GLOBAL COMPETITIVENESS AND CORRUPTION: A PANEL ANALYSIS IN ASEAN COUNTRIES

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BY

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DECLARATION

We hereby declare that:

(1) This undergraduate research project is the end result of our own work and that due acknowledgement has been given in the references to ALL sources of information be they printed, electronic, or personal.

(2) No portion of this research project has been submitted in support of any application for any other degree or qualification of this or any other university, or other institutes of learning.

(3) Equal contribution has been made by each group member in completing the research project.

(4) The word count of this research report is 16568 words.

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LIST OF ABBREVATIONS

AEC	ASEAN Economic Community
ARCH	Autoregressive Conditional Heteroscedasticity
BLUE	Best Linear Unbiased Estimate
BPLM	Breusch-Pagan Lagrange Multiplier
CCI	Control of Corruption
CPI	Corruption Perception Index
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
H-O	Heckscher and Ohlin Theory
IMD	Institute for Management Development
IMF	International Monetary Fund
OLS	Ordinary Least Square
POLS	Pooled Ordinary Least Square
REM	Random Effect Model
TO	Trade Openness
WEF	World Economic Forum
WGI	Worldwide Governance Indicators

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PREFACE

This research is entitled “Global Competitiveness and Corruption: A Panel Analysis in ASEAN Countries”. The research is developed to explore the important drivers that will affect the Global Competitiveness Index (GCI) among the ASEAN countries. The Global Competitiveness Index delivers a comparative assessment of a country's economic and business capabilities. In 2007, ASEAN Economic Community (AEC) set one of its goals to improve competitiveness, and ASEAN has undertaken a number of initiatives to promote the improvement of the countries’ competitiveness.

Since the GCI is playing an important role in facilitating the ASEAN’s competitive position, the major objective of this research is to identify the important factors that will influence the GCI among the ASEAN countries. Through this research, the readers will have a better understanding of the determinants that will impact the GCI and the importance of the particular determinants on the ASEAN countries.

ABSTRACT

This paper attempts to assess the determinants that affect the GCI in ASEAN countries. It is known that the GCI allows decision-makers to evaluate the productivity of individual sectors and the economy as a whole for each country. Besides, it has nine pillars that are classified into three sub-indices, where a total of ninety variables are composed to determine a country's competitiveness. Hence, it is beneficial to examine the set of institutions, policies, and variables that govern the degree of economic success that can be sustained in both the short-run and long-run.

Furthermore, the World Economic Forum (WEF) has compiled a Global Competitiveness Index (GCI) as a study on the competitiveness of countries around the world, including ASEAN countries since 2004. This study focuses on the ASEAN nations that make up the AEC's axis. This community is committed to boosting ASEAN's capabilities to pursue the flow of barrier-free liberalization and trade while also enhancing the international trade system's legislation and regulations. Consequently, the ASEAN countries' competitiveness index should always be evaluated. The study is only undertaken in ASEAN-7 nations, including Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, due to data limitations in various countries. In our research, the Ordinary Least Squares (OLS) method is employed to explore the relationship between the explanatory variables (Control of Corruption (CCI), Gross Domestic Product (GDP), FDI inflows, Trade Openness, Gross Fixed Capital Formation (GFCF)) and the dependent variable (global competitiveness index).

Lastly, the empirical findings indicate that the CCI, GDP, and FDI have an impact on ASEAN countries' GCI. The CCI, GDP, and FDI are proven to have a positively favorable link with GCI in ASEAN countries. On the other hand, the moderating effect between CCI and GDP with CCI and FDI has a negative influence on GCI. However, the remaining control variables, namely trade openness and GFCF, were shown to have little or no effect on GCI among the ASEAN nations.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

Competition is essential to the effectiveness of market economies. It helps to create a more efficient atmosphere. It boosts allocative efficiency by ensuring that supply matches customers' expectations and resources are allocated to the most valuable use. In an era of growing competition and economic opening, the most difficult challenge for most countries is to make their economies more competitive. The World Economic Forum (WEF), which has been assessing nations' competitiveness since 1979, describes competitiveness as "the combination of institutions, regulations, and variables that influence a country's level of production". (World Economic Forum, 2020)

By structuring on the framework of "the global competitiveness of the nation", it is important to emphasize how fascinating the idea of global competitiveness is. According to Fagerberg (1988), competitiveness is a country's capacity to meet the dual aims of enhancing its citizens' standard of living through a continuous increase in income and employment while avoiding balance-of-payment issues on a national scale. Global competitiveness, on the other hand, is defined by Scott (1985) as "a nation state's capacity to produce, distribute, and service goods in the world economy in competition with the goods and services produced in other nations, and to do so in a manner that earns an increasing living standard." The OECD Program on Technology and the Economy (1992) acknowledged that competitiveness refers to the degree to which a nation can create products that compete against foreign competitors while simultaneously sustaining and boosting domestic real income under open market circumstances. Various studies from Kharlamova & Vertelieva (2013) and Porter et al. (2000) emphasize that global competitiveness refers to a country's economic structures and institutions that aid economic growth as a weight in the global economy's structure. In this case, we have chosen to take to dispel the ambiguity that underlies the idea of global competitiveness.

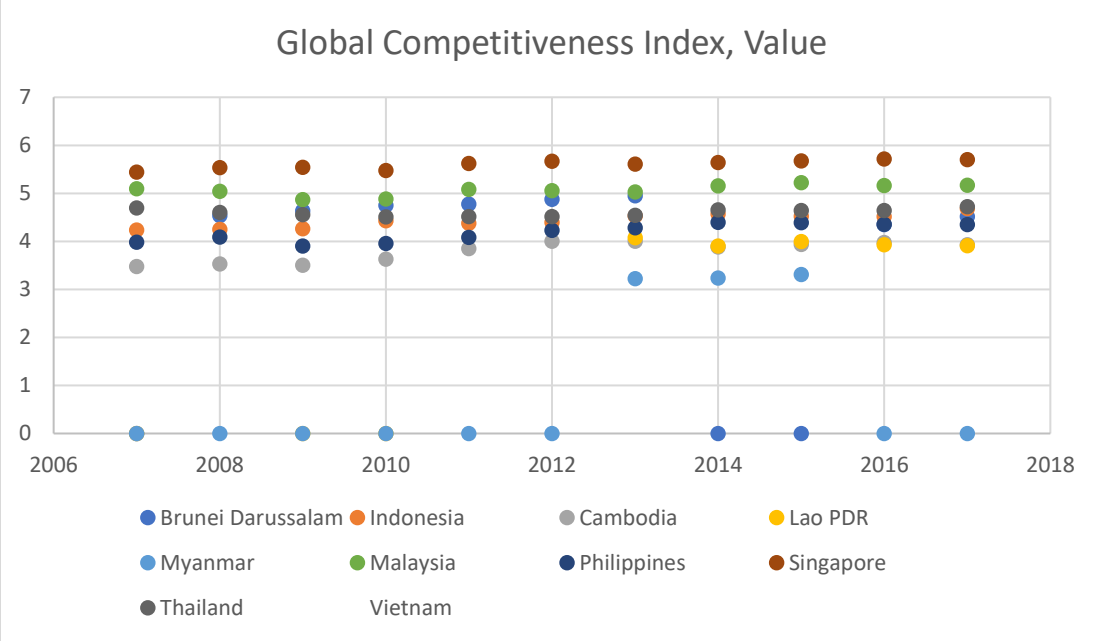
According to Porter (1990), competition is now one of the primary concerns of governments and businesses throughout the world. One of the major concerns is the nature of corruption's influence on global competitiveness. (Ulman, 2013) Hence, many authorities and policymakers express substantial concerns about global competitiveness. (Lall, 2001) As a result, these concepts have evidenced that competitiveness is determined by strategies rather than endowments following Porter's Diamond model. (Scott, 1985) It is a diamond-shaped framework that describes strategy, structure, and rivalry in global competition. (Tsai et al., 2021) In other words, they prioritize competitive advantage based on high-value production and economies of scale of a country over comparative advantage based on resource endowment. Governments and industry representatives strive hard to address why certain firms or governments prosper while others fail in global competition. As a result, too many businesses and authorities misunderstand the nature of competition and the job at hand by focusing on enhancing financial performance, obtaining government assistance, achieving stability, and mitigating risk through alliances and mergers. (Porter, 2014) However, before solving the above issue, one first grasp what competitiveness is and how to quantify it. Hence, Global Competitiveness Index (GCI) comes to the rescue.

1.1 Research Background

Over the past decades, WEF has commonly studied global competitiveness. (Sala-I-Martin, 2007) Annual Global Competitiveness Reports have always been used to investigate the relevant variables that enable the national economies to achieve long-term economic development and prosperity since 1979. Over the years, GCI served as a tool for industries and politicians to identify barriers to increased competitiveness to encourage discussion on solutions. GCI examines the components that have a significant impact on developing a favorable business climate in the country and are critical in terms of competitiveness and manufacturing. It assesses a country's strengths and shortcomings and identifies initiatives for facilitating the execution of political reforms. (World Economic Forum, 2013) As a result, the GCI score is based on a 7-

point scale, with 1 being the least desired and 7 being the most ideal development score. According to the Global Competitiveness Report 2019, the researchers examine the competitiveness of up to 141 countries using open data and the opinions of thousands of professionals from over 100 countries, including ASEAN countries.

Figure 1.1.: Global Competitiveness Index by Value of the Selected Countries from 2007 to 2017



Source: World Economic Forum Global Competitiveness Index (2018)

The ASEAN Economic Community (AEC) aims to increase competitiveness, and ASEAN has undertaken several initiatives to achieve its goals since 2007. In this research, we will examine the determinants of GCI in the ASEAN countries, and hence, data comparison among the nations is developed. As a result, the ASEAN country's average GCI is between 4.00 and 5.00. This result indicated that most countries still required a great effort to strengthen and improve their competitiveness to increase the world median. As compared, Singapore gained the highest GCI from the beginning when GCI was first established. Due to its strong economic performance, it topped the 2020 Institute for Management Development (IMD) World Competitiveness Ranking. (Rachel, 2020) This is because Singapore resulted in a steady performance in its

education system and technological advancements. Followed by Malaysia ranked at the 2nd position among the ASEAN countries, and it achieved an average year-on-year growth rate of 0.17 percent during the studied period. (World Bank Data, n.d.) Consequently, Malaysia was ranked 23rd in 2017 among the countries based on GCI rank. According to Malaysia's Global Competitiveness Report 2017, Malaysia is in transition between the efficiency enhancer subindex and the innovation and sophistication factors subindex, with GDP per capita ranging from USD9,000 to USD17,000. (MPC, 2017) On the other hand, Thailand maintains its GCI between 4.50 to 5.00. This has allowed Thailand to be designated as an 'Efficiency Driven Economy' due to the GCI 2016-17 score. Brunei leapfrogs six places in the GCI, ranking as the world's 56th most economically competitive country out of 141 nations in 2019. (Othman, 2019) It gained an average score of 4.68 due to its leading position in its ICT adoption and labor market. Meanwhile, the Philippines and Indonesia have a similar GCI between 4.00 to 4.50. WEF observed that Indonesia is gradually climbing the competitiveness ladder, as it has improved performance across all its pillars. (Indonesia Investments, 2017) This resulted in Indonesia achieving a year-on-year average growth rate of 1.02 percent before 2017. The Philippines moved up a notch in the GCI 2017, placing 56th out of 137 economies, up from 57th in 2016. However, its score fell by 0.01 points to 4.35 by 2017, down from 4.36. Its nearly flat performance put it behind most of its ASEAN neighbors, including Vietnam, Brunei, Indonesia, Thailand, Malaysia, and Singapore. (Paz, 2017) Vietnam improved the most among nations and regions, ranking 67th and jumping 10 spots in GCI 4.0, aided by the trade war that has driven manufacturing out of China. (Othman, 2019) Although both Laos and Myanmar have an incomplete dataset, we can still see that their score has remained bottom among the ASEAN countries. As a result, Myanmar has its highest year-on-year average growth at 1.34 percent, while Laos has the lowest, at -1.01 percent. Although Cambodia gained a low GCI score in the first two years during the studied period, it continuously improved until almost 4.0 by 2017. Cambodia's economy has grown at 7 percent each year since 2014, making it one of Asia's fastest-growing nations. (Senase, 2019)

From a study by Schwab et al. (2011), GCI refers to a project conducted by WEF that evaluates the economic underpinnings of almost all countries to determine each country's competitiveness in attaining long-term economic productivity, growth, and prosperity. Recently, GCI scores are helpful to function as measurements of Social Pressure and Resilience for the Coastal Livelihoods and Economies objective. (Halpern et al., 2012) This is because GCI 4.0 measures competitiveness by examining the factors that influence an economy's productivity, often regarded as the most significant predictor of long-term growth and wealth. In essence, increased competition indicates increased prosperity income. Since competitive economies are more likely to be able to develop more sustainably and inclusively, as well as bring benefits of economic expansion, GCI is necessary to explain each country's state and maturity as it is a critical factor for global competitiveness and long-term prosperity. Hence, the current GCI 4.0 provides policymakers and other stakeholders a much-needed compass to overcome this chasm. It provides recommendations for long-term growth and designs economic strategies, influences policy debates, and measures progress. (Klaus, 2019)

1.2 Problem Statement

GCI was designed by the WEF in 1979 and has been fine-tuned since then to capture an accurate picture of the growth potential of global economies. It is widely recognized as the most authoritative and thorough research. (World Economic Forum, 2007) The particular challenge confronting ASEAN is that the concept of competitiveness is more focused on ASEAN countries' ability to follow the flow of liberalization and trade without obstacles, which tends to limit the government's role. (Nababan, 2019) This is because the dynamic has created restrictions on competition in its domestic market and global trade. However, economic liberalization is only helpful for economies that can drive themselves on both the local and exterior markets. As a consequence, it is essential to examine the global competitiveness of the nations as every nation is encouraged to take cautions on the corruption problem to ensure economic growth.

(Ulman, 2013) Hence, we will estimate the factors that influenced the GCI score in ASEAN countries.

One of the major concerns is that corruption is often discussed; it strongly correlates with global competitiveness. (Ulman, 2013) Corruption is argued to have hindered growth by increasing inequality and poverty, as well as generating suspicion, animosity, and instability, lowering the country's competitiveness. (Pani, 2011) On the contrary, a contrasting perspective regarding corruption held that it might be good, beneficial, and increases efficiency since it reduces the burdensome and inefficient government rules, avoiding bureaucracy as it is viewed as a type of economic activity tax. (Shleifer & Vishny, 1994) This problem is especially relevant for the developing nations in ASEAN countries, which have suffered from a lack of competitiveness on a regional and international scale for several decades. (ASEAN Community, n.d.) It is no surprise that there are changes in ranking elicit strong responses when the index is revealed every year, with some governments ecstatic and others in amazement. As a result, the purpose of this study was to determine whether global competitiveness impacts corruption and, if so, what kind of influence it has. In other words, the study will focus on whether there is a link between corruption and competitiveness.

According to Diaz et al. (2013), the changes in competitiveness are related to increases in growth. Generally, GCI and gross domestic product (GDP) are positively linked. (Korez-Vide & Tominc, 2016) According to their findings, rich countries are more likely to be competitive than poor ones, showing that GCI and GDP have a functional relationship. (Podobnik et al., 2012) A recent research proved that the fall in GDP was substantially less in a more competitive nation than in less competitive countries during the current economic slump among the countries in European Union. (Rusu & Roman, 2018) In another scenario, a case study in Bangladesh revealed that an improvement in corruption is more likely to achieve more substantial economic growth, which could boost the competitiveness of Bangladesh. (Roy & Kumar, 2006) Friedrich (1972) also advised that it is also conceivable for corruption to be advantageous to economic growth. Hence, we will investigate the power of economic growth in influencing global

competitiveness, as well as the impact of corruption on the relationship between growth and global competitiveness in ASEAN countries.

Several studies have evidenced that foreign direct investment (FDI) has an impact on a country's global competitiveness. (Dunning & Zhang, 2008; Popovici & Călin, 2012) This is because a study showed that improving a country's FDI could have a favorable influence on a country's ability to increase its competitiveness. Consequently, Popovici & Calin (2012) found a positive connection between global competitiveness and FDI. In other words, FDI is identified as the factor that improves competitiveness. (Dunning & Zhang, 2008) However, the empirical findings supported previous findings that a country's level of corruption is the significant driver of inward FDI. (Curtis et al., 2013) Kersan-Skabic & Orlic (2007) also suggested that the major FDI factors include the fundamental variables (GDP and trade openness), infrastructure development, as well as including the degree of corruption. Therefore, we expect there is a moderating effect in corruption towards FDI. We will analyze the direct effect of FDI on global competitiveness and the impact of corruption on the relationship between FDI and global competitiveness.

Many studies assess the influence of trade openness on competitiveness in a country. Hence, one of the factors that influenced competitiveness was trade openness. (Bruneckiene & Paltanaviciene, 2012; Mulatu, 2016) We believe there is a correlation relationship between the indicators from the study. In other words, it is critical to determine if a specific degree of trade openness led to a country's competitiveness. On the other hand, the effect of gross capital formation on global competitiveness will also be examined. Although only a little study was conducted to study the linkage between two indicators, a study found that gross capital formation seems to play a significant role in the growth of Bulgaria and the Czech Republic to build competitiveness. (Gibescu, 2010) In other words, a nation could enhance its competitiveness through the contribution of gross capital formation. Thus, this research aimed to analyze the relationship between global competitiveness and other control variables (trade openness and gross capital formation).

1.3 Research Objectives

As mentioned previously, competitiveness is a fairly complex concept. In general, competitiveness denotes a country's favorable position, particularly in international trade, as well as its ability to enhance its position. Rapid economic growth allows a country to promote and support indigenous firms on the global market and help in job creation. Under these conditions, the country's economy can be regarded as competitive. Hence, competitiveness serves as a key reminder of the significance of considering the effects of our current choices on future prosperity based on continuous development, especially during the current challenging economy.

1.3.1 General Objective

In this case, it is critical to understand the variables that influence the total competitiveness of the selected countries, including Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, among the ASEAN countries. The reason for choosing these nations is because there is a complete dataset in the GCI variable to provide a comprehensive analysis in this research. One of these key factors influencing global competitiveness is corruption, which is the primary objective of this research. In fact, the purpose of this research is to determine the relationship between global competitiveness and corruption in the selected countries using a dynamic panel approach.

1.3.2 Specific Objectives

In this case, it is critical to understand the variables that influence the total competitiveness of the selected countries, including Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, among the ASEAN

countries. The reason for choosing these nations is because there is a complete dataset in the GCI variable to provide a comprehensive analysis in this research. One of these key factors influencing global competitiveness is corruption, which is the primary objective of this research. In fAs a result, global competitiveness is the main concern of every country's ability to improve and increase its economic growth. Hence, it is necessary to identify the effect of GDP on GCI. FDI will also be taken into account as one of the drivers to determine GCI as it seems to have a specific level of influence in assessing GCI score. From the previous section, we understand that corruption would moderately impact certain variables. Hence, we will estimate the power of corruption in affecting both GDP and FDI, respectively, to influence GCI in order to provide more valuable insights for government authorities. Rather than just looking at the relationship between global competitiveness and corruption, we will emphasize the relationship of the control variables on GCI as these factors would have a specific level of influential effect on global competitiveness. The link between global competitiveness and common macroeconomic indicators, including trade openness and gross capital formation, is also examined in this paper. With all this evidence, it is no longer an issue, especially for the government authorities and policymakers on the implications of new policies, strategies, and programs, as well as the possible remedies or actions taken. In fact, the purpose of this research is to determine the relationship between global competitiveness and corruption in the selected countries using a dynamic panel approach.

1.4 Research Questions

It is commonly criticized that global competitiveness is directly related to economic growth. However, we usually may not fix the issues that arise within us if we do not clearly understand the cause of the particular issue. Hence, the best way to identify the effectiveness of global competitiveness is to understand it through research and

discussion. The study aimed to examine the empirical relationship of the major determinants for global competitiveness among the ASEAN countries: Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam.

The research questions of this paper included:

1. What is the relationship between global competitiveness and corruption in ASEAN countries?
2. (a) What is the relationship between gross domestic product and global competitiveness in ASEAN countries?
   (b) What is the impact of corruption on the relationship between gross domestic product and global competitiveness in ASEAN countries?
3. (a) What is the relationship between foreign direct investment and global competitiveness in ASEAN countries?
   (b) What is the impact of corruption on the relationship between foreign direct investment and global competitiveness in ASEAN countries?
4. What is the relationship between other control variables (trade openness and gross capital formation) and global competitiveness in ASEAN countries?

1.5 Significance of Study

The contributing factors toward global competitiveness in the selected countries are wide range, including quantitative and qualitative measures. In this paper, the results will contribute to the advancement of knowledge in the area by conducting an extensive analysis of selected nations among the ASEAN countries classified by stage of development over 11 years and taking five economic variables into account that have potential influence on global competitiveness. The main issue of the study is that there are growing concerns of corruption power over GCI. Corruption is a frequently debated topic since it could influence a country's economic development in terms of economic efficiency and growth. Hence, the research enables one to recognize the mechanics and

begin to combat them by studying the specific situation from time to time. In this research, we explore the interconnectedness of corruption on GDP and FDI to show its moderating effect on the selected nations. In other words, the innovation of research could contribute its results to help the government authorities establish appropriate policies to improve their competitive advantage. As a result, it also provides better insights for future researchers.

1.6 Chapter Layout

The organization of this research is as follows: Section 2 elaborates on the theoretical framework and hypotheses of the study, as well as the progression of the variables under consideration during an 11-year period; section 3 discusses the research methods and the economic models used. On the other hand, section 4 focuses on the results and explains the key findings of the research. The last section, section 5, will present the conclusions and demonstrate the limitations and recommendations for future studies.

1.7 Conclusion

GCI, which has served as a dependent variable, is introduced and discussed throughout the research. Consequently, objectives are developed to determine the determinants of GCI to improve the competitiveness in the selected countries. There are four indicators: GDP, FDI, trade openness, and gross capital formation used to identify their effect on GCI, including a major determinant, control of corruption, to investigate the factors that influence this connection with the objective of developing a prediction model. From chapter 1, researchers will provide a better understanding of the factors that contribute to the level of competitiveness. There is expected to be a significant relationship between global competitiveness and its determinants. Next, researchers

will look into the literature review to demonstrate a review of the key findings and discussions on the topic.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

In the previous section, an introduction of the research background was addressed, and concerns about the factors of global competitiveness were highlighted. Competitiveness is a concept commonly used in economic literature in the context of financial performance assessments. Hence, we will review some past research and studies in this chapter. The findings mainly focus on the connection between GCI and selected independent variables, such as corruption, GDP, FDI, trade openness, and gross capital formation. The methodology and strategies of the past researchers will be discussed to examine the expected relationship of the variables included.

2.1 Review of the Literature

2.1.1 Global Competitiveness Index (GCI)

As mentioned earlier, the World Bank has recommended analyzing the competitiveness of nations in its global component using an indicator called the Global Competitiveness Index (GCI) to account for all dimensions of competitiveness. This is because it takes into consideration all competitiveness determinants, including price and structural factors. (Sigue, 2020) Knowing that the aspects underlying this process have occupied economists' perceptions for hundreds of years, spawning theories ranging from Adam Smith's emphasis on specialization and the division of labor to neoclassical economists' focus on investment in physical capital and infrastructure, and, more recent time, on interest in other mechanisms such as training and education, technical

advancement, economic stability, effective governance, firm sophistication, and market efficiency among each other. Auzina-Emsina (2014) evidenced that GCI is widely applied to evaluate and rank countries depending on the level of global competitiveness. As a result, GCI is developed to capture this open-endedness by adding a weighted average of several individual components, each evaluating a different dimension of competitiveness. 12 pillars have been divided to explain these components. In other words, the first class, which includes the first three pillars, is that of fundamental parameters; the second class, which includes the following six pillars, is that of sources of effectiveness; and the third class, which consists of the remaining pillars, is that of sources of innovation and sophistication. The different pillars are utilized to examine the various stages of development for every single country. As mentioned in the previous section, the computation is based on consecutive aggregations of scores, ranging from 1 to 7. (FEM, 2015). In short, GCI is a broad measure of competitiveness in that it considers all areas as well as population well-being.

2.1.2 Corruption

Corruption is an economic problem that affects both microtransactions and economies. (Senior, 1998) A monetary definition is proposed that distinguishes corruption from crime in general and stealing in particular. Corruption is also described as using public authority for personal gain, typically by an elected politician or a government official. (Transparency International, 2020) Government authorities make an effort to reduce corruption in their countries because it will significantly reduce investment and slow economic growth, as supported by the empirical evidence provided by International Monetary Fund (IMF). (Mauro, 1997) Generally, a study revealed that an additional level of corruption significantly diminishes a country's possibility of improving its wealth and competitiveness. (Mo, 2001) Several empirical types of research demonstrated that corruption significantly reduces investment and slows

economic growth. To put it more simply, the higher the level of corruption, the lower level of competitiveness. The hypothesis is supported by Herciu (2006). It indicated that corruption is negatively linked to GCI. From the regression results, nations with highly competitive are also seen as having a lower likelihood of corruption. (Leff, 1964) However, in both studies, Corruption Perception Index (CPI) is utilized to measure the level of corruption. The indicator measures only perceived corruption rather than actual corruption and may be irrelevant to the actual result of the study. In fact, we will use Control of Corruption (CCI) under the Worldwide Governance Indicators (WGI) to study the relationship between the variables.

On the contrary, World Bank argued that corruption might also benefit the economy, according to some economists. (Pablo, 2006) This is because bribes may cut through red tape in a country whose substantial bureaucracy finds it challenging to start businesses, both import or export commodities, even if it is unethical. According to Lui (1996), corruption is considered a charge for underpriced services, which helps to ensure the process runs smoothly. Aidt (2009) also advised that corruption is favorable to growth and development since it allows for the avoidance of administrative impediments, in accordance with the "greasing the wheels" model. Ulman (2013) even added that the connection between the inverse corruption and competitiveness indices is powerful, implying that a high degree of corruption has a large positive influence on national competitiveness. This suggested that corruption could help in enhancing a nation's competitive edge. Hence, we can assume that corruption is considered an indicator that provides a strong correlation to competitiveness in measuring GCI.

2.1.3 Gross Domestic Product (GDP)

According to Callen (2020), GDP is an estimator used to assess the financial worth of final goods acquired by end-users created in a country within a given time, often a quarter or a year. It includes all of the products produced within a country's borders. IMF claimed that GDP is essential since it delivers information on the size and performance of an economy. (Callen, 2020) Real GDP growth is generally regarded as proof that the economy is doing well. While GDP is the most important indicator for measuring economic activity, it fails to provide a sufficient assessment of people's well-being, for which the inclusion of additional indicators may be more appropriate. (OECD, 2021) Consequently, a linkage between GDP and GCI will be demonstrated to emphasize the competitiveness level of the selected countries that represent their economic performance from the previous studies regarding their living standards.

Schwab (2015) has proven that a more competitive economy is more likely to have higher growth over time. This is because GDP usually positively impacts GCI, claimed Dima et al. (2018). A study by Nababan (2019) indicates that the GDP of the ASEAN-7 nations has a positive and substantial influence on growing the GCI. In other words, countries are anticipated to continue expanding their GDP since rising GDP is a strong predictor of the GCI. The authors, Lopez-Claros et al., stated in 2007 that GCI effectively estimates an economy's aggregate growth rates from the Global Competitiveness Report 2007. However, we will use GDP per capita in assessing GCI because GDP growth only calculates the overall value of goods and services produced annually instead of measuring a country's economic output per person. From the previous studies, we expected the relationship is significant as it has a causal effect on GCI.

2.1.3.1 Moderating Effect Between Control of Corruption and GDP

Although we included corruption as the primary determinant that influences GCI, some studies indicate a moderating effect between the independent variables. Consequently, corruption is summarized that a lower degree of corruption is relatively linked to a lower level of inequality by harming economic growth, claimed by World Bank (2021). Šumah (2018) proved that corruption has an indirect negative influence on economic growth, particularly due to the country's environment. Li & Wu (2010), on the other hand, investigate why certain nations have good economic development despite pervasive corruption. Their findings supported their theory that trust reduces the detrimental impact of corruption on economic growth. Moreover, corruption reduces a country's competitiveness by lowering financial investments and economic growth, conveying improper market incentives, resulting in suboptimal national resource distribution. (Kordalska & Olczyk, 2016; Cieślik & Goczek, 2018; Sharma & Mitra, 2019) A study by Reyes & Useche (2019) emphasized that greater perceived corruption was associated with more robust GDP growth. It indicated that Venezuela has the greatest perception of corruption, as well as the lowest economic performance and the least competitive economy in 2017 among the studied countries.

However, there is criticism of the relationship between GDP and corruption. The critique stems from the study's finding that corruption promotes growth and development because it allows for the avoidance of administrative barriers. (Aidt, 2009) Huang (2016) supported that the influence of corruption on economic growth is strongly positive. He suggested that corruption contributed to a rise in economic growth during the years studied in South Korea. Although the relationship between GDP and corruption is still ambiguous, we expected there is an influence on GDP regardless of any level of corruption.

2.1.4 Foreign Direct Investment (FDI)

FDI has proven to be robust, especially during financial crises. It is a sort of cross-border investment in which a resident of one nation gains a long-term interest in and significant influence over a resident of another economy. (OECD, n.d.) FDI is seen as a key component of international economic integration since it develops long-term and durable links between economies. Furthermore, it is an essential medium for transferring technology between nations since it promotes international trade by offering access to other markets and serves as a strong economic growth instrument. (Feldstein, 2000)

As a result, Popovici & Calin (2012) revealed that a country's competitiveness correlated to FDI inflows. This outcome was evidenced by Ali (2017). He concluded that FDI is an important indicator for assessing GCI to explain economic growth prospects. In general, FDI is recognized as the potential indicator that enhances a country's competitiveness. (Dunning & Zhang, 2008) Clipa (2011) also added that the connection between GCI and FDI is inversely related, especially FDI inflows in China. Hence, we predicted a strong correlation between the variables.

2.1.4.1 Moderating Effect Between Control of Corruption and FDI

There are also mixed findings to elaborate on the correlation between FDI and corruption. The connections between these variables are frequently being discussed and researched to identify the right direction in terms of the relationship. However, the results revealed a variety of interpretations according to different dimensions and measurements practiced. In past decades, Mauro (1995) evidenced a negative linkage between FDI and corruption. In other words, the increased level of corruption will cause a decline in FDI. Dunning (2003) observes that greater attention on "soft" location characteristics

relating to the quality of life, such as corruption and other unpleasant social behaviors, would function as an important indicator of FDI in a country. For instance, a study showed that Sweden is labeled one of the most corrupted countries which makes it generates less FDI than Russia. (Bakri et al., 2018) According to Belgibayeva & Plekhanov (2019), FDI is not homogeneous and is affected by the extent of corruption in the host nation. Some findings also demonstrated that corruption has raised the cost of conducting business, reduced investment profitability, and discouraged FDI, leading to lower competitiveness levels. (Curtis et al., 2013, Brada et al., 2019)

However, the findings from Subasat & Bellos (2013) supported the concept of 'grease the wheels', whereby the lower levels of corruption correspond to lower levels of FDI inflows. Lucas (1990) revealed that the free and ease of capital flows might cause the developing economies to become more competitive due to corruption. In fact, corruption tends to have a favorable impact on FDI by developing ordinary least squares (OLS) estimation and GMM estimators in recent research. (Blundell-Wignall & Roulet, 2017) Politically unstable countries, especially with high corruption, are more likely to attract FDI from advanced economies. Since the moderating effect is detected through past studies, we expect corruption could affect the performance of FDI in enhancing global competitiveness. However, we will utilize pooled ordinary least square (POLS) method to emphasize the connection between the variables.

2.1.5 Trade Openness

According to IGI Global (n.d.), it defined trade openness is the direction of a country's economy in international commerce. The size of an economy's recorded imports and exports is used to estimate its level of openness. It is important because the investors may obtain more accounting and regulatory

information on overseas markets and invest in foreign assets through trade. (Arouri et al., 2014)

Several studies revealed that trade openness was addressed as one of the drivers of global competitiveness, such as Staskeviciute & Tamosiuniene (2010); Bruneckiene & Paltanaviciene (2012); Mulatu (2016). The research has found the linkage between trade openness and global competitiveness. (Ilzkovitz et al., 2008; Taner et al., 2010) According to the authors, a country's trade openness is frequently seen as a measure of its global competitiveness. Competitiveness is linked to trade performance since trade influences a country's access to global resources and expands market presence. The findings also revealed that trade openness benefits nations with a greater level of GDP, as well as countries with a higher level of FDI and a larger gross fixed capital formation (GFCF). (Fetahi-Vehapi et al., 2015; Pilinkiene, 2016) Consequently, trade openness is regarded as one of the essential elements influencing a country's competitiveness and improvement in living standards. A nation is treated as competitive when it has a greater level of trade openness. (Pilinkienė, 2016) Hence, we will include trade openness as one of the determinants to measure competitiveness as it indicated a correlated relationship with GCI from the previous studies.

2.1.6 Gross Capital Formation

The entire value of a unit's or sector's gross capital formation, changes in inventory, and purchases of fewer valuables disposals are used to calculate gross capital formation. (OECD, 2001) The relevant assets are resources that will be used to produce other goods and services for longer than a year. (OECD, 2021) Countries need capital goods to replace older ones used in the production of goods and services. This is because output diminishes if a country is unable to replace capital assets as they reach the end of their useful life.

According to Simionescu et al. (2021), the capital formation also contributes positively to economic growth. He proved this by demonstrating how capital development affected the GCI between 2004 and 2018. Taraki & Arslan (2019) underlined that gross capital formation could offer job possibilities while also boosting human capital and output despite stalled economic development and unemployment. This, in turn, has increased a nation's competitiveness. Although only a few studies showed the connection of both indicators, we believe that gross capital formation would have a specific level of influence on GCI.

2.2 Review of Relevant Theoretical Models

Classical theory has been widely used in past decades to examine global competitiveness. The theory combines all three dimensions of competitiveness, which included Smith's (1976) theory of absolute costs, Ricardo's (1817) theory of comparative advantage, and Heckscher and Ohlin's (1976) theory of factor endowments. However, there are criticisms against economists. The notion claimed that both nations must achieve an absolute advantage to specialize in a specific good to engage in trade; otherwise, the trade is worthless. The idea is rejected since there is a presence of restrictiveness in assumptions' theory. In the real world, additional factors discourage the price of goods, such as trade barriers and transportation costs to vary the price.

In fact, the theory has evolved and now become structural competitiveness. As a result, Bellon (1994) modified the structural competitiveness from five dimensions, including the product dimension, trade dimension, financial and monetary dimension, and the institutional and political dimension that could highly affect the competitive advantages. Hence, we will discuss the relevant theories to further enhance the relationship between the variables.

2.2.1 Adam Smith's Theory

According to Adam Smith's economic theory, when the government leaves markets alone, they function successfully. (Robinhood, 2021) Adam Smith used the phrase 'invisible hand' to explain his view that people pursuing their economic self-interest have served the community more than they would if they strove to assist society directly. Hence, this is relevant to the linkage between corruption and global competitiveness. It is claimed that corruption could affect 'greasing the wheels' on a nation's economic performance. (Huntington, 1968) When governance is unsatisfactory, it appears that corruption becomes considerably more destructive. In economics, there are well-known scenarios in which an additional distortion may boost welfare in the existence of existing distortions. According to Méon & Sekkat (2005), if authorities lack sufficient knowledge or are unable to make decisions, corruption may replicate the outcome of a competitive auction. Wei & Kaufmann (1999) also stated that corruption might minimize the amount of time to deal with authorities in foreign countries, which promotes ease of doing business by using firm-level data. Hence, we believe that corruption possesses the ability to enhance global competitiveness.

2.2.2 Keynesian Theory

Keynesian economic theory is a macroeconomic theory that argues for higher government expenditure and reduced taxation to promote demand. (Probasco, 2021) GDP is required for the intensity of competitiveness and export revenues, according to Keynesian economics. According to the notion, more government spending eventually leads to increased economic activity and even more spending. It argues that spending boosts aggregate output and generates more income. If people are willing to spend their additional money, the eventual increase in GDP might be considerably more than the initial stimulus amount.

This is intended to gain a competitive advantage. Hence, Keynesian theory reveals that higher GDP could lead to higher competitiveness by enhancing economic growth.

2.2.3 Development Economics Theory

Development economic theory s is an area of economics whose purpose is to improve developing nations' fiscal, economic, and social circumstances. If there are under-utilized resources in developed countries that could not be exploited owing to balance-of-payments restrictions, foreign aid will be mutually beneficial by transferring such resources to poor countries. (Durham, 2004) In other words, the economic reason was also in the developed nations' self-interest to invest in emerging countries to improve their well-being. As a result, FDI plays a major role to boost a country's economic growth. It is said that FDI could lead to higher economic growth, which develops a strong level of competitiveness. (Osano & Koine, 2016) Borensztein (1998) supports these notions, viewing FDI as a means of producing technological spillovers with a bigger contribution to economic growth than national investments to increase competitiveness. Hence, the Keynesian theory could explain the relationship between FDI and GCI.

2.2.4 Trade Theory

The theoretical origins of the idea of competitiveness may be traced back to the economics of foreign commerce and its role in national and international economic prosperity. Existing trade patterns, their impact on domestic demand, and different public policies that could be undertaken to improve a country's well-being might all be explained by trade theory. (Coalition Theory Network, n.d.) According to Eriksson (2012), the theoretical framework addresses the

implications of traditional and modern trade theory, demonstrating that trade today is a hybrid of the two, which should be considered while assessing competitiveness measures. The traditional trade theory also emphasizes competitiveness measures focused on aggregated national measurements based on interindustry trade between countries. Consequently, trade theory developed a strong correlation between trade openness and GCI. (Eriksson, 2012)

2.2.5 Heckscher-Ohlin Theory

Heckscher and Ohlin's (H-O) model demonstrates that variances in factor-endowments cause international trade. An economic theory argues that countries should export what they can create most efficiently and abundantly. (Mukherjee, 2015) The statistics from Oyebowale & Algarhi (2020) revealed that a shock in exports, gross capital formation, and government spending results in positive economic development, increasing competitiveness in Africa. Hence, a rise in the gross capital investment indicates that a country's competitiveness is more likely to improve. As a result, the H-O theory is especially relevant to the North-South trade. It showed that export in the United States tends to be skill-intensive products while South Korea's exports mainly focused on basic product such as shoes. (Clarke & Kulkarni, 2010) Hence, the H-O theory enables the nation to gain a comparative advantage to improve its competitiveness when the country has factor abundance such as capital growth. Heckscher-Ohlin theory supported that higher investment in gross capital formation will improve competitiveness.

2.3 Hypotheses Development

There are several factors that are likely to influence the economy's overall competitiveness. In this section, the hypotheses of this research will be presented as follows:

H_1: Competitiveness has a relationship with corruption.
H_{2a}: Competitiveness has a relationship with gross domestic product.
H_{2b}: Gross domestic product has a relationship with control of corruption.
H_{3a}: Competitiveness has a relationship with foreign direct investment.
H_{3b}: Foreign direct investment has a relationship with control of corruption.
H_{4a}: Competitiveness has a relationship with trade openness.
H_{4b}: Competitiveness has a relationship with gross capital formation.

2.4 Conclusion

This section has studied the factors influencing GCI using various journal articles, books, and reports from previous studies. From the review of literature, there is only a little evidence found to support the correlated relationship between GCI and gross capital formation. On the other hand, the effect of corruption on GCI remained ambiguous as there are differences in terms of perspectives and interpretations. Instead, the remaining independent variables, such as GDP, FDI, and trade openness, seem to be consistent as the findings could explain the relationship of the determinant variables with GCI. Hence, we will develop a relevant methodology to assess the connection of these findings to undermine the significance of the analysis.

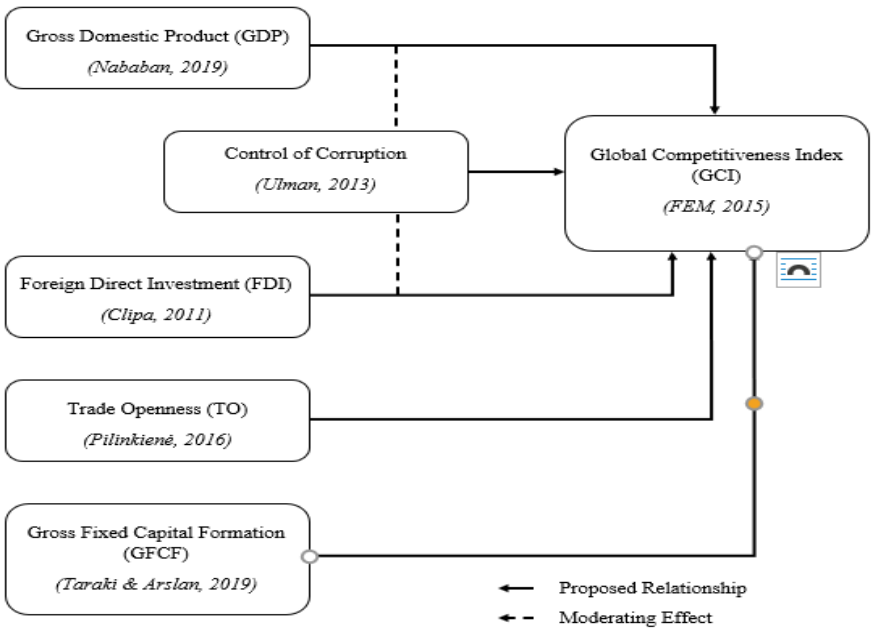
CHAPTER 3: METHODOLOGY

3.0 Introduction

Methodology is a tool for achieving research goals. To meet the study aims, researchers must select from a variety of models, approaches, and research methods. Hence, in chapter 3, we will discuss different types of data collection and data estimation. In addition, the determinants of the GCI, especially in the selected countries, will be fully explained in this paper. This study will clearly explain the determinants of tax performance in Malaysia. The structure of this chapter would be the proposed research and theoretical framework and data and model estimation.

3.1 Proposed Research Framework

Figure 3. 1: Dependent Variable and Independent Variables



Source: Developed by Author

3.2 Proposed Theoretical Framework

Researchers developed theories to explain facts, analyze relationships, and make predictions. A theoretical framework could present and discuss the idea that explains why the research topic is being studied. In this research, some theories are appropriate to clarify the explanatory variables. The theories included Adam Smith's Theory, Competitive Theory, Keynesian Theory, Trade Theory, and Heckscher-Ohlin Theory. These theories enable the researchers to explain the relationship of variables with proper methodologies.

Table 3.1: Variables, Descriptions, Theories, and Expected Relationships

Abbreviation	Variable Name	Theory	Expected Relationship
CCI	Control of Corruption	Adam Smith's Theory	–
GDP	Gross Domestic Product	Keynesian Theory	+
FDI	Foreign Direct Investment	Development Economics Theory	+
TO	Trade Openness	Trade Theory	+
GFCF	Gross Fixed Capital Formation	Heckscher-Ohlin Theory	+

Source: Compiled by Author

3.3 Data

This research uses a panel data analysis to find the significant characteristics that contributed to global competitiveness in ASEAN countries. Panel data is a mix of

cross-sectional and time-series data. It could gather more significant information, variability, and efficiency since it captures group and individual behavior.

In this research, we will use secondary data for data collection to develop the analysis, covering from 2007 to 2017, a total of 11 years period. This time range was chosen primarily due to the availability of data on the explanatory variable, GCI. Since there is incomplete time-series data on GCI scores in Brunei, Lao PDR, and Myanmar, the research will focus on the selected ASEAN countries, including Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. Data are mainly collected from the World Bank database, including GCI and independent variables, such as GDP, FDI, trade openness, and GFCF. The remaining independent variable's data sources, CCI, were collected from Worldwide Governance Indicators (WGI) database.

More information is presented below to explain the variables further.

Table 3.2: Summary of Data

Data	**Scale of Measurement**	**Source of Data**
GCI	Index Score (1 – 7)	World Bank
CCI	Index Point (-2.5 – 2.5)	Worldwide Governance Indicators
GDP	USD ($)	World Bank
FDI	%	World Bank
TO	%	World Bank
GFCF	%	World Bank

Source: Compiled by Author

3.3.1 Global Competitiveness Index (GCI)

GCI is a comprehensive instrument that analyses a country's competitiveness' microeconomic and macroeconomic underpinnings across 12 pillars, including

infrastructure. (World Bank Data, n.d.) It is based on the Executive Opinion Survey, the longest-running and most comprehensive survey of its type, which reflects the perspectives of business leaders from all over the world on a wide range of topics for which data sources are limited or missing on a global scale. (PPI Database, n.d.) The indicators are ranked from 1 to 7, where 7 is the most beneficial and 1 is the least favorable. It examines how nations achieve and maintain economic growth, as well as how competition affects each country's business.

3.3.2 Control of Corruption (CCI)

CCI is a governance indicator described by World Bank. CCI refers to the public authority or bureaucratic regulation for private advantage, resulting in corruption in the country and potential barriers to foreign investment. (IGI Global, n.d.) This is because massive corruption could result in ineffective planning for the foreign party due to the uncertainty and ambiguity it produces. This indicator examines the extent to which public authority is utilized for personal benefit, including petty and grand corruption, as well as "state capture" by elites and economic interests. (World Bank Data, n.d) In other words, it analyses the robustness and efficacy of a country's anti-corruption policies and institutional system to eliminate corruption. (MCC, n.d.)

3.3.3 Gross Domestic Product (GDP)

GDP is the monetary value of all finished goods and services produced inside a country during a specific period. (Worldometer, n.d.) The indicator gives an economic overview of a country and calculates the size and rate of growth of an economy. Its primary purpose is to assess a country's financial sustainability. In other words, it allows policymakers and central banks to determine whether

the economy is contracting or expanding and take immediate actions. (Callen, 2020) Using the income approach, GDP can be estimated utilizing the expenditures approach as the total spending in the economy or as the income earned on total production. (Khan Academy, n.d.) In fact, it commonly expresses a country's wealth.

3.3.4 Foreign Direct Investment (FDI)

FDI flows are measured in US dollars and as a percentage of GDP. (OECD Data, n.d.) It is an investment in the business interests of another nation undertaken by a firm or investor in one country. (OECD iLibrary, n.d.) In general, FDI happens when an investor establishes international business transactions or purchases foreign business assets in a foreign firm. FDI could be categorized into two terms, whereby inflows and outflows. The value of investors' equity and net loans to home country firms in foreign economies is referred to as the outflow FDI. While inflow FDI, on the other hand, represented the value of foreign investors' equity and net loans to companies based in the reporting economy. In fact, FDI is crucial because it will have a long-term influence on expanding the host country's integration with the global economy, which will result in greater imports and exports. (OECD, n.d.)

3.3.5 Trade Openness

Trade openness refers to the economic orientation of a country within the context of international trade. (IGI Global, n.d.) Trade openness is one measure of a country's engagement in the global trade system. The actual magnitude of an economy's recorded imports and exports measures its degree of openness. (Alotaibi & Mishra, 2014) Trade openness, it is said, delivers several economic benefits, including more excellent technology transfer, skills transfer, higher

labor, total factor productivity, and economic growth and development. As a result, it is essential to develop local firms' market possibilities, enhance productivity, and encourage innovation through competition. (EconomicsOnline, 2021) Hence, it is relevant to act as an independent variable to examine competitiveness.

3.3.6 Gross Fixed Capital Formation (GFCF)

GFCF is the sum of resident producers' investments in fixed assets after subtracting disposals during a specific time. (National Institute of Statistics and Economic Studies, n.d.) It also covers various non-produced asset value enhancements that producers or institutional units realize. The fixed assets could be either tangible or non-tangible, implying that the goods have been used regularly or continuously for more than a year. (Eurostat, n.d.) It includes the firm's permanent assets, such as buildings and equipment, which are not intended to be disposed of by the firm. It is viewed as the key that has the potential to stimulate economic growth as it is the largest component of domestic investment in terms of macroeconomic policy. (BYJUS, 2021)

3.4 Data Estimation

Relevant data estimations are discussed to assess the data collected through the statistical method. As a result, we will introduce panel regression models since we are utilizing panel data in this research. There are three types of panel data regression models: (1) pooled ordinary least squares model (POLS), (2) fixed effect model (FEM), and (3) random effect model (REM), which are adaptable to various conditions and assumptions. Hence, we will use different estimation methods to identify the relationship of the hypothesis formed.

3.4.1 Pooled Ordinary Least Square Model (POLS)

Pooled Ordinary Least Squares (POLS) is a model with constant coefficients linking intercepts and slopes. Researchers may use this strategy to pool all data and construct an ordinary least squares regression model. According to Wooldridge (2010), Pooled OLS is applied when a different sample is chosen for each month or year of the panel data. In other words, it assumed that no time effect exists. In addition, the error term in this model is known as clustered standard errors. The error term is independent and resistant to the correlation between error terms such that the coefficients of each observation will be the same and heteroskedasticity across time. However, the estimated parameter may be inconsistent, biased, and ineffective when the explanatory variables are exogenous. The Best Linear Unbiased Estimate (BLUE) is developed when every assumption is fulfilled. The POLS estimator (Equation 3.1) will be:

$$Y_{it} = \beta_0 + \beta_1 X_{1\,it} + \beta_2 X_{2\,it} + \mu_{it} \quad (3.1)$$

Where t = 1, 2, 3, …, T, Y_{it} = dependent variable, β_0 = constant, β_1 = slope coefficient, X_1 = independent variable, i refers to the country and μ refers to the error term.

3.4.2 Fixed Effect Model (FEM)

The fixed Effect Model (FEM) captures variations in the regression model's constant term and intercept term as they vary across cross-sectional units. In this model, the constant coefficient would express the fixed country effect. In fact, it is used to analyze the individual's characteristics for each unit of observation based on the intercept term without considering the time impact. The differential intercept dummy technique is in place to allow the intercept to differ across individuals by inserting dummy variables into the regression

model. As a consequence, FEM may be free of bias caused by missing variables that do not vary over time. The linear regression (Equation 3.2) is constructed as below:

$$Y_{it} = \beta_0 + \alpha + \beta 1\ X_{1\ it} + \beta_2\ X_{2\ it} + \mu_{it} \quad (3.2)$$

Where t = 1, 2, 3, …, T, Y_{it} = dependent variable, β_0 = constant, β_1 = slope coefficient, X_1 = independent variable, α refers to the individual effect components, i refers to the country and μ refers to the incorrect component that combines time series and cross-section.

3.4.3 Random Effect Model (REM)

The awareness of the Random Effect Model (REM) is to estimate the REM using Generalised Least Square (GLS) rather than Ordinary Least Square (OLS); otherwise, the error term is discovered to be non-constant, resulting in autocorrelation difficulties. Individual effects are distributed at random across cross-sectional units in the REM model, and the regression model includes an intercept term suggesting an overall constant term to capture the individual effects. (Seddighi, 2000) It has more freedom than FEM as it only estimates the parameter that describes the distribution of the intercepts. FEM is also useful for the estimation of time-variant explanatory variables. However, it can only capture cross-sectional variability in the dependent variable instead of capturing the temporal variation. The intercept (Equation 3.3) can be interpreted as below:

$$Y_{it} = \beta_0 + \beta_1\ X_{1\ it} + \beta_2\ X_{2\ it} + \varepsilon_{it} + \mu_{it} \quad (3.3)$$

Where t = 1, 2, 3, …, T, Y_{it} = dependent variable, β_0 = constant, β_1 = slope coefficient, X_1 = independent variable, ε refers to cross-section error component

is inconstant or random, i refers to the country and μ refers to the mix of cross-sectional and time series error component.

3.4.4 Breusch-Pagan Lagrange Multiplier (LM) Test

Essentially, the Breusch-Pagan Lagrange Multiplier (BPLM) Test determines if the individual error term has zero variance; if it does, pooled regression will capture it. The LM test is used to determine if the REM or POLS is preferable for the study. For the BPLM test, if the p-value is less than 5%, the null hypothesis should be rejected; otherwise, do not reject the null hypothesis. If the null hypothesis is rejected, this suggests that the REM model is better suited for this study than the POLS model. The POLS model, on the other hand, is more appropriate, and there is no individual effect if the alternative hypothesis is rejected.

3.4.5 Hausman Test

The Hausman test evaluates econometric model misspecification by comparing two distinct model parameter estimators. It allows researchers to choose between using a FEM or REM. using a decision rule of rejecting the null hypothesis if the p-value is less than all significant values at 1 percent, 5 percent, and 10 percent, respectively. It could suggest that the FEM is better suited to the model if the null hypothesis is rejected. Otherwise, REM is preferable.

3.4.6 Poolability Test

An F-test can be applied for the poolability of the dataset to examine the stability of the parameters. The researcher performed the Poolability F-test to determine if the POLS or FEM would be better appropriate for this study. When the p-value is less than the significant level (5%), the Poolability F test rejects the null hypothesis. Aside from that, the null hypothesis is not rejected. When the null hypothesis is rejected, it indicates that the FEM model is better suited to this investigation than the POLS model. According to Gujarati and Porter (2008), when the null hypothesis is rejected, the fixed effect is more appropriate or the goodness of fit in the FEM increases.

3.4.7 Diagnostic Testing

Diagnostic testing is one of several processes available for regression analysis that aim to evaluate the validity of a model in various ways. In this research, we will run the normality, heteroskedasticity, multicollinearity, and autocorrelation tests to identify the efficiency of the data collection.

3.4.7.1 Heteroskedasticity Test

Heteroskedasticity happens when the variance of the residuals changes unequally throughout a range of measured values. The test is used to identify the heteroskedasticity in a linear regression model in that the error terms are normally distributed based on the assumption. When there is a presence of heteroscedasticity, there is model misspecification, which omitted variables in the model. There is a risk that statistical findings would be insignificant if the assumptions are ignored at any point. Various tests are available to detect this issue, including the Park test, Glesjer test, BreuschPagan-Godfrey test, White

test, and Autoregressive Conditional Heteroscedasticity (ARCH) test. (Gujarati & Porter, 2008) In other words, the error term in the model is free from the heteroskedasticity problem if the p-value is greater than the significant level at 5 percent.

3.4.7.2 Cross-Section Dependence Test

Panel data can demonstrate extensive cross-sectional dependency, in which all units in the same cross-section are associated. This is frequently attributed to the effect of some undetected common terms shared by all units and affect them all, albeit in different ways. If the omitted common variables are correlated with the regressors, as is generally the case, both the standard homogeneous estimators for panel data (FE or RE) are inconclusive. (Henningsen & Henningsen, 2019) In this scenario, Pesaran (2006) proposed using cross-sectional averages of the regressand and regressors to estimate the unknown common components, boosting the model with the latter to obtain unbiased estimates. Pesaran's CD test, Friedman's test, and Frees' test could identify the presence of cross-section dependence in the model. (Hoyos & Sarafidis, 2006)

3.4.7.3 Autocorrelation Test

Autocorrelation refers to the disturbances term for any observation related to the disturbance term of other observations. In other words, it is a statistical measure of the degree of resemblance between a particular time series over consecutive time intervals and a lagged version of itself. The OLS estimator is no longer BLUE in this case; it is biased, inconsistent, and inefficient. The higher standard errors yield a larger t-statistic, presenting the hypothesis testing of variable significance incorrect since there is a higher tendency to reject the null hypothesis. The Durbin-Watson d test comes to the rescue to determine the

presence of an autocorrelation issue in a model. The Durbin Waston statistic will always have a value between 0 and 4. No autocorrelation is identified if the d-test value is between d_U and $4 - d_U$. However, autocorrelation is identified when the d-test is less than d_L or more than $4 - d_L$. Otherwise, the outcome is all-inclusive.

3.5 Model Specification

The assessment of factors that affect global competitiveness is always a matter of judgment. Judgments must be made in order to establish which medium of expression may best combine economic reasoning with statistical value. As a result, we have demonstrated that the idea of competitiveness has been the focus of various research, including price competitiveness and structural competitiveness, employing past theoretical literature.

However, it is challenging to form a competitive model due to insufficient data and limited sample size; developing a competitive model covering all factors is impossible. Instead, we will statistically analyze the effect of CCI, GDP, FDI, trade openness, and GFCF on GCI based on the empirical literature. The moderating effect and turning point of the corruption power will be separately examined in different equations. Hence, the econometric model is specified as below:

The functional form (Equation 3.4):

$$\mathbf{GVI = } \boldsymbol{f}\ \mathbf{(CCI, GDP, FDI, TO, GFCF)} \quad (3.4)$$

The original form:

Model 1:

$$\mathbf{GCI_{it} = \beta_0 + \beta_1\ (CCI)_{it} + \beta_2\ ln\ (GDP)_{it} + \beta_3\ (FDI)_{it} + \beta_4\ (TO)_{it} + \beta_5\ (GFCF)_{it} + \mu_{it}} \quad (3.5)$$

Model 2:

$$\mathbf{GCI_{it} = \beta_0 + \beta_1 (CCI)_{it} + \beta_2 \ln (GDP)_{it} + \beta_3 (FDI)_{it} + \beta_4 (TO)_{it} + \beta_5 (GFCF)_{it} + \beta_6 (CCI*GDP)_{it} + \mu_{it}} \quad (3.6)$$

Model 3:

$$\mathbf{GCI_{it} = \beta_0 + \beta_1 (CCI)_{it} + \beta_2 \ln (GDP)_{it} + \beta_3 (FDI)_{it} + \beta_4 (TO)_{it} + \beta_5 (GFCF)_{it} + \beta_6 (CCI*FDI)_{it} + \mu_{it}} \quad (3.7)$$

Model 4:

$$\mathbf{GCI_{it} = \beta_0 + \beta_1 (CCI)_{it} + \beta_2 \ln (GDP)_{it} + \beta_3 (FDI)_{it} + \beta_4 (TO)_{it} + \beta_5 (GFCF)_{it} + \beta_6 (CCI*CCI)_{it} + \mu_{it}} \quad (3.8)$$

Model 5:

$$\mathbf{GCI_{it} = \beta_0 + \beta_1 (CCI)_{it} + \beta_2 \ln (GDP)_{it} + \beta_3 (FDI)_{it} + \beta_4 (TO)_{it} + \beta_5 (GFCF)_{it} + \beta_6 (CCI*GDP)_{it} + \beta_7 (CCI*FDI)_{it} + \beta_8 (CCI*CCI)_{it} + \mu_{it}} \quad (3.9)$$

where: GCI = Global Competitiveness Index

CCI = Control of Corruption

ln GDP = Natural log of Gross Domestic Product (GDP) per Capita

FDI = Foreign Direct Investment, Net Inflows (% of GDP)

TO = Trade Openness (% of GDP)

GFCF = Gross fixed capital formation (% of GDP)

β_0 = Constant coefficient

β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8 = Coefficients of independent variables

μ_t = Error term

i = country (Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam)

t = period (2007 – 2017)

3.6 Conclusion

In this chapter, secondary data from 7 countries, namely Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam, from 2007 to 2017 were utilized in the research. Hence, an econometric model has been built to analyze the effect of the selected variables on GCI. Accordingly, the data sources have been demonstrated, and appropriate estimations have been adopted to run the test. This section also clearly explains the flow of data processing, data analysis, as well as diagnostic checking employed in the research. The following chapter will use the panel data collection to run the relevant tests and make appropriate analyses and discussions through STATA.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

In Chapter 4, all relevant findings and results will be derived from historical empirical studies previously discussed in Chapter 3. The empirical results have been detailed in the table to identify the relationship between GCI and CCI as main variables and other complementary independent variables. The empirical findings obtained from historical data from various sources are examined to determine the factors that affect the GCI in selected countries. The final findings will serve as recommendations for this study, explaining how corruption with other complementary independent variables might impact the GCI in the selected nations, namely Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam in the next chapter.

4.1 Descriptive Analysis

Table 4.1: Descriptive Statistics for Each Variable

Variable	Mean	Median	Standard Deviation	Min.	Max.
GCI	4.5562	4.43	0.5843	3.48	5.72
CCI	-0.1416	-0.45	1.0129	-1.29	2.25
ln GDP	8.3786	8.16	1.2473	6.45	11.02
FDI	6.7570	3.79	6.8426	0.06	29.35
TO	148.8347	130.91	98.1954	37.42	437.33
GFCF	24.8921	24.95	4.4779	15.97	35.11
*CCI*GDP*	-0.0100	-3.6045	9.9281	-9.3267	23.85
*CCI*FDI*	3.3523	-0.992	17.5331	-16.2153	62.8090
*CCI*CCI*	1.0326	0.3364	1.5332	0.0009	5.0625

Source: Developed for the research

Notes. GCI stands for Global Competitiveness Index, CCI stands for Control of Corruption Index, ln GDP stands for the natural log for Gross Domestic Product per Capita, FDI stands for FDI Net Inflows, TO stand for Trade Openness, GFCF stands for Gross Fixed Capital Formation, CCI*GDP stand for moderating effect between Control of Corruption Index and Gross Domestic Product per Capita, CCI*FDI stand for the moderating effect between Control of Corruption Index and FDI Net Inflows and CCI*CCI stand for the turning point effect of Control of Corruption Index.

Table 4.1 illustrates the descriptive data of GCI from 2007 to 2017. Referring to Table 4.1, the mean of the dependent variable, GCI for 77 observations is 4.5562 with a standard deviation of 0.5843. Its minimum value is 3.48 while the maximum value is 5.72. The range is 2.24. As a result, the mean value is near the median value, 4.43. This resulted that the data being also symmetrical. Therefore, the data can be assumed to be normally distributed.

The mean value of CCI during the studied period is -0.1416. Its highest figure achieves 2.25 and the lowest is -1.29. By observing the standard deviation, it is clear that CCI has the lowest standard deviation at 1.0129 among the independent variables, meaning that it deviates slightly from the mean value. Hence, we can see the close value between the mean and median as this indicated that the data are normally distributed. On the other hand, we can see the gap in GDP between the median and mean value is very small, with only a difference of 0.2186. Hence, we can conclude that the finding is normally distributed. Since the indication of FDI between the minimum value and the maximum value is far away, the mean and median value also resulted in a further gap. Hence, the data is not normally distributed. The same situation goes for the finding of TO. We assume the data is not symmetric. When comes to the scenario in GFCF, the standard deviation indicates how far the variables deviate from the mean, in which the standard deviation is 4.4779. The findings also demonstrated that the data are not

symmetric, including the variable CCI*GDP, CCI*FDI, and CCI*CCI since the gap between both mean and median values is large.

4.2 Panel Data Analysis

Table 4.2: Result of Static Panel Regression for Model 1: POLS, FEM and REM

Variables	**POLS**	**FEM**	**REM**
CCI	0.7112	1.4693	0.7112
	(1.64)	**(2.62)****	**(1.64)**
GDP	0.3955	0.2939	0.3955
	(11.23)***	**(4.74)*****	**(11.23)*****
FDI	0.0226	0.0233	0.0226
	(5.12)***	**(3.64)*****	**(5.12)*****
TO	-0.0005	-0.0010	-0.0005
	(-1.53)	**(-1.38)**	**(-1.53)**
GFCF	0.0082	-0.0184	-0.0082
	(3.17)***	**(0.42)**	**(3.17)*****
*CCI*GDP*	-0.0430	-0.1533	-0.0430
	(-0.91)	**(-2.25)****	**(-0.91)**
*CCI*FDI*	-0.0117	-0.0121	-0.0117
	(-5.47)***	**(-3.51)*****	**(-5.47)*****
*CCI*CCI*	0.0817	-0.1190	-0.0817
	(-1.79)*	**(-1.69)***	**(-1.79)***
C	1.1841	2.4050	1.1841
	(3.38)***	**(3.78)*****	**(3.38)*****
Prob > F	0.0000	0.0000	0.0000
F-statistics	416.84	19.33	3334.72
R-Squared	0.9777	0.7138	0.6837

Source: Developed for the research

Notes. The figure without a bracket represents the value of the test statistic, the value with a bracket represents the p-value, while *, **, ***, represents the rejection of the null hypothesis at 10%, 5%, and 1% level of significance respectively.

4.2.1 Pooled Ordinary Least Square Model (POLS)

$$GCI_{it} = 1.1841 + 0.7112\ (CCI)_{it} + 0.3955\ \ln\ (GDP)_{it} + 0.0226\ (FDI)_{it} - 0.0005\ (TO)_{it} + 0.0082\ (GFCF)_{it} - 0.0430\ (CCI*GDP)_{it} - 0.0117\ (CCI*FDI)_{it} + 0.0817\ (CCI*CCI)_{it} + \mu_{it} \quad (4.1)$$

From Table 4.2, the coefficient, β_0 (1.1841) indicates when CCI, ln GDP, FDI, TO, GFCF, CCI*GDP, CCI*FDI, and CCI*CCI are zero, the GCI is equal to 1.1841 index point. The result shows that CCI has a positive, insignificant, relationship with the GCI without any significance level. This indicates that every one index point increase in CCI will lead to a 0.7112 index point increase in the GCI. Meanwhile, the GDP per capita and FDI net inflows have proved to have a positive, statistically significant, effect on the GCI at a 1% significance level, respectively. This means that for every one dollar increase in GDP per capita, on average, the GCI will increase by 0.3955 index point. Additionally, for every one percent increase in FDI net inflows, the GCI will increase by 0.0226 index point. However, TO show a negative, insignificant, effect on the GCI without any significance level. For every one percent increase in trade openness, on average, the GCI will decrease by 0.0005 index point. GFCF, on the other hand, indicates a positive and significant linkage to GCI with a 1% significance level. In other words, an increase of one percent in GFCF will cause the GCI to increase by 0.0082 index point. Both CCI*GDP and CCI*FDI harm GCI. However, the effect of CCI*GDP is not significant at all on GCI while CCI*FDI is on GCI is statistically significant at a 1% level. This also indicates that for every one percent increase in CCI*GDP or CCI*FDI, on

average, the GCI will decrease by 0.0430 and 0.0117 index point, respectively. The last indicator, CCI*CCI has a positive and significant effect on GCI at a 10% significance level. Hence, for every one percent increase in CCI*CCI, on average, the GCI will increase by 0.0817 index point. As a result, F-statistic revealed that the model is fitted for the analysis. When the p-value is less than the 5% level of significance, it means that the model is well-fit too. The R-squared value also implies that the explanatory variable accounted for 97.77 percent of the variation in the GCI.

4.2.2 Fixed Effect Model (FEM)

$$GCI_{it} = 2.4050 + 1.4693\ (CCI)_{it} + 0.2939\ \ln\ (GDP)_{it} + 0.0233\ (FDI)_{it} - 0.0010\ (TO)_{it} - 0.0184\ (GFCF)_{it} - 0.1533\ (CCI*GDP)_{it} - 0.0121\ (CCI*FDI)_{it} - 0.1190\ (CCI*CCI)_{it} + \mu_{it} \quad (4.2)$$

The β_0 (2.4050) shows that the GCI is equal to 2.4050 index point when all the factors are equal to zero. The FEM model provides evidence that CCI has a positive, significant, effect on the GCI at a 5% significance level. For every one index point increase in CCI, the GCI will increase by 1.4693 index point. Meanwhile, GDP per capita is also proved to have a positive, statistically significant, effect on the GCI at a 1% significance level. This indicates that every one dollar increase in GDP per capita will lead to a 0.2939 index point increase in the GCI. FDI net inflows have a positive, statistically significant, effect on the GCI at a 1% significance level. This means that every one percent increase in FDI net inflows will lead to an increase in the GCI by 0.0233 index point. Trade openness, however, remained a negative, insignificant, effect on the GCI without any significant level as the previous result. For every one percent increase in trade openness, the GCI will decrease by 0.0010 index point. GFCF is tested negative and insignificant in the FEM model. It indicates that for every one percent increase in GFCF, the GCI will decrease by 0.0184 index

point. While CCI*GDP, CCI*FDI, and CCI*CCI, have negative, statistically significant, effects on GCI at 5%, 1%, and 10%, respectively. This also indicates that for every one percent increase in CCI*GDP, CCI*FDI, or CCI*CCI, on average, the GCI will decrease by 0.1533, 0.0121, and 0.1190 index point, respectively. As a consequence, F-statistic revealed that the model is fitted for the analysis. When the p-value is less than the 5% level of significance, it means that the model is well-fit too. The R-squared value also implies that the explanatory variable accounted for 71.38 percent of the variation in the GCI.

4.2.3 Random Effect Model (REM)

$$GCI_{it} = 1.1841 + 0.7112\ (CCI)_{it} + 0.3955\ \ln\ (GDP)_{it} + 0.0226\ (FDI)_{it} - 0.0005\ (TO)_{it} - 0.0082\ (GFCF)_{it} - 0.0430\ (CCI*GDP)_{it} - 0.0117\ (CCI*FDI)_{it} - 0.0817\ (CCI*CCI)_{it} + \mu_{it} \quad (4.3)$$

The β_0 (1.1841) implies that the GCI is equal to 1.1841 index point when all factors are equal to zero. According to Table 4.4, the outcome reflects that CCI has a positive, insignificant, effect on the GCI. For every one index point increase in CCI, on average, the GCI will increase by 0.7112 index point. Meanwhile, GDP per capita is proved to have a positive, statistically insignificant, effect on the GCI at a 1% significance level. This means that every dollar increase in GDP per capita will cause the GCI to increase by 0.3955 index point. The FDI net inflows have a positive, statistically significant, effect on the GCI at a 1% significance level. This implies that an increase of one percent in FDI net inflows will lead to an increase of 0.0226 index point in the GCI. Trade openness has a negative and insignificant relationship on the GCI with any significance level. For every one percent increase in trade openness. the GCI will decrease by 0.0005 index point. In addition, GFCF has proved to have a negative, statistically significant, effect on the GCI at a 1% significance level.

This means that for every one percent increase in GFCF, on average, the GCI will decrease by 0.0082 index point. However, the effect of CCI*GDP is negative, but insignificant on GCI. This also indicates that for every one percent increase in CCI*GDP, on average, the GCI will decrease by 0.0430 index point. On the other hand, CCI*FDI and CCI*CCI have a negative and significant effect on GCI at a 1% and 10% significance level, respectively. Hence, for every one percent increase in CCI*FDI or CCI*CCI, on average, the GCI will decrease by 0.0117 and 0.0817 index point, respectively. Consequently, the Chi-square statistic revealed that the model is fitted for the analysis. When the p-value is less than the 5% level of significance, it means that the model is well-fit too. The R-squared value also implies that the explanatory variable accounted for 68.37 percent of the variation in the GCI.

4.3 Model Selection

POLS, FEM, and REM data analysis were described in the previous section. Hence, comparison tests such as the Poolability F-test, Hausman test, and LM test are required in order to select the best-suited model among them.

4.3.1 Breusch-Pagan Lagrange Multiplier (LM) Test

Table 4.3: Result of Breusch-Pagan Lagrange Multiplier (LM) Test

Test	Chi-Square Statistic	P-Value
LM Test	0.0000	1.0000

Source: Developed for the research

The LM test allows the researchers to select the appropriate model from POLS and REM. POLS is preferred under the null hypothesis, H_0 while REM is

preferred under the alternative hypothesis, H_1. If the p-value is less than the significance level, the null hypothesis is rejected.

H_0: POLS is preferred.
H_1: REM is preferred.

According to Table 4.6, the p-value (1.0000) is greater than the significance level, implying that POLS is better than REM in this research.

4.3.2 Hausman Test

Table 4.4: Result of Hausman Test

Test	Chi-Square Statistic	P-Value
Hausman Test	24.41	0.0020***

Source: Developed for the research

The Hausman test is used to determine which of the REM and FEM models better suits our research. In this study, the null hypothesis is that REM is preferred, while the alternative hypothesis is that FEM is preferred. If the p-value is less than the significance level, reject the null hypothesis; otherwise, do not reject the null hypothesis.

H_0: REM is preferred.
H_1: FEM is preferred.

We can see that FEM is preferred over REM for this study because the p-value (0.0000) is less than the significance levels of 1%, 5%, and 10%, respectively.

4.3.3 Poolability F-Test

Table 4.5: Result of Poolability F-test

Test	F-statistic	P-Value
Poolability Test	2.87	0.0156**

Source: Developed for the research

Notes. F test that all u_i=0.

Poolability F-test is functioned to choose the best-fit model among the Pooled OLS and FEM models. The null hypothesis is developed as below:

H_0: POLS is preferred.
H_1: FEM is preferred.

Since all fixed effects are equal to 0 and the p-value is lesser than the 5% level of significance, this showed that the Poolability F-test is significant. In other words, we will reject H0 as the FEM model is recommended. Hence, the FEM model is preferred.

4.4 Diagnostic Checking

4.4.1 Heteroskedasticity

Table 4.6: Result of Wald Test

Test	Chi-Square Statistic	P-Value
Wald Test	29.44	0.0001***

Source: Developed for the research

The effectiveness of the estimators in a model will be affected by a heteroscedasticity problem, and the findings provided then will become meaningless. The Wald test was employed in this study to identify whether there is a presence of heteroscedasticity problem in the data. The null hypothesis emphasizes that the model has no problems with heteroscedasticity while the alternative hypothesis indicates that there is a difficulty with heteroscedasticity.

H_0: Residuals are homoskedasticity.
H_1: Residuals are heteroskedasticity.

Table 4.5 shows a p-value of 0.0001 implies rejecting the null hypothesis of no heteroscedasticity. As a result, it was established that the regression is heteroscedastic. The standard error of the coefficients may thus be violated.

4.4.2 Cross-Sectional Dependence Test

Table 4.7: Result of Pesaran CD Test

Test	CD Value	P-Value
Pesaran CD Test	1.572	0.1160

Source: Developed for the research

The presence of cross-sectional dependence means that such dependence can result from a number of counts, including non-randomly choosing individuals and undetected common shocks. Since the Pesaran CD test is conducted in this research, we will investigate whether there is a contemptuous correlation in our findings. The null hypothesis emphasizes that the model has no cross-sectional dependence while the alternative hypothesis indicates that there is an existence of cross-sectional dependence.

H_0: Residuals are no cross-sectional dependence.

H_1: Residuals are cross-sectional dependence.

The test has a 0.1160 p-value. This means that the null hypothesis of weak cross-sectional dependence may be failed to reject, and the residuals are likely to impede weak cross-sectional dependence. This indicates that our estimates are consistent and unbiased.

4.4.3 Autocorrelation

Table 4.8: Result of Wooldridge Test

Test	F-Statistic	P-Value
Wooldridge Test	48.132	0.0004***

Source: Developed for the research

In panel data research, autocorrelation is a significant concern. It occurs when the current variable value is similar to its own lagged version. Hence, the Wooldridge test is used to estimate the autocorrelation problem. Consequently, the null hypothesis demonstrates that no first-order effects autocorrelation, whereas the alternative hypothesis indicates that there is a first-order autocorrelation.

H_0: Residuals are no autocorrelation.

H_1: Residuals are autocorrelation.

According to the STATA result, the p-value obtained is 0.0004, thus rejecting the null hypothesis at a 5% level of significance. Hence, this revealed that the regression has a problem with first-order autocorrelation.

4.5 Robust Cluster as Remedies

Table 4.9: Result of Fixed Effect Model (FEM) with Robust Cluster

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
CCI	0.2395 **(1.96)***	1.8243 **(1.56)**	0.2854 **(2.64)****	0.1739 **(1.88)**	1.4693 **(2.39)***
GDP	0.4080 **(6.23)*****	0.2965 **(2.63)****	0.4024 **(8.41)*****	0.3842 **(5.17)*****	0.2939 **(4.76)*****
FDI	0.0056 **(0.63)**	0.0073 **(0.80)**	0.0250 **(4.38)*****	0.0045 **(0.55)**	0.0233 **(4.53)*****
TO	-0.0001 **(-0.08)**	-0.0009 **(-1.19)**	-0.0006 **(-1.10)**	0.0002 **(0.31)**	-0.0010 **(-1.55)**
GFCF	0.0077 **(2.10)***	0.0071 **(1.67)**	0.0006 **(0.28)**	0.0087 **(2.59)****	0.0018 **(0.77)**
*CCI*GDP*		-0. 1947 **(-1.45)**			-0.1533 **(-2.08)***
*CCI*FDI*			-0.0135 **(-5.55)*****		-0.0121 **(-5.39)*****
*CCI*CCI*				-0.1329 **(-2.26)***	-0.1190 **(-7.25)*****
C	0.9528 **(1.44)**	2.2369 **(1.93)**	1.1818 **(2.35)***	1.2171 **(1.61)**	2.4049 **(3.44)****
Prob > F	0.0022	0.0000	0.0001	0.0000	-
F-statistics	15.51	64.94	40.96	63.48	-
R-Squared	0.6031	0.6420	0.6762	0.6196	0.7138

Source: Developed for the research

Notes. The figure without a bracket represents the value of the test statistic, the value with a bracket represents the p-value, while *, **, ***, represents the rejection of the null hypothesis at 10%, 5%, and 1% level of significance respectively.

From the table, we can see that Model 5 showed the best results among the models with all variables significant except trade openness and GFCF. This is because it gained the highest R-squared of 0.7138 that well-explained the GCI in ASEAN countries. The indicators, namely GDP, FDI, CCI*FDI, and CCI*CCI indicated a strong significant relationship with GCI with a 1% level of significance. Although FDI and trade openness is tested as insignificant in Model 1, 60.31% of the independent variables could explain the dependent variable, GCI. Model 2 is specifically developed to assess the moderating effect between CCI and GDP on GCI. However, the result revealed no significant relationship in the moderation between the variables. The model also evidenced that GDP was the only variable that could explain a significant, positive impact on GCI. In the scenario of Model 3, a similar result as Model 5 is determined where trade openness and GFCF are proven to be insignificant. The negatively significant relationship of the moderating effect between CCI and FDI at a 5% level of significance is also examined from the model. The result is evidenced by a high R-squared of 0.6762, which implies that the explanatory variables in Model 3 accounted for 67.62 percent of the variation in the GCI. On the other hand, Model 4 revealed a similar result as model 1, which indicates that insignificant relationship between FDI and trade openness on GCI. The turning point effect of CCI is also identified in Model 4, which expressed a negative and significant effect of CCI*CCI on GCI at a 10% level of significance.

In the comparison among the variables, GDP is found to be positive and significant in all models. Its robust results revealed the strong correlation effect of GDP on GCI in the research as it showed a 1% level of significance in almost all models. Hence, it is assumed to be an unavoidable variable due to its strong connection with GCI, which is consistent with our hypotheses. Since most of the models indicate a positive and significant linkage of CCI with GCI, we can conclude that better control of corruption could lead to higher GCI among the ASEAN countries. However, the influential power

is not as strong as the GDP is. Although there are only a few models (Model 3 & Model 5) that proved that FDI has a significant relationship with GCI, however, the correlation power is strong as both models showed a 1% level of significance in explaining GCI. Trade openness, on the other hand, resulted insignificant in all five models, which is opposite from the findings of GDP. The findings are found to not tally with our study as it showed no relationship on GCI at any level of significance. Hence, we expected trade openness is not an important driver to affect the GCI in ASEAN countries. While GFCF showed the least significant relationship among the variables, it proves to have the least positive influential power in determining GCI with 10% (Model 1) and 5% (Model 4) significance levels, respectively. Although the moderating effect between CCI and GDP in Model 2 is insignificant, it resulted negative, significant effect on GCI at a 10% level of significance in Model 5. Hence, we can conclude that the moderating effect of CCI on GDP is still important since it could provide a significant relationship due to the additional interaction terms included in the variables. The moderation impact between CCI and FDI seems to have a stronger effect as compared to CCI*GDP. This is because it has resulted from a 1% level of significance in both Model 3 and Model 5. Hence, corruption could give a greater impact on FDI rather than GDP in ASEAN countries. The turning point effect of CCI*CCI is strong in this research. This is because the findings revealed a negative and significant relationship between CCI*CCI at 10% (Model 4) and 1% (Model 5) levels of significance, respectively.

4.5 Conclusion

Consequently, Breusch-Pagan Lagrange Multiplier (BPLM) test, Hausman test, and Poolability F-test are being performed respectively, with the results indicating that FEM is the best model in this chapter. Hence, various diagnostic checking tests have been performed to see if the model has difficulties like multicollinearity, cross-sectional dependence, or heteroscedasticity. However, the results reveal that the data is heteroscedastic. To deal with these issues, the researchers have used robust standard

error to regress the panel data models. In fact, the discussion findings in the next chapter are primarily based on the FEM model.

CHAPTER 5: CONCLUSION

5.0 Introduction

This chapter will review and summarise the findings from the previous chapter. In addition, we will compare the expected relationship to the resulting outcome to see if we achieved our research goals. The limitations and recommendations of the research will also be discussed in this section if any of the researchers wish to pursue more research. Lastly, we will provide a summary of the findings of the determinants of GCI study in selected ASEAN countries.

5.1 Summary of Statistics Analyses

Table 5.1: Summary of Statistic Analyses Results

	Analysis	**Result**
Model Selection		
POLS and REM	Breusch-Pagan Lagrange Multiplier (BPLM) Test	POLS is preferred.
FEM and REM	Hausman Test	FEM is preferred.
POLS and FEM	Poolability Test	FEM is preferred.
Diagnostic Testing		
Heteroskedasticity	Wald Test	Residuals are heteroskedasticity but solved with standard error.
Cross-Sectional Dependence	Pesaran CD Test	Residuals are no cross-sectional dependence.

Autocorrelation	Wooldridge Test	Residuals are autocorrelation but solved with robust standard error.

Source: Developed for the research

Table 5.2: Summary of Panel Analysis Results

Variable	**POLS**	**FEM**	**REM**
CCI	Positive insignificant	Positive significant	Positive insignificant
GDP	Positive significant	Positive significant	Positive significant
FDI	Positive significant	Positive significant	Positive significant
TO	Positive insignificant	Negative insignificant	Negative insignificant
GFCF	Positive significant	Negative insignificant	Negative significant
*CCI*GDP*	Negative insignificant	Negative significant	Negative insignificant
*CCI*FDI*	Negative significant	Negative significant	Negative significant
*CCI*CCI*	Negative significant	Negative significant	Negative significant

Source: Developed for the research

Notes. FEM model is preferred.

Table 5.3: Summary of Fixed Effect Model (FEM) with Robust Cluster

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
CCI	Positive significant	Positive insignificant	Positive significant	Positive insignificant	Positive significant
GDP	Positive significant	Positive significant	Positive significant	Positive significant	Positive significant

FDI	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant	Positive significant
TO	Negative insignificant	Negative insignificant	Negative insignificant	Positive insignificant	Negative insignificant
GFCF	Positive significant	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant
*CCI*GDP*		Negative insignificant			Negative significant
*CCI*FDI*			Negative significant		Negative significant
*CCI*CCI*				Negative significant	Negative significant
C	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant	Positive significant

Source: Developed for the research

Notes. Model 5 is preferred.

5.2 Discussion on Major Findings

5.2.1 Control of Corruption (CCI)

From the previous chapter, most studies showed a positive, significant effect of CCI on GCI. The result has met the objective of our study that a strong connection between the variables is detected, where better control of corruption will lead to higher GCI in the ASEAN countries. According to the results, Model 5 illustrated the best result among the models. It indicates an increase in CCI by one percentage, the GCI increased by 1.4693 percent. This means that an increase in CCI could have a great impact on GCI. Hence, we can conclude

that CCI is the determinant of the GCI since it tested significantly at a 10% level of significance. We believed that CCI is a significant factor to identify GCI among the ASEAN nations. Additionally, most of the results are robust as it remains unchanged, thus it is a strong linkage between CCI and GCI. The result is tally with the study from Left (1964) and Violeta (2015). The study supported that reducing corruption enables governments to be competitive and innovative, as well as better prepared to cope with unforeseen issues that may affect the sustainability performance of the country. It is advisable that ASEAN countries should control their corruption level in order to stay competitive globally.

5.2.2 Gross Domestic Product (GDP)

As a result, GDP proved to have a highly significant relationship with GCI. The positive and significant relationship between GDP is strong as the results in all models remain robust. Most of the models even indicate a 1% level of significance. The findings revealed that GDP is the best-fit control variable among the indicators. Hence, it aligns with the Keynesian theory applied that we mentioned in the previous chapter, where higher GDP could gain a competitive advantage over others in the scenario of ASEAN countries. Hence, we can conclude that the findings are consistent with our study and assume GDP is the important driver affecting GCI in ASEAN countries. Nababan (2019) is one of the previous literatures that supported the findings. Therefore, the ASEAN-7 countries' GDP has a beneficial and substantial impact on GCI growth.

Although the moderating effect between GDP and GCI is determined, the results of Model 2 and Model 5 are different, where one tested significant and the other tested insignificant. Hence, the influential power of corruption on GDP is not too strong among the ASEAN nations. The negative impact of CCI*GDP indicates that the extra cost is incurred when controlling the

corruption level in GCI's ASEAN countries. In other words, this is relevant to our research objective. This relates to a study by Reyes & Useche (2019). Although there are additional costs required to reduce corruption, this will increase GDP indirectly, which in turn improve the GCI among the ASEAN nations.

5.2.3 Foreign Direct Investment (FDI)

In the case of FDI inflows, the significant findings revealed a 5% level of significance, which is a strong relationship detected between FDI and GCI in ASEAN countries. Although some models showed an insignificant effect on GCI, the major model, Model 5 resulted in a positive and significant effect on GCI in ASEAN countries. In other words, the higher the FDI, the greater the GCI. ASEAN countries were encouraged to increase their investments as much as possible to gain a comparative advantage. The result could explain Development Economics Theory, where the underdeveloped resource can transfer in terms of FDI to contribute a stronger economic growth and a higher degree of competitiveness. The findings also align with the study by Raeskyesa & Suryandaru (2020), where the majority of ASEAN countries have found a substantial correlation between competitiveness and FDI inflows.

In both models, Model 3 and Model 5 revealed a strong negative relationship between CCI on FDI inflows to influence GCI in ASEAN countries with a 5% level of significance. This indicates that almost all models showed that better control of corruption could enhance FDI inflows and improve GCI, which indicates a positive relationship. In other words, the moderating effect between CCI and FDI inflows is large enough to influence GCI. The negative impact of CCI*FDI indicates that the FDI inflows may be failed to increase at a certain if the corruption level is not controlled well among the countries. Hence, there is the presence of extra costs imposed to control CCI in order to improve its

competitive position. This is consistent with our findings and aligns with Brada et al. (2019). We can summarize that efficient control of corruption is able to encourage more FDI inflows to make a country competitive.

5.2.4 Trade Openness

Unfortunately, the findings from all models resulted in a highly insignificant relationship between trade openness and GCI. This is irrelevant to our hypothesis as trade openness has no linkage to affecting the changes in GCI. The insignificant results in all models indicate no connection between the variables with strong and unchanged results. In other words, trade openness is assumed to be irrelevant as it has no power to influence the GCI in ASEAN countries. A study from Nguyen & Bui (2021) criticized that trade could boost growth and productivity in ASEAN countries. The study evidenced that trade openness is positively linked to economic growth rather than global competitiveness, where trade openness should be promoted aggressively to improve economic growth among the ASEAN countries, especially Indonesia and Thailand. Hence, we conclude that trade openness has no direct relationship with GCI in the ASEAN countries since it will not affect competitiveness on a global basis.

5.2.3 Gross Fixed Capital Formation

The proxy, GFCF is the innovation of our study as there is only a little evidence in the previous study which focuses on gross capital formation. From the result, some findings showed a positively significant effect, and some were not consistent with GCI among the ASEAN nations. Since finding in Model 1 revealed only a 10% level of significance, we can assume that GFCF is not an important factor that has only little effect on influencing GCI. However, the majority of the results revealed an insignificant impact on affecting global competitiveness. Thus, we can conclude that the findings were irrelevant to our

research objective. In other words, the findings oppose the evidence from Taraki & Arslan (2019). This is because Gibescu's study (as cited in Gibescu, 2010) argued that gross fixed capital formation is the indicator to identify economic growth. He added that capital formation is classified as the third factor to impacts economic growth, which consists of large-scale projects such as infrastructural development that must be completed to carry out economic activity and trade. Hence, we concluded that GFCF could not affect the GCI in ASEAN countries.

5.3 Implications of Study

5.3.1 Government Authorities

Corruption is a societal issue that has a global context. It takes many forms, undermining human values and products, impeding future social progress, and inducing a psychosis of insecurity, powerlessness, demoralization, widespread state of disarray, and course a lower competitiveness level in the country. In our research, the findings proved that the GCI could enhance if the ASEAN nations can maintain a moderate or low corruption level. A study from Amin & Soh (2019) evidenced that corruption would rise faster in poorer countries than in advanced nations as a function of country size. The rationale behind this is that developed economies have more resources and are thus more likely to be able to overcome at least some of the scale economies that come with being large. Moreover, the strong moderating effect between CCI and the selected variables, GDP and FDI is detected in the research. The results from both CCI*GDP and CCI*FDI imply an Inverted U-Shaped curve. In other words, there are extra costs that may impose when controlling corruption's effect on both GDP and FDI among the ASEAN countries. If the ASEAN countries are not able to control the corruption level well, this may cause the level of FDI inflows and

GDP to not achieve its real output. Hence, the findings of this research encourage the policymakers to be alert in controlling corruption issues by adopting relevant policies such as anti-bribery and anti-corruption policies.

On the other hand, GDP appears to be the robust indicator that positively links GCI in ASEAN countries. As rising GDP is an excellent predictor of the GCI, the selected ASEAN nations are highly encouraged to keep raising their GDP. Economists usually utilize GDP to make decisions because it is a representation of economic activity and growth. Almost everyone in a particular economy is affected by economic output and growth. When the economy is doing well, unemployment is normally lower, and salaries rise as firms recruit more workers to fulfill the economy's expanding demand. Hence, policymakers in ASEAN countries should put more effort into improving countries' GDP to boost the GCI.

FDI inflows are also an unavoidable factor when determining the ASEAN nations' GCI. To the study, FDI is positively related to GCI, where higher FDI inflows encourage greater GCI among the ASEAN nations. FDI is especially important as it enables the transfer of technology that cannot be done by financial investments or trade-in products and services, notably in the form of new types of capital inputs. Hence, it is undeniable that FDI inflows create opportunities to increase competitiveness within the country. It is encouraged that the policymakers in ASEAN countries will try their best to attract foreign investments. As a result, the countries could actively engage in the free-trade agreements to reduce or remove the trade barriers to enhance GCI among ASEAN. Prakash & Assaf (2001) also demonstrated that FDI has a positive influence on developing nations, according to both economic theory and empirical research. Therefore, policy recommendations for emerging nations should emphasize strengthening the investment climate for FDI inflows.

5.3.2 Bank and Investors

Although policymakers have greater power in controlling corruption, investors among the ASEAN countries could fight against corruption with their effort too. Institutional investors play a critical role in the fight against corruption around the world. They could assist in set corporate standards, create incentives for businesses, and affect company valuations through their investment policies. According to Carlos (2020), fascinating financial mechanisms are available that can alter the incentives of businesses, particularly those in developing nations. As a result, financial institutions must include corruption as a key factor of sovereign risk. On this front, there has been progressed, as the extent of corruption can impair a country's readiness to repay its obligations. This is because corruption has a direct impact on borrowing costs, but it also has an indirect impact on the rule of law. Credit agencies have an intrinsic value in accurately evaluating the impact of corruption on sovereign risk since it increases the predictive capacity of their ratings, which is their primary business. With the effort in reducing corruption, ASEAN countries could enjoy more comparative advantage to compete against the developed nations.

As shown in many emerging economies, countries that attract FDI inflows often see higher economic growth and greater competitiveness by expanding to new markets. This is also applied to the ASEAN countries. As ASEAN's economic integration process continues, it will be well situated to embrace the complete benefit of external possibilities. With such a diverse mix of races, cultures, languages, faiths, and political history, each step toward integration has entailed and will continue to entail extensive debate. When compared to the global average and that of emerging nations, ASEAN regularly provides good returns on investment. This statement is proven by ASEAN (n.d.) For the period 2005-2011, ASEAN's yearly average rate of return on FDI was 11 percent, compared

to 6.9 percent and 9.4 percent for the globe and developing nations, respectively. In 2011, ASEAN had a return on FDI rate of 9.8%, compared to 9.0% for developing nations and 7.1 percent for the rest of the world. Consequently, ASEAN is attracted to global players from a variety of industries. Many businesses are developing and recognizing the rising prospects and potential of ASEAN integration. From the investors' perspective, it is beneficial to invest in ASEAN countries. When exists higher FDI inflows, the competitiveness level among the nations will be raised.

5.4 Limitations of the Study

Despite the fact that most of our studies were successful in achieving and meeting research objectives, we discovered several limitations in our study. These limitations should be addressed and used as a guide for future research. The first constraint we encountered was the limited time frame, which resulted in insufficient datasets. The dependent variable, GCI that was retrieved from WGI is only available from 2007 to 2017, a total of 10 years database. Hence, we have included all the nations with complete datasets in ASEAN countries in our database in order to examine their effects on GCI. However, this also means that we are unable to analyze the effect of a single country as we added more countries to our database. In other words, our findings will look at the general effects of the selected countries rather than the individual effect of every country. Instead, it is recommended that researchers concentrate on a single country in order to evaluate that country's actions.

Additionally, we only used quantitative data to capture the effect of the variables on GCI in our research. This has shown the lack of resources in data collection. Large sample size is typically required for quantitative research. A large-scale study is, however, unfeasible due to a lack of resources. This is because many institutional factors from other parties such as government and educational institutions may lack knowledge, especially in the developing nations, and, more importantly, the resources

required to conduct comprehensive quantitative research. Since quantitative research could create a real-time picture of the current trend in the chosen demographic, this also revealed the limitation in assessing the social changes or how people interpret their own or others' actions.

We have learned how to counteract these challenges in our future according to the constraints that have been mentioned previously. As a result, this could also give a clear direction for further research. These limitations serve as a reminder to researchers, allowing them to improve their future research. Therefore, we make some suggestions in the hopes that they will be useful to researchers in the future.

5.5 Recommendations for Future Research

To counter these limitations, we recommend the researchers find alternative data to replace GCI in order to determine the linkage between the variables in future research. In other words, it is recommended that future researchers could explore the linkage if there is alternative data to replace GCI. As a result, an alternative dependent variable with higher availability data will also help to solve the data limitation issue to obtain sufficient data. This is because the data with a longer time span allows for achieving sufficient datasets with fewer countries involved. On the other hand, researchers may include data with different time scales, such as daily and yearly, as interaction terms to avoid data restriction. To avoid such issues in the future, researchers may be more cautious when selecting proxies for their research.

It is also encouraging to include qualitative measurement in future research to better capture the effect on GCI in ASEAN countries. This is because the qualitative measurement could provide rich, in-depth insights as well as the ability to explore context. In other words, qualitative measurement is frequently utilized in social and behavioral studies as human interactions are more complex than molecular reactions in a beaker. This is because qualitative measurement could provide favor outcome

although with non-random sampling or small sampling. Hence, it is able to deeply investigate and gather rich descriptive data on social phenomena with institutional measures.

5.6 Conclusion

The research is developed to objectify the determination of drivers that influence the GCI in seven selected ASEAN countries, which are Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam within a sample period from 2007 to 2017. This study has explored three determinants that may play a key role in affecting the GCI among the ASEAN countries CCI, GDP, and FDI inflows. According to our findings, FEM is the model that best describes the data collected as compared to POLS and REM. Throughout the study, CCI, GDP, and FDI inflows have a strong and positive relationship with the GCI whereas the moderating effect of CCI*GDP and CCI*FDI have a negative relationship with the GCI. Therefore, the research provided limitations and recommendations of this research to provide useful insights to future researchers who are interested in studying this area. Policymakers who played a vital role in tackling economic issues by developing permanent policies related to enhancing ASEAN countries' GCI. In summary, this study may serve as a reference for policymakers, businesspeople, and individuals to have a better understanding of how to gain a comparative advantage accordingly.

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Appendix

Appendix I: Variables, Descriptions, Theories, and Expected Relationships

Abbreviation	Variable Name	Theory	Expected Relationship
CCI	Control of Corruption	Adam Smith's Theory	–
GDP	Gross Domestic Product	Keynesian Theory	+
FDI	Foreign Direct Investment	Development Economics Theory	+
TO	Trade Openness	Trade Theory	+
GFCF	Gross Fixed Capital Formation	Heckscher-Ohlin Theory	+

Appendix II: Summary of Data

Data	Scale of Measurement	Source of Data
GCI	Index Score (1 – 7)	World Bank
CCI	Index Point (-2.5 – 2.5)	Worldwide Governance Indicators
GDP	USD ($)	World Bank
FDI	%	World Bank
TO	%	World Bank
GFCF	%	World Bank

Appendix III: Descriptive Statistics for Each Variables

Variable	Mean	Median	Standard Deviation	Min.	Max.
GCI	4.5562	4.43	0.5843	3.48	5.72
CCI	-0.1416	-0.45	1.0129	-1.29	2.25
ln GDP	8.3786	8.16	1.2473	6.45	11.02
FDI	6.7570	3.79	6.8426	0.06	29.35
TO	148.8347	130.91	98.1954	37.42	437.33
GFCF	24.8921	24.95	4.4779	15.97	35.11
*CCI*GDP*	-0.0100	-3.6045	9.9281	-9.3267	23.85
*CCI*FDI*	3.3523	-0.992	17.5331	-16.2153	62.8090
*CCI*CCI*	1.0326	0.3364	1.5332	0.0009	5.0625

Appendix IV: Result of Static Panel Regression for Model 1: POLS. FEM and REM

Variables	**POLS**	**FEM**	**REM**
CCI	0.7112	1.4693	0.7112
	(1.64)	**(2.62)****	**(1.64)**
GDP	0.3955	0.2939	0.3955
	(11.23)***	**(4.74)*****	**(11.23)*****
FDI	0.0226	0.0233	0.0226
	(5.12)***	**(3.64)*****	**(5.12)*****
TO	-0.0005	-0.0010	-0.0005
	(-1.53)	**(-1.38)**	**(-1.53)**
GFCF	0.0082	-0.0184	-0.0082
	(3.17)***	**(0.42)**	**(3.17)*****
*CCI*GDP*	-0.0430	-0.1533	-0.0430
	(-0.91)	**(-2.25)****	**(-0.91)**
*CCI*FDI*	-0.0117	-0.0121	-0.0117
	(-5.47)***	**(-3.51)*****	**(-5.47)*****
*CCI*CCI*	0.0817	-0.1190	-0.0817
	(-1.79)*	**(-1.69)***	**(-1.79)***
C	1.1841	2.4050	1.1841
	(3.38)***	**(3.78)*****	**(3.38)*****
Prob > F	0.0000	0.0000	0.0000
F-statistics	416.84	19.33	3334.72
R-Squared	0.9777	0.7138	0.6837

Appendix V: Result of Breusch-Pagan Lagrange Multiplier (LM) Test

Test	**Chi-Square Statistic**	**P-Value**
LM Test	0.0000	1.0000

Appendix VI: Result of Hausman Test

Test	Chi-Square Statistic	P-Value
Hausman Test	24.41	0.0020***

Appendix VII: Result of Poolability Test

Test	F-statistic	P-Value
Poolability Test	2.87	0.0156**

Appendix VIII: Result of Wald Test

Test	Chi-Square Statistic	P-Value
Wald Test	29.44	0.0001***

Appendix IX: Result of Pesaran CD Test

Test	CD Value	P-Value
Pesaran CD Test	1.572	0.1160

Appendix X: Result of Wooldridge Test

Test	F-Statistic	P-Value
Wooldridge Test	48.132	0.0004***

Appendix XI: Result of Fixed Effect Model (FEM) with Robust Cluster

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
CCI	0.2395 **(1.96)***	1.8243 **(1.56)**	0.2854 **(2.64)****	0.1739 **(1.88)**	1.4693 **(2.39)***
GDP	0.4080 **(6.23)*****	0.2965 **(2.63)****	0.4024 **(8.41)*****	0.3842 **(5.17)*****	0.2939 **(4.76)*****
FDI	0.0056 **(0.63)**	0.0073 **(0.80)**	0.0250 **(4.38)*****	0.0045 **(0.55)**	0.0233 **(4.53)*****
TO	-0.0001 **(-0.08)**	-0.0009 **(-1.19)**	-0.0006 **(-1.10)**	0.0002 **(0.31)**	-0.0010 **(-1.55)**
GFCF	0.0077 **(2.10)***	0.0071 **(1.67)**	0.0006 **(0.28)**	0.0087 **(2.59)****	0.0018 **(0.77)**
*CCI*GDP*		-0. 1947 **(-1.45)**			-0.1533 **(-2.08)***
*CCI*FDI*			-0.0135 **(-5.55)*****		-0.0121 **(-5.39)*****
*CCI*CCI*				-0.1329 **(-2.26)***	-0.1190 **(-7.25)*****
C	0.9528 **(1.44)**	2.2369 **(1.93)**	1.1818 **(2.35)***	1.2171 **(1.61)**	2.4049 **(3.44)****
Prob > F	0.0022	0.0000	0.0001	0.0000	-
F-statistics	15.51	64.94	40.96	63.48	-
R-Squared	0.6031	0.6420	0.6762	0.6196	0.7138

Appendix XII: Summary of Statistic Analyses Results

	Analysis	**Result**
Model Selection		
POLS and REM	Breusch-Pagan Lagrange Multiplier (BPLM) Test	POLS is preferred.
FEM and REM	Hausman Test	FEM is preferred.
POLS and FEM	Poolability Test	FEM is preferred.
Diagnostic Testing		
Heteroskedasticity	Wald Test	Residuals are heteroskedasticity but solved with standard error.
Cross-Sectional Dependence	Pesaran CD Test	Residuals are no cross-sectional dependence.
Autocorrelation	Wooldridge Test	Residuals are autocorrelation but solved with robust standard error.

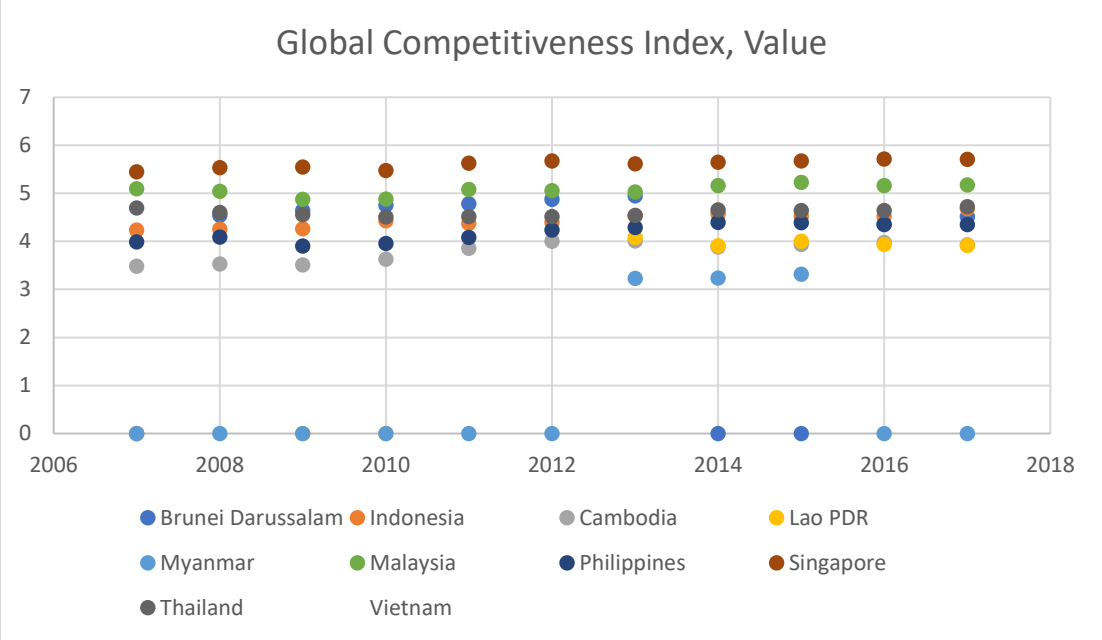
Appendix XIII: Summary of Panel Analysis Results

Variable	**POLS**	**FEM**	**REM**
CCI	Positive insignificant	Positive significant	Positive insignificant
GDP	Positive significant	Positive significant	Positive significant
FDI	Positive significant	Positive significant	Positive significant
TO	Positive insignificant	Negative insignificant	Negative insignificant
GFCF	Positive significant	Negative insignificant	Negative significant
*CCI*GDP*	Negative insignificant	Negative significant	Negative insignificant
*CCI*FDI*	Negative significant	Negative significant	Negative significant
*CCI*CCI*	Negative significant	Negative significant	Negative significant

Appendix XIV: Summary of Fixed Effect Model (FEM) with Robust Cluster

Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
CCI	Positive significant	Positive insignificant	Positive significant	Positive insignificant	Positive significant
GDP	Positive significant	Positive significant	Positive significant	Positive significant	Positive significant
FDI	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant	Positive significant
TO	Negative insignificant	Negative insignificant	Negative insignificant	Positive insignificant	Negative insignificant
GFCF	Positive significant	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant
*CCI*GDP*		Negative insignificant			Negative significant
*CCI*FDI*			Negative significant		Negative significant
*CCI*CCI*				Negative significant	Negative significant
C	Positive insignificant	Positive insignificant	Positive significant	Positive insignificant	Positive significant

Appendix XV: Global Competitiveness Index by Value of the Selected Countries from 2007 to 2017



Appendix XVI: Dependent Variable and Independent Variables