (PP) test, developed by Peter C.B. Phillips and Pierre Perron, serves as an alternative to the ADF test and is commonly used to verify the robustness of the ADF test results.

In unit root tests have two hypotheses

 $H_0$ : Null hypothesis if the test statistic is greater than the critical value 0.05, it means the variable has a unit root.

 $H_1$ : Null hypothesis if the test statistic is less than the critical value 0.05, it means the variable does not have a unit root.

	Level		First different	
Variable	Test statistic	Critical Value	Test statistic	Critical Value
LGDP	-2.17	-2.98	-3.1	-2.99
LFDI	-0.22	-2.98	-3.62	-2.99
LGFCF	-1.03	-2.98	-5.26	-2.99
LTO	-1.38	-2.98	-6.08	-2.99

#### Table 4: Augmented Dickey Fuller (ADF) test

Source: Authors' calculation

	Level		First different	
Variable	Test statistic	Critical Value	Test statistic	Critical Value
LGDP	-2.17	-2.98	-3.1	-2.99
LFDI	-0.36	-2.98	-3.5	-2.99
LGFCF	-2.43	-2.98	-6.11	-2.99
LTO	-2.15	-2.98	-6.77	-2.99

#### Table 5: Phillip Perron (PP) Test

Source: Authors' calculation

Based on the analysis of the ADF and PP tests, LGDP, LFDI, LGFCF, and LTO are not significant at the level form AR(0) because the test statistics are lower than the critical values at the 5% significance level (p-value > 0.05). However, these variables become significant in their first differences, I(1), as the test statistics exceed the critical values (p-value < 0.05).

## 4.4. Lag Selection Criteria

Lag selection criteria are crucial for ensuring the reliability of a model, as the choice of lag length significantly impacts the model's accuracy. Selecting an inappropriate lag length can lead to problems and inaccurate results. Among the standard lag selection criteria, the Akaike Information Criterion (AIC) and the Schwarz Criterion (SC) are commonly used and are wellregarded in various studies for their effectiveness in selecting the appropriate lag length. Based on the lag selection table, the asterisk (\*) indicates that lag 1 has been selected.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	43.23	NA	5.09 x 10 <sup>-7</sup>	-3.14	-2.94	-3.08
1	137.12	150.21*	1.02 x 10 <sup>-9*</sup>	-9.37*	-8.39*	-9.1*
2	146.73	12.31	1.91 x 10 <sup>-9</sup>	-8.8	-7.1	-8.37

#### **Table 6: Lag selections**

Source: Authors' calculation

#### 4.5. Johansen Cointegration Test

The Johansen Cointegration Test is a key method for analyzing the relationships between dependent and independent variables. It helps economists understand whether a set of non-stationary time series variables are cointegrated. If the variables are cointegrated, it indicates that they share a common stochastic trend and move together in the long run. The results below show that the Johansen Cointegration Test indicates cointegration among the variables. Based on the results of the Johansen Cointegration Test, there is evidence of at least one cointegrating relationship in the Unrestricted Cointegration Rank Test, as indicated by the asterisks and the probability values being less than the 0.05 critical value for both the Trace and Max-eigenvalue statistics.

**Table 7: Johansen Cointegration Test** 

Unrestricted Cointegration Rank Test (Trace)							
HypothesizedEigenvalueTrace Statistic0.05 Critic				Prob.***			
			Value	Critical Value			
None*	0.756425	55.64584	55.24578	0.0461			
At most 1	0.450682	21.74992	35.01090	0.5919			

At most 2	0.256351	7.372061	18.39771	0.7460
At most 3	0.010923	0.263600	3.841465	0.6077
Unrestricted Coi	ntegration Rank <b>T</b>	Test (Max-eigenva	lue)	
None*	0.756425	33.89592	30.81507	0.0203
At most 1	0.450682	14.37786	24.25202	0.5532
At most 2	0.256351	7.108462	7.14769	0.7012
At most 3	0.010923	0.263600	3.841465	0.6077

Source: Authors' calculation

## 4.6. Vector Error Correction Model

#### Table 8: VECM Result

Variable	Coefficient	Std Error	F statistics
Long run			
LGDP	1		
LFDI	-0.058901*	0.01175	-5.01253
LGFCF	0.165239	0.10681	1.54699
LTO	-0.458098*	0.09380	-4.88366
Short run			
ECT	-0.428306*	0.21425	-1.99911
ΔLGDP	0.556612	0.30072	1.85094
ΔLFDI	0.014573	0.02207	0.66040
ΔLGFCF	0.052026	0.10573	0.49206
ΔLTΟ	-0.363098	0.14432	-2.51599
Constant	9.807044	4.85114	2.02160
Trend	0.020662	0.01171	1.76450

## Source: Authors' calculation

The numbers can also be presented for both the short run and long run, based on the analysis using EViews software.

The formula of short and long run based on the Eviews results

Short run

$$\Delta LGDP_{t} = -0.428306ECT_{t-1} + \sum 0.014573 \Delta LFDI_{t-i} + \sum 0.052026 \Delta LGFCF_{t-i} - \sum 0.363098 \Delta LTO_{t-i} + 9.807044 + 0.020662 + \epsilon_{t}$$
(1)

Long run

$$LGDP_{t} = 1 - 0.058901 \, LFDI + 0.165239 LGFCF - 0.458098 LTO + \epsilon_{t} \, (2)$$

From the table, in the short run, if there is a shock that affects the overall economy, the speed of adjustment, as indicated by the error correction model, is 42%. This suggests that it would take approximately 1.5 years to reach long-term equilibrium. Since this speed is less than 50%, the adjustment process takes longer than usual. Typically, it takes more than 70% adjustment speed to return to equilibrium more quickly.

$$\frac{\ln(0.43)}{\ln(1-0.43)} = 1.5 \ years \ (3)$$

For the long term, if the FDI increase 1 percentage, the GDP will also increase 5%.

## 4.7. Impulse Response Functions and Variance Decompositions



Figure 2: The response graphs of shock innovation

Based on the graph, the initial shock to GDP increases from 0.028 to 0.036 between year 1 and year 2. Following this period, GDP slightly declines, experiencing a short-term peak before steadily decreasing from year 4 onwards, continuing until it stabilizes around year 10.

Furthermore, the shock of FDI on GDP rises rapidly from 0.000 to 0.013 during year 1 and year 2. After that, it steadily declines until reaching a stable state.

Additionally, the shocks to GFCF and TO follow a similar trend, which differs from the trends observed in the GDP and FDI shocks.



Response to Cholesky One S.D. (d.f. adjusted) Innovations

Response of LGDP to Innovations

Figure 3: The overall graphs of shock innovations

According to the graph, the shocks from various variables to GDP are illustrated, with Foreign Direct Investment (FDI) showing a notable impact. Specifically, FDI causes a significant and rapid increase in GDP during the initial period, from year 1 to year 3. This initial surge in GDP growth highlights the immediate benefits that FDI can bring, such as enhanced technology, job creation, and innovation. Following this early boost, the effect of FDI on GDP stabilizes, with GDP reaching a steady state as the initial impacts of the investment are absorbed and the economy adjusts.

Variance Decomposition of LGDP					
Period	S.E.	LGDP	LFDI	LGFCF	LTO
1	0.026886	100.0000	0.000000	0.000000	0.000000
2	0.046878	89.66371	6.415304	1.976235	1.944753
3	0.060418	84.78969	8.347569	4.833532	2.029205
4	0.070560	86.30005	7.919165	4.292955	1.487832
5	0.078009	86.72110	8.368480	3.614152	1.296271
6	0.082409	86.41851	8.710680	3.290371	1.580441
7	0.085227	85.78822	8.567398	3.143163	2.501218
8	0.087292	84.70200	8.353715	3.362645	3.581638
9	0.088802	83.82145	8.176336	3.528050	4.474166
10	0.090150	83.23070	8.000800	3.653166	5.115331

**Table 9: Variance Decomposition Percentages** 

Source: Authors' calculation

Based on the table, GDP has shown a slight decrease in its percentage over time, which aligns with the impulse response analysis of how GDP reacts to FDI shocks. Over a 10-year period, FDI emerges as the primary indicator influencing GDP, compared to other variables such as LGFCF and LTO. Despite FDI accounting for only 8%, it demonstrates a tendency to increase in the subsequent periods.



# Variance Decomposition using Cholesky (d.f. adjusted) Factors

Figure 4: The overall bar chart of Variance Decomposition

A graphic illustration can effectively showcase how Foreign Direct Investment (FDI) influences Gross Domestic Product (GDP) over time. Although FDI might represent a relatively small proportion of the economy, its impact on GDP growth can be significant. The graphic can reveal trends and correlations, demonstrating how increases in FDI often correspond with rises in GDP. This relationship highlights the role of FDI in bringing advanced technology, creating jobs, and fostering innovation, all of which contribute to economic growth.

## 4.8. Diagnostics Tests

Null Hypothesis: No Serial Correlation at lag H							
1	23.76972	16	0.0947	1.775453	(16, 19.0)	0.1162	
2	16.95413	16	0.3886	1.091935	(16, 19.0)	0.4229	
3	12.89689	16	0.6803	0.762513	(16, 19.0)	0.7055	
Null	Null Hypothesis: No Serial Correlation at lags 1 to h						
1	23.76972	16	0.0947	1.775453	(16, 19.0)	0.1162	
2	37.18352	32	0.2425	1.042051	(32, 9.0)	0.5101	
3	NA	48	NA	NA	(48, NA)	NA	

## Table 10: Autocorrelation LM Test

Source: Authors' calculation

## There is no autocorrelation in the model.

## Table 11: Normality Test

Component	Skenwness	Chi-sq	df	Prob.*
1	-0.577365	1.333402	1	0.2482
2	-0.699771	1.958720	1	0.1617
3	-0.368570	0.543376	1	0.4610
4	-0.053255	0.011345	1	0.9152
Joint		3.846843	4	0.4271
Component	Kurtosis	Chi-sq	df	Prob.*
1	3.569941	0.324833	1	0.5687
2	3.276524	0.076466	1	0.7821
3	2.101243	0.807763	1	0.3688
4	2.650063	0.122456	1	0.7264
Joint		1.331518	4	0.8560
Component	Jarqu	e-Bera	df	Prob.*

1	1.658235	2	0.4364
2	2.035186	2	0.3615
3	1.351140	2	0.5089
4	0.133800	2	0.9353
Joint	5.178361	8	0.7384

Source: Authors' calculation

There residual is normally distributed.

$$JB = \frac{24}{6} \left( (-0.58)^2 + \frac{(3.57 - 3)^2}{4} \right) = 1.67 \ (3)$$

#### Table 12: Heteroskedasticity

Joint test:		
Chi-sq	df	Prob.
218.3573	200	0.1777

Source: Authors' calculation

#### There is no heteroscedasticity in the model.

#### 4.9. Forecasting

We developed three scenarios to provide insightful forecasts by analyzing different growth rates of Foreign Direct Investment (FDI) and their impact on macroeconomic variables, particularly GDP. In the first scenario, we applied a 10% growth rate to FDI, representing the highest growth in our analysis. This scenario reflects an optimal environment for FDI, where it achieves maximum growth, significantly boosting GDP and other economic variables. The second scenario assumes a medium growth rate, with a 5% increase in FDI, reflecting a moderately favorable environment that supports steady FDI growth, leading to moderate but positive impacts on the economy. Lastly, the third scenario considers a 3% growth rate in FDI, accounting for economic challenges that hinder FDI growth. This scenario illustrates a less conducive environment for FDI, resulting in slower growth and more subdued effects on the broader economy.

Based on our forecasting, we observed that an increase in FDI has a potentially significant impact on other macroeconomic variables, especially GDP. In this study, we assume that FDI is a key driver of growth for GDP, Gross Fixed Capital Formation (GFCF), and Trade Openness (TO). Given these results, we strongly recommend that the government take proactive measures to attract more investors, aligning with Cambodia's vision to become an upper-middle-income country, as FDI remains one of the main contributors to economic growth.



The maximum growth (10% to the FDI)

Figure 5: Forecasting the maximum graphs from 2023 to 2030

In Figure 5, the results demonstrate that a consistent 10% increase in FDI significantly contributes to GDP growth, raising it from USD 28 billion in 2023 to USD 43 billion in 2030, representing a constant 7% annual growth rate. Additionally, Gross Fixed Capital Formation (GFCF) increases from USD 7 billion in 2023 to USD 12 billion in 2030, reflecting a steady 5% growth. In terms of Trade Openness (TO), there is a 3% increase, with the index rising from 180 in 2023 to 220 in 2030.



#### The medium growth (5% to the FDI)

Figure 6: Forecasting the median graphs from 2023 to 2030

In Figure 6, the data illustrates that a 5% increase in FDI contributes to GDP growth, raising it from USD 26 billion in 2023 to USD 35 billion in 2030, with a consistent annual growth rate of 4%. Additionally, Gross Fixed Capital Formation (GFCF) increases from USD

7 billion in 2023 to USD 9 billion in 2030, reflecting a 3% growth rate. Meanwhile, Trade Openness (TO) rises from an index of 170 in 2023 to 200 in 2030.

These findings reinforce that increasing FDI positively impacts other macroeconomic variables, particularly GDP, which is the primary focus of our study.



The minimum growth (3% to the FDI)

Figure 7: Forecasting the minimum graphs from 2023 to 2030

Figure 7 shows that a 3% increase in FDI contributes less to economic growth compared to the high and medium growth scenarios, where GDP increases more significantly. In this case, GDP rises from USD 26 billion in 2023 to USD 29 billion in 2030, reflecting a modest 2% annual growth rate. Similarly, Gross Fixed Capital Formation (GFCF) shows low growth, increasing from USD 7 billion in 2023 to USD 8.1 billion in 2030, also representing a 2% growth rate. Meanwhile, Trade Openness (TO) increases from an index of 170 in 2023 to 190 in 2030, which is a relatively small growth of only 1%.

These findings suggest that a lower increase in FDI results in smaller gains across key macroeconomic variables, underscoring the importance of higher FDI growth to achieve more substantial economic benefits.

## CONCLUSION

The conclusion of this thesis draws from a comprehensive empirical investigation of the impact of foreign direct investment, trade openness, and gross capital formation on Cambodia's economic growth between 1996 and 2022 using the VECM model. This study confirms the important role of FDI in fostering economic growth in Cambodia. From the research, we can conclude that FDI, alongside other side factors, does indeed contribute to the economic growth of Cambodia. FDI contributes tremendously in the field of human capital due to the technology's spillover. Moreover, the openness of trade has enabled the country to integrate into the global market, boosting exports, attracting FDI and promoting efficiency. Simultaneously, gross fixed capital formation supports economic growth by expanding the infrastructure, creating jobs, and fostering long-term economic stableness.

The model section demonstrates that the selected macroeconomic variables are wellsuited for the VECM model. Beyond model fitness, the empirical results indicate that FDI has a positive impact on Cambodia's economic growth in the long run. Additionally, we have illustrated the GDP response to shock innovations, highlighting the percentage outcomes. Importantly, we have also created scenarios to forecast the growth variations of macroeconomic variables across three categories: maximum growth, median growth, and minimum growth.

For the final part of the thesis, we forecast the growth variation of FDI under three different scenarios, examining the impact on key macroeconomic variables such as GDP, GFCF, and TO. The results indicate that an increase in FDI has a significant impact on these variables, with higher FDI growth leading to stronger economic performance. This demonstrates that FDI is a crucial driver for Cambodia's economic growth, particularly in achieving a consistent rise in GDP, investment levels, and trade. Therefore, we strongly recommend that the government

takes proactive measures to attract and manage FDI effectively, such as improving investment policies, regulatory frameworks, and infrastructure. Such actions will be essential for achieving Cambodia's vision of becoming an upper-middle-income country by 2030.

## RECOMMENDATION

#### Institution

- Delegate clear functions and duties regarding decision-making power with corresponding responsibility and accountability to the nation. Additionally, establish leadership training programs to implement ethics and adopt technologies in public administration. Enhance performance-based management and promote competition and innovation within the civil service management system to serve the public effectively.<sup>53</sup>
- Choose representatives and skilled individuals based on meritocracy for recruitment and appointments. Encourage productive civil servants by providing comprehensive management through a public sector pay and incentive system.<sup>54</sup>
- Enhance the inspection and audit mechanisms by establishing standard systems to combat corruption, which is a major obstacle to institutional prosperity. Strengthen cooperation between Anti-Corruption Units and public institutions through a focal person mechanism, both in providing anti-corruption education and in preventing corruption.<sup>55</sup>
- Promote fairness and effectiveness in law enforcement through integrity, professionalism, and ethics. Improve inspection and punishment mechanisms for law enforcement officers and court officials who break the rules.<sup>56</sup>
- Strengthen governance in the private sector and business by accelerating participation in addressing social issues and promoting social morality and cultural values.

<sup>&</sup>lt;sup>53</sup> Royal Government of Cambodia, "Pentagonal Strategy Phase I," *Ministry of Foreign Affairs and International Cooperation*, August 2023,

https://www.mfaic.gov.kh/files/uploads/1XK1LW4MCTK9/EN%20PENTAGONAL%20STRATEGY%20-%20PHASE%20I .pdf.

<sup>&</sup>lt;sup>54</sup> Ibid.

<sup>&</sup>lt;sup>55</sup> Ibid.

<sup>&</sup>lt;sup>56</sup> Ibid.

Additionally, improve effectiveness, transparency, and integrity by adopting information technology systems in procedural inspections.<sup>57</sup>

#### Human Capital Development

- Increase the number of new generation students choosing STEM (Science, Technology, Engineering, and Mathematics) for their future careers. Developing an industrial-based economy and becoming an upper-middle-income country by 2030 requires qualified human resources in STEM fields. Both local and global job markets need skilled labor in STEM because it generates significant profits and attracts large companies to invest in the country.<sup>58</sup>
- Implement TVET (Technical and Vocational Education and Training) programs to provide people with practical experience in response to the rapidly changing technology job market. TVET programs offer hands-on experience and reduce study time.<sup>59</sup>
- Invest in Research and Development (R&D) to increase productivity. The government should allocate budget for R&D to keep up with new technologies that can solve critical issues and lead to prosperity.<sup>60</sup>
- Focus on health as a crucial aspect of human capital development. To prolong growth, life expectancy is important. Ensure the effectiveness of product quality and safety, provide effective screening, treatment, and palliative care, and promote multisectoral collaboration to address other health issues.<sup>61</sup>

<sup>&</sup>lt;sup>57</sup> Ibid.

<sup>&</sup>lt;sup>58</sup>Ministry of Industry, Science, Technology & Innovation, "Cambodia's Science, Technology, & Innovation Roadmap," *Ministry of Industry, Science, Technology & Innovation*, July 26, 2021, https://doi.misti.gov.kb/doguments/002108261620000117.pdf

https://cdn.misti.gov.kh/documents/202108261629990117.pdf. <sup>59</sup> *Ibid.* 

<sup>&</sup>lt;sup>60</sup> *Ibid*.

 <sup>&</sup>lt;sup>61</sup> Ministry of Health, "National Multisectoral Action Plan for the Prevention and Control of Noncommunicable Disease 2018-2027," *Ministry of Health*, June 2018, https://moh.gov.kh/content/uploads/2017/05/NMAP-NCD\_-13-06-2018-Signed En.pdf.

#### Infrastructure

- Improve internet speed to build a solid foundation for digital infrastructure. Enhanced internet speed and connectivity can empower digital citizens, digital government, and digital businesses by facilitating seamless interactions, improving access to online services, and supporting the implementation of digital initiatives across sectors.<sup>62</sup>
- Establish data centers for storing databases, including records of individuals, properties, businesses, and government entities. This will provide valuable insights for the government to establish targeted public policies to attract investors. On the investor side, it helps in considering the marginal benefits of opening businesses through available government databases.<sup>63</sup>
- Foster the implementation of AI and ML (Artificial Intelligence and Machine Learning) based on insightful data in the public sector to help the government predict policy outcomes. Automated reports can assist policymakers in making faster decisions. For investors, this enhances investment analysis through risk assessment and market forecasting, leveraging local expertise and available data.<sup>64</sup>
- Infrastructure development, such as building bridges, roads, hospitals, and schools, is crucial for economic growth and community well-being. For example, the Funan Canal offers significant benefits, such as reducing travel time and transportation costs, which help local businesses and attract new investments. This improved connectivity raises property values by making the area more desirable for residents and businesses. Infrastructure projects like the Funan Canal also boost tourism and recreational

<sup>&</sup>lt;sup>62</sup> Royal Government of Cambodia, "Cambodia Digital Economy and Society Policy Framework 2021-2035," *Ministry of Post and Telecommunications*, n.d., https://mptc.gov.kh/en/2023/06/cambodia-digital-economy-and-society-policy-framework-2021-2035/.

<sup>&</sup>lt;sup>63</sup> Ibid.

<sup>&</sup>lt;sup>64</sup> Ibid.

activities, stimulating local economic activity. Such developments create a stronger, more dynamic community, support sustainable economic growth, and attract more foreign direct investment (FDI).<sup>65</sup>

<sup>&</sup>lt;sup>65</sup> Ibid.

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## **APPENDICES**

## Table A1: The Raw dataset

Year	GDP	FDI	GFCF	ТО
1996	4381671867	293600000	475322611.7	39.80747455
1997	4557228855	203700000	554013616.4	44.80667928
1998	4770581545	115871733	521715902.2	41.86079731
1999	5376702112	102225822	714108919	53.00936884
2000	5914027157	118308566.3	881923093.6	61.05005109
2001	6395924923	146481995.1	844651220.4	63.92241125
2002	6816708955	130956363.9	1076686837	68.25943767
2003	7396531099	81580650.56	1155212313	70.49486741
2004	8161371526	131416229.3	1282340902	79.03442527
2005	9242760346	379180190.6	1532447143	81.55975301
2006	10238305796	483209382.7	1788136315	86.52669027
2007	11283900343	867288538.6	1969055434	87.24012277
2008	12038971277	815180218	2282610592	97.48667534
2009	12049408699	928393617.3	2374363670	87.6414509
2010	12767924407	1404315449	2140716296	98.08471925
2011	13670561754	1538883425	2371200567	107.7023057
2012	14670337168	1988102945	2783278871	116.0974604
2013	15749584749	2068470774	3208200151	123.9162744
2014	16874510038	1853471158	3498553349	128.0107398
2015	18049954289	1822804151	3869000933	127.864067
2016	19301414292	2475915854	4259747966	129.8756018
2017	20651915663	2788084322	4519334435	127.0148034
2018	22194442188	3212633447	5226533628	136.6046647
2019	23760061873	3663032999	5972674497	143.080947
2020	23024448759	3624644990	5809309481	132.8470891
2021	23721258227	3483461606	6203233044	152.7734443
2022	24945858694	3578831296	7445298615	176.5729796

Source: WDI (2023)









## At first difference

Figure A2: The logarithm variables in first difference form