

**ANALYSIS OF BILATERAL TRADE AND  
INVESTMENT RELATIONS BETWEEN  
INDONESIA AND SINGAPORE 2015-2019**



**BACHELOR THESIS**

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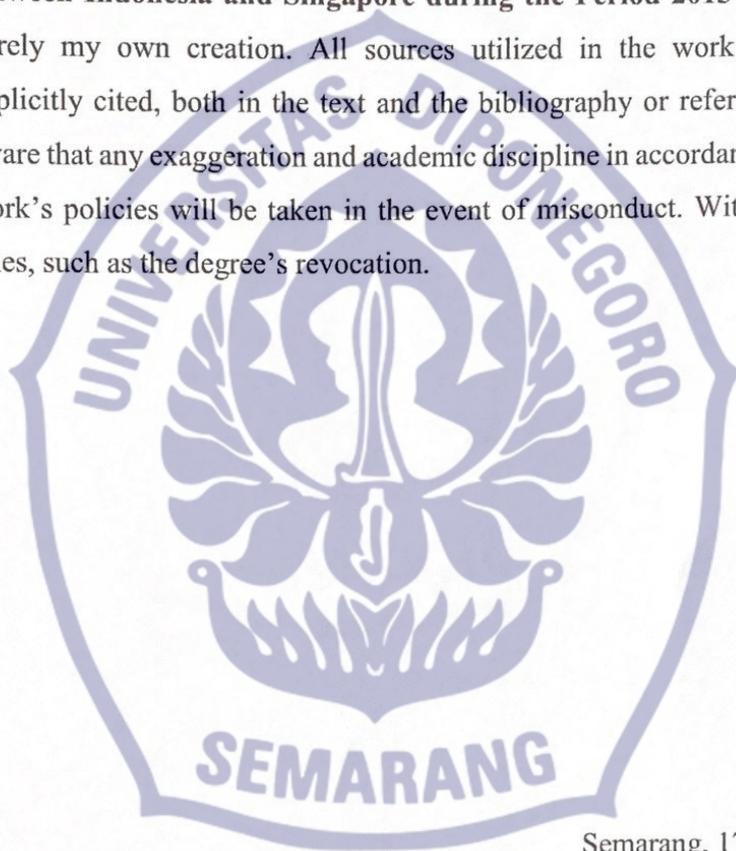
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## STATEMENT OF BACHELOR THESIS ORIGINALITY

The undersigned, I. Alexandros Thomas Wisnu W, declare that the thesis entitled “**Analysis of Bilateral Trade and Investment Relations between Indonesia and Singapore during the Period 2015 – 2019.**” is purely my own creation. All sources utilized in the work have been explicitly cited, both in the text and the bibliography or references. I am aware that any exaggeration and academic discipline in accordance with this work’s policies will be taken in the event of misconduct. With academic rules, such as the degree’s revocation.



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## MOTTO AND TRIBUTES



I dedicated this milestone of my life's journey to my cherished mother, father, and brother, acknowledging their unwavering encouragement and prayers.

## ABSTRACT

This study examines the bilateral trade and investment relations between Indonesia and Singapore during the period 2015–2019, tracing the evolution of their collaboration from uncertainty to robust cooperation. Using international trade theory, including the augmented gravity model and RCA-CMSA, the research analyzes various factors influencing trade flows, such as GDP, distance, GDP per capita, regional trade agreements, and common language. The dataset covers the years 1948 to 2019, with a specific focus on the recent period.

Findings indicate positive correlations between GDP and trade flows, with Indonesia exerting a stronger influence. Distance negatively impacts trade, while similarities in GDP per capita favor bilateral trade. Regional trade agreements and common language enhance trade relations. In 2015, both countries optimized their trade flows, with untapped trade potential reaching \$863 trillion USD by 2019, suggesting opportunities for further growth. The study identifies potential trade products and investment opportunities, with Singapore showing greater potential for investment in Indonesia compared to vice versa. Overall, the findings underscore the mutually beneficial nature of Indonesia-Singapore relations and the potential for sustained collaboration in trade and investment.

**Keywords:** Bilateral Trade, Indonesia, Singapore, Augmented Gravity Model, RCA-CMSA

## ABSTRAKSI

*Studi ini mengkaji hubungan perdagangan dan investasi bilateral antara Indonesia dan Singapura selama periode 2015–2019, melacak evolusi kolaborasi mereka dari ketidakpastian menjadi kerjasama yang kuat. Dengan menggunakan teori perdagangan internasional, termasuk model gravitasi yang diperluas dan RCA-CMSA, penelitian ini menganalisis berbagai faktor yang memengaruhi aliran perdagangan, seperti GDP, jarak, GDP per kapita, perjanjian perdagangan regional, dan bahasa yang umum. Kumpulan data mencakup tahun 1948 hingga 2019, dengan fokus khusus pada periode terkini.*

*Temuan menunjukkan adanya korelasi positif antara GDP dan aliran perdagangan, dengan Indonesia memberikan pengaruh yang lebih kuat. Jarak secara negatif memengaruhi perdagangan, sementara kesamaan GDP per kapita mendukung perdagangan bilateral. Perjanjian perdagangan regional dan bahasa yang umum meningkatkan hubungan perdagangan. Pada tahun 2015, kedua negara mengoptimalkan aliran perdagangan mereka, dengan potensi perdagangan yang belum dimanfaatkan mencapai \$863 triliun USD pada tahun 2019, menunjukkan peluang untuk pertumbuhan lebih lanjut. Studi ini mengidentifikasi produk perdagangan potensial dan peluang investasi, dengan Singapura menunjukkan potensi lebih besar untuk berinvestasi di Indonesia dibandingkan sebaliknya. Secara keseluruhan, temuan ini menekankan sifat saling menguntungkan dari hubungan Indonesia-Singapura dan potensi kerjasama yang berkelanjutan dalam perdagangan dan investasi.*

**Kata Kunci:** *Perdagangan Bilateral, Indonesia, Singapura, Augmented Gravity Model, RCA-CMSA*

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With utmost gratitude and a sense of accomplishment, I present this thesis as the culmination of my academic journey, marking the fulfillment of the requirements for my Economic bachelor's degree at the Faculty of Economics, Diponegoro University. It is with great pleasure that I embark on this acknowledgement, expressing my sincere appreciation to all those who have contributed to the completion of this work. This gratitude is extended to:

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The author is well aware that this bachelor thesis has its flaws. Critiques and suggestions are appreciated, whether they are directed at the bachelor thesis or the author. Hopefully, this bachelor thesis may be of assistance to those who require it.

Semarang, 17 May 2024

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## TABLE OF CONTENTS

THESIS APPROVAL .....	ii
EXIMINATION COMPLETION APPROVAL .....	iii
STATEMENT OF BACHELOR THESIS ORIGINALITY .....	iv
MOTTO AND TRIBUTES.....	v
ABSTRACT.....	vi
ABSTRAKSI.....	vii
ACKNOWLEDGEMENT .....	viii
LIST OF TABLES .....	xiv
LIST OF FIGURES .....	xv
LIST OF APPENDIX .....	xvi
<b>CHAPTER I INTRODUCTION.....</b>	<b>1</b>
1.1 Research background.....	1
1.2 Research Problems .....	7
1.3 Research Objectives .....	7
1.4 Research Significance .....	8
1.5 Systematic of Writing.....	8
<b>CHAPTER II LITERATURE REVIEW.....</b>	<b>11</b>
<b>2.1 Theoretical Foundation.....</b>	<b>11</b>
<b>2.1.1 International Trade Theory .....</b>	<b>11</b>
<b>2.1.2 Investment.....</b>	<b>14</b>
<b>2.2 Indonesian Trade Agreement.....</b>	<b>15</b>
<b>2.3 Economic Relationship Indonesia and Singapore .....</b>	<b>17</b>
<b>2.4 Previous Research .....</b>	<b>17</b>

2.5	Conceptual Framework .....	31
2.6	Research Hypothesis .....	34
<b>CHAPTER III RESEARCH METHODOLOGY .....</b>		<b>35</b>
3.1	Operational Definition of Variables .....	35
3.1.1	Dependent Variables.....	35
3.1.2	Independent Variables (Variables of Interest).....	35
3.1.3	Operational Variables.....	36
	Variable.....	36
	Scale Measurement.....	36
	Trade Flow ( $\ln X_{ijt}$ ) .....	36
	Logarithm.....	36
	GDP Origin Country ( $\ln GDP_{it}$ ).....	36
	Logarithm.....	36
	GDP Destination Country ( $\ln GDP_{jt}$ ) .....	36
	Logarithm.....	36
	GDP Per Capita Difference ( $\ln GDP_{PERCAPDIFFijt}$ ).....	36
	Logarithm.....	36
	Distance Between Country ( $\ln DISTANCE_{ij}$ ).....	36
	Logarithm.....	36
	Regional Trade Agreement ( $RTA_t$ ) .....	36
	Linear .....	36
	Common Language ( $Com. Lang_t$ ).....	37
	Linear .....	37
3.2	Types and Data Sources .....	37
3.3	Data collection method.....	37

3.4	Data analysis method.....	38
3.4.1	Augmented Gravity Model .....	38
3.4.2	RCA-CMSA.....	41
	<b>CHAPTER IV RESULTS AND DISCUSSIONS .....</b>	<b>45</b>
4.1	Overview of Research Object.....	45
4.1.1	Research Area.....	45
4.1.2	Trade and Investment in Indonesia and Singapore .....	46
4.2	Descriptive Statistics .....	48
4.3	Selection Methods for Panel Data Model.....	49
4.4	Gravity Estimation Results.....	49
4.5	Classical Assumption Tests.....	52
4.6	Measuring Trade Potential of Indonesia and Singapore.....	53
4.7	RCA-CMSA .....	55
	<b>CHAPTER V CONCLUSION .....</b>	<b>63</b>
5.1	Conclusion.....	63
5.2	Research Limitation.....	65
5.3	Suggestion and Further Research .....	65
	<b>REFERENCES.....</b>	<b>66</b>
	<b>APPENDIX .....</b>	<b>71</b>

## LIST OF TABLES

Table 2.1 Summary of Previous Research .....	20
Table 3. 1 Industry Classification based on RCA-CMSA estimation.....	43
Table 3. 2 Bilateral potential based on product-status comparison .....	44
Table 4. 1 Summary Statistics.....	48
Table 4. 2 Augmented Gravity Estimation .....	51
Table 4. 3 Heteroscedasticity Test .....	52
Table 4. 4 Woolridge Test.....	53
Table 4. 5 Variance Inflation Factor Test .....	53
Table 4. 6 Gap of predicted and actual trade flow (P-A), Indonesia-Singapore.....	54
Table 4. 7 Product Classification Comparison, Indonesia-Singapore (HS4 Products) .....	56
Table 4. 8 FDI Inflows (Sunset – Sunrise).....	57
Table 4. 9 FDI Inflows (Sunrise – Sunset).....	58
Table 4. 10 Trade (Suffer – Suffer and Great – Great).....	59

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## LIST OF FIGURES

Figure 1. 1 Indonesia Top Commodities Export-Import with Singapore in 2019.....	3
Figure 1. 2 List of Countries with the Largest Investment in Indonesia (2015 – 2019) (US\$ Billion).....	5
Figure 2.1 Conceptual Framework.....	32



## LIST OF APPENDIX

Appendix 1 Data .....	71
Appendix 2 Regression Test .....	73
Appendix 3 Trade Potential Products Indonesia – Singapore (Suffer-Suffer) .....	75
Appendix 4 Trade Potential Products Indonesia – Singapore (Great – Great).....	92
Appendix 5 FDI Inflow Potential Products Indonesia – Singapore (Sunset – Sunrise) .....	93
Appendix 6 FDI Outflow Potential Products Indonesia – Singapore (Sunrise – Sunset) .....	95



# CHAPTER I

## INTRODUCTION

### 1.1 Research background

According to World Bank (2024), a regional trade agreement (RTA) is a treaty between two or more governments that define the rules of trade for all signatories. The common of RTA include Association of Southeast Asian Nations (ASEAN), North American Free Trade Agreement (NAFTA), Central American-Dominican Republic Free Trade Agreement (CAFTA-DR), the European Union (EU), Asia-Pacific Economic Cooperation (APEC), and others. Based on World Trade Organization (2024) RTA can increase trade, economic growth, and job creation. However, it can lead to trade diversion, where countries trade more with each other at the expense of other countries, and can also create new trade barriers. RTAs are an important tool for countries to promote economic cooperation and integration, and they play a significant role in the global trading system.

While RTAs involve trade agreements among groups of countries, bilateral trade agreements are narrower in scope, occurring between just two nations. Bilateral trade pacts aim to facilitate economic cooperation and reduce trade barriers specifically between the two partner countries. Bilateral trade refers to both countries engage in investing capital in each other's economies, creating a mutually beneficial relationship where both parties contribute and gain from the economic collaboration. Bilateral trade involves the reciprocal exchange of goods between two nations, fostering economic transactions and investment. In order to facilitate and promote trade and investment, the two involved countries commit to decreasing or eliminating tariffs, import quotas, export restrictions, and

other impediments to trade (Kagan, 2020). Crucial to a nation's economy, it establishes a market for its products, fosters economic growth, and expands avenues for investment.

Nations engaging in bilateral trade and payment agreements typically anticipate that such arrangements will aid them in broadening, diversifying, and altering their trade patterns. Some countries seek to enhance their terms of trade and stabilize their export markets and prices. Additionally, certain nations aspire to discover new export markets and alternative sources for imports, aiming to reduce reliance on conventional markets (Swidrowski, 1968). Regarding bilateral ties with Singapore, Indonesia's relationship with its closest neighbor and strategic ally is strengthening and steadily advancing. In the realm of trade, Singapore remains Indonesia's most crucial trading ally, holding the top position within the ASEAN region (Ministry of Foreign Affairs, 2023).

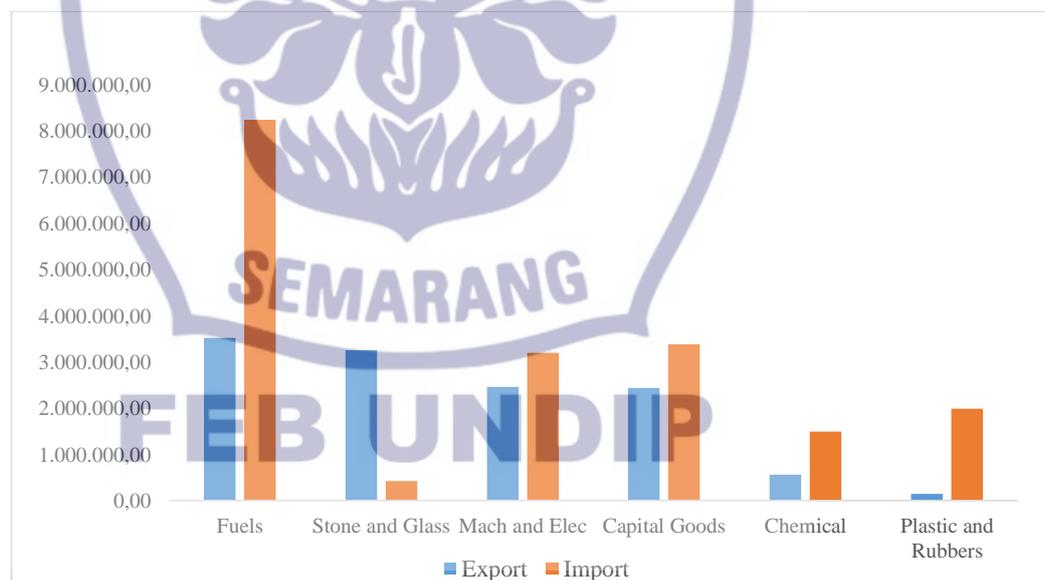
The bilateral relations between Indonesia and Singapore have traversed a considerable journey, evolving from a period of uncertainty in the mid-1960s to their current status. Following the confrontation era, Indonesia-Singapore relations experienced a period of growth and prosperity. The pivotal moment in this transformation was the active involvement of Indonesia and Singapore, alongside Malaysia, the Philippines, and Thailand, in the establishment of the Association of Southeast Asian Nations (ASEAN) in 1967. This marked a significant departure from the previously tumultuous phase in their relationship (Marzuki, *Indonesia-Singapore Relations: The Next 50 Years*, 2017).

The government-to-government bilateral ties between Singapore and Indonesia have materialized through the expansion of collaboration in multiple domains, encompassing political, economic, and socio-cultural spheres. Notably, in the economic sector, the cooperative efforts between Indonesia and Singapore are evident in the rising volumes of investments

originating from both countries, with a particular emphasis on investments by Singaporean business leaders in Indonesia.

Bilateral trade encompasses more than just investment; it involves both imports and exports. Indonesia's export trade significantly contributes to the overall success of its economy. Furthermore, imports are also crucial for Indonesia because they help fulfill the demand for certain commodities and services that are limited domestically and cannot be produced within the country, indirectly contributing to national stability. As per the World Bank's data for 2019, Indonesia's primary export destinations included China, the United States, Japan, Singapore, and India, among others. For the imports were China, Singapore, Japan, Thailand, and United States.

**Figure 1. 1**  
Indonesia Top Commodities Export-Import with Singapore in 2019  
(per \$US Dollar)



Source: World Bank (2019)

As seen on Figure 1.1, it is evident that fuels constitute the most significant commodity both in terms of exports to and imports from Singapore, followed by capital goods and machinery and electricity. This implies that Singapore and Indonesia have established a robust economic relationship to meet their respective needs through this bilateral trade.

Singapore consistently maintains its position as the primary source of FDI. It continues to exert a strong influence over foreign investments in Indonesia, with an increasing number of Singaporean companies choosing the archipelago as a platform for expanding their business operations. The government's unwavering commitment to further developing infrastructure and improving connectivity throughout the archipelago, alongside efforts to simplify the business environment, solidifies Indonesia's status as one of the most promising investment destinations in the Asian region. Singapore has maintained its dominant role in foreign investment in Indonesia for numerous years. This neighboring country is likely to continue leading foreign investors in Indonesia in the coming years, as capital from Singapore continues to flow.

Investment stands as a critical catalyst for international economic integration and represents one of the primary factors driving a country's economic growth, Indonesia being no exception. Given the right policy framework, investment can contribute to financial stability, foster economic progress, and improve the quality of life within societies. In Indonesia, investments originate from both Domestic Direct Investment (DDI) and foreign direct investment (FDI). One of the foreign investment partners in Indonesia is Singapore.

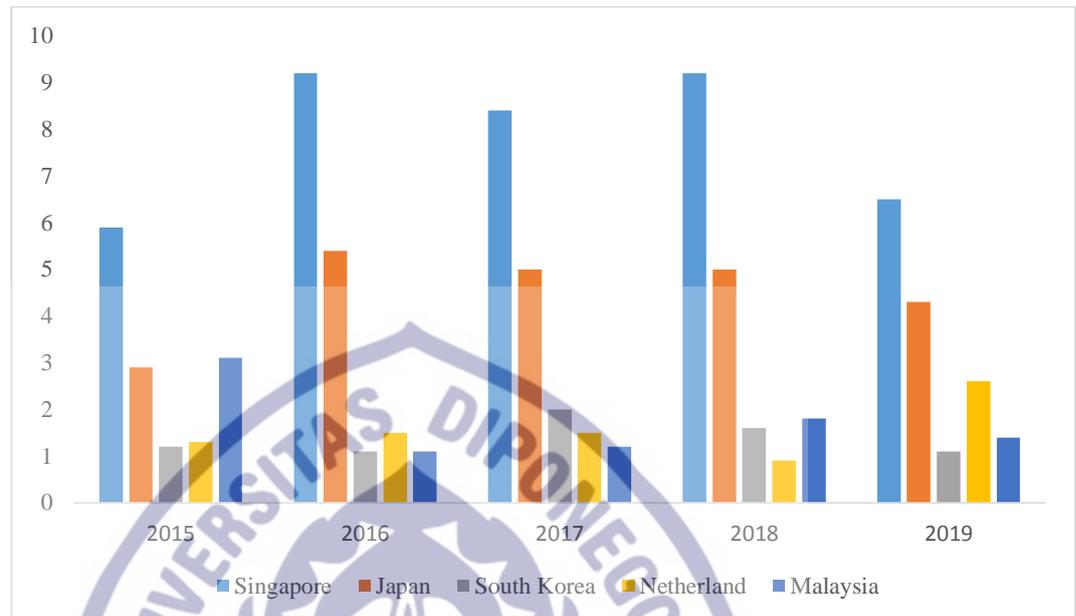
FDI plays a crucial role within an open and efficient global economic framework and serves as a significant driver of progress. However, it's important to note that the advantages of FDI aren't distributed uniformly among nations and industries. This makes it vital to understand how to attract FDI to a broader range of developing countries and how to fully harness its potential for fostering development (OECD, 2002).

FDI represent a significant reservoir of fresh financial resources that can bolster local economies, particularly in developing nations. Consequently, not every country can successfully allure the appropriate type of FDI, and not every investor is willing to venture their investments

without thoroughly assessing the prevailing conditions in the host country. Indonesia's economy continues to present extensive opportunities due to the nation's sustained economic expansion, political stability, a sizable young population, a burgeoning middle class, and abundant natural resources. Investment plays a pivotal role in catalyzing economic growth, generating employment opportunities, and transitioning the current consumption-driven economy into a production-oriented one (Mustofa & Sukmana, *The Effect of Institutional Quality on Foreign Direct Investment*, 2021).

However, there is a distinction between bilateral trade and FDI. FDI entails acquiring an ownership stake in a foreign company or project by an investor, company, or government from another country. Conversely, bilateral trade pertains to the interchange of goods and services between two nations. FDI constitutes a long-term investment in a foreign company, while bilateral trade involves short-term transactions encompassing the exchange of goods and services between two countries. Despite the potential for complementarity between FDI and bilateral trade, they encompass distinct transaction types and serve varied economic functions (Whiteaker, 2020; Hayes, 2023).

**Figure 1. 2**  
List of Countries with the Largest Investment in Indonesia (2015 – 2019)  
(US\$ Billion)



Source: Ministry of Investment (2023)

According to Figure 1.2, Singapore dominantly contribute the investment to Indonesia. In 2019, the total trade between the two nations amounted to a substantial \$6.5 billion, with Singapore emerging as the primary foreign investor in Indonesia since 2014. Moreover, both countries have established substantial collaborations spanning various sectors, such as education, culture, defense, and environmental initiatives.

Prior studies on Indonesia-Singapore trade and investment, as conducted by Amalina and Muis (2022) and Achmad and Nasir (2022), have revealed that the presence of a Bilateral Investment Treaty (BIT) can enhance the depth of Foreign Direct Investment (FDI) collaboration between Indonesia and Singapore. Additionally, these studies have underscored the significance of economic zones established between the two countries, which serve as a strategic economic interest and a means of fostering bilateral cooperation.

While previous research has examined various aspects of Indonesia-Singapore trade and investment relations. However, there remains a significant research gap regarding the specific time period selected, and the utilization of distinct research methodologies. Moreover,

the concept of complementary economic relations and its role in sustaining bilateral trade and investment ties between these two nations has received limited attention. This research aims to assess whether these nations possess mutually beneficial relations that can support the longevity of their trade and investment partnerships.

Based on the background in the study, the title of this research is **"Analysis of Bilateral Trade and Investment Relations between Indonesia and Singapore during the Period 2015 – 2019."**

### **1.2 Research Problems**

Based on the research background above, the research problems in this study are formulated as follows:

1. Are trade flows influenced by GDP origin country, GDP destination country, the distance between countries. The GDP percapita difference between country, the RTA (Regional Trade Agreement) between country and the common language?
2. What types of product/commodities can enhance economic cooperation between Indonesia and Singapore?
3. What types of product/commodities can increase Foreign Direct Investment inflow and outflow between Indonesia and Singapore?

### **1.3 Research Objectives**

Based on the research problem above, the objectives of this study are as follows:

1. To observe the influenced of GDP origin country, GDP destination country, the distance between countries. The GDP percapita difference between country, the RTA (Regional Trade Agreement) between country and the common language on trade flows.
2. To identify the types of products/commodities that have the potential to enhance economic cooperation between Indonesia and Singapore.

3. To analyze the types of products/commodities that could potentially increase Foreign Direct Investment (FDI) inflow and outflow between Indonesia and Singapore.

#### **1.4 Research Significance**

The results are expected to provide benefits to related parties, including the following:

1. Academics

To provide knowledge of what products/commodities that can enhance the economic cooperation between Indonesia and Singapore and what are the best investment are suitable for Indonesia and Singapore.

2. Practitioners

To support data in determining the government of Indonesia in knowing what are the best products and investment that can support the economics of Indonesia and Singapore

#### **1.5 Systematic of Writing**

In order to offer comprehensive overview, this thesis has been meticulously and systematically prepared, including five chapters, as outlined below:

#### **CHAPTER I: INTRODUCTION**

In the first chapter, I delve into the background of this research, offering a comprehensive overview of bilateral trade between Indonesia and Singapore. This includes an exploration of the research problem, research objectives, an examination of the benefits derived from the research, and a systematic presentation of the study's structure.

## **CHAPTER II: LITERATURE REVIEW**

In the second chapter, this research presents the theoretical foundations underpinning the study, explores relevant prior research, and establishes the conceptual framework that serves as the intellectual scaffolding for the research endeavor. This chapter aims to provide a solid theoretical grounding, integrate insights from existing studies, and conceptualize the framework that guides the subsequent analysis and findings.

## **CHAPTER III: RESEARCH METHODOLOGY**

In the third chapter, the research delves into the intricate details of the study, elucidating the definitions of key variables, categorizing types and identifying sources of data. Additionally, it outlines the meticulous approach to data collection and expounds upon the chosen data analysis methods. The focus of this chapter is on providing a comprehensive understanding of the variables under consideration, detailing the types and origins of data utilized, and explicating the methods employed for data collection and subsequent analysis. Special attention is given to the application of the Augmented Gravity Model and RCA-CMSA in the analytical process.

## **CHAPTER IV: RESULTS AND DISCUSSION**

In the fourth chapter, the research unfolds the outcomes of the study, presenting the empirical findings and engaging in an in-depth discussion of the research results. This section serves to systematically showcase and interpret the data gathered, drawing meaningful insights and conclusions from the research outcomes. The discussion delves into the implications of the results, their alignment with the research objectives, and any noteworthy patterns or trends observed.

## **CHAPTER V: CONCLUSION**

In the fifth and final chapter, the research culminates with a conclusive overview, summarizing the key findings and insights derived from the study. This section offers a comprehensive conclusion to the research, synthesizing the results and addressing how they align with the initial research objectives. Furthermore, the chapter outlines any limitations encountered during the research process, acknowledging constraints and potential areas for improvement. Additionally, provides suggestions for future studies or potential enhancements to the research methodology.



## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 Theoretical Foundation**

##### **2.1.1 International Trade Theory**

This study employed international trade theory as its conceptual framework. It commenced with mercantilist principles, expanding upon the notion of absolute advantage. The contention was that adhering strictly to mercantilist recommendations would not lead to collective prosperity for all nations, as the export of one nation corresponds to the import of another. According to Adam Smith in Krist (2024), the argument proposed that universal gains could be achieved if nations engaged in free trade and specialized based on their individual absolute advantages (Smith, 1776). Adam Smith advocated for free trade but didn't explore the concept of comparative advantage. Absolute advantage, based solely on labor productivity, could mean a nation lacks an advantage in any specific area. Smith was more focused on the impact of foreign trade on economic development, presenting a dynamic model with variable factor supplies (Myint, Adam Smith's Theory of International Trade in the Perspective of Economic Development, 1977).

The static resource allocation problem by introducing the concept of comparative advantage. Unlike absolute labor productivity values, this concept relies on labor productivity ratios, stemming from Ricardo's labor theory of value. According to Ricardo in Krist (2024), in a competitive market, the price of a good is determined by the wage rate and labor used in production, establishing a direct connection between comparative advantage and relative commodity prices. Ricardo's theory suggests that even less technologically advanced countries can engage in global trade,

emphasizing a mutually beneficial scenario where workers in all trading nations can consume more goods. However, Ricardo's model did not account for complexities arising from factors like capital or changes in factor price ratios.

The comparative advantage model makes several unrealistic assumptions, overlooking the complexity of the real world with numerous countries, goods, and factors of production. It assumes perfect competition in each market, neglecting industries with market power. Additionally, the model assumes fixed labor productivity and assured full employment. It considers technological differences as the sole distinctions between countries. In a dynamic context, comparative advantage evolves as trade in goods and capital influences the factor endowments of trading countries. The Heckscher-Ohlin (H-O) model posits that trade between countries is shaped by their resource endowments. It relies on key assumptions: two trading nations with two goods, one capital-intensive and the other labor-intensive. One country is endowed with labor, the other with capital. Factors of production are immobile between countries but mobile within, and both nations share identical technological structures and consumption preferences (Leamer, *The Heckscher-Ohlin Model in Theory and Practice*, 1995).

There's theory created by Stolper-Samuelson. This theorem shows that an increase in the price of a product leads to a rise in the income of resources extensively used in its production. Conversely, a decrease in the product's price diminishes the income of resources heavily involved in its manufacturing. The abundant resource with a comparative advantage witnesses an increase in income, while the scarce resource undergoes a reduction in income, irrespective of the industry. This trade theory concludes that, despite the long-term perspective, certain individuals may

experience losses as a result of free trade (Stolper & Samuelson, 1941).

In the realm of international trade, the gravity model stands out as an economic framework forecasting bilateral trade flows by considering the economic sizes and distances between two entities (Carrère, Mrázová, & Neary, Gravity Without Apology: the Science of Elasticities, Distance and Trade, 2020). Introduced by Walter Isard in 1954, the fundamental model for trade between two countries (i and j) is structured as follows:

$$F_{ij} = G \cdot \frac{M_i M_j}{D_{ij}} \dots\dots\dots$$

(2.1)

In this equation, G represents a constant, F denotes trade flow, D signifies distance, and M stands for the economic dimensions of the countries under consideration. For the purpose of econometric analyses, the equation can be transformed into a linear form by applying logarithms (Isard, Location Theory and Trade Theory: Short-Run Analysis, 1954). Economists have utilized the model to scrutinize the factors influencing bilateral trade flows, including shared borders, languages, legal systems, currencies, and colonial legacies. It has been instrumental in assessing the effectiveness of trade agreements and organizations such as the North American Free Trade Agreement (NAFTA) and the World Trade Organization (WTO). Additionally, the model has found application in international relations to gauge the influence of treaties and alliances on trade (Head, Mayer, & Ries, The Erosion of Colonial Trade Linkages After Independence, 2010).

### 2.1.2 Investment

According to Samuelson and Nordhaus (2001), investment involves the augmentations to a nation's capital stock, encompassing buildings, equipment, software, and inventories, over the course of a year. Economists generally advocate for the unrestricted movement of capital across international borders, primarily because it enables capital to pursue the highest rate of return. According to Feldstein (2000), this free flow of capital offers additional benefits. Firstly, it diminishes the risk for capital owners by enabling them to diversify their lending and investment. Secondly, the global integration of capital markets can foster the dissemination of best practices in corporate governance, accounting rules, and legal traditions. Thirdly, the worldwide mobility of capital serves as a constraint on governments, limiting their ability to implement unfavorable policies.

The cross-border investment between nations is referred to as Foreign Direct Investment (FDI). FDI plays a pivotal role in global economic integration. It establishes direct, stable, and enduring connections between economies, fostering the transfer of technology and knowledge across borders. Additionally, FDI enables the host economy to expand the reach of its products in international markets. Crucially, FDI is instrumental in creating and organizing production across countries, contributing significantly to the formation of global value chains. Moreover, as an additional funding source for investment, FDI, under conducive policy environments, can serve as a significant driver for development (OECD Library, 2024).

FDI manifests in various forms, each serving distinct strategic purposes. Horizontal FDI occurs when a domestic company invests in a foreign entity within the same industry, aiming to replicate its established business conditions in a foreign

market. This often involves the establishment of new branches or subsidiaries, as well as Mergers and Acquisitions (M&A) within the same industry. On the other hand, Vertical FDI encompasses two approaches. Backward Integration sees companies investing in lower stages of the supply chain abroad, like raw material extraction and manufacturing. Conversely, Forward Integration involves investments in higher stages of the supply chain, often within related or the same industry, such as marketing or distribution. Lastly, Conglomerate FDI is characterized by investments unrelated to a domestic company's existing businesses. This type of FDI, considered less common, entails setting up entirely new operations or acquiring foreign companies in unrelated industries. Typically undertaken by well-capitalized and experienced entities, conglomerate FDI serves the purpose of diversification in global markets. Each type of FDI provides avenues for companies to strategically expand their international presence and optimize their positions within the global economic landscape (Hayes, 2023).

## **2.2 Indonesian Trade Agreement**

Indonesia adheres to an active and independent foreign policy, which means that Indonesia's politics cannot be intervened by other countries, and this also influences its economic relations with other nations (Embassy of The Republic of Indonesia in Washington D.C. The United States of America, 2024). At present Indonesia has established bilateral cooperation with 162 countries and one special territory in the form of non-self-governing territory. The Indonesian partner partners are divided into eight regions (Africa, the Middle East, East Asia and the Pacific, South and Central Asia, North and Central America, South America and the Caribbean, Western Europe, and Central and Eastern Europe) (Ministry of Foreign Affairs of The Republic of Indonesia, 2023).

Bilateral trade in Indonesia with other countries has different agreements depending on the political conditions, commodities, etc. For example, Indonesian and Japan economic partnership agreement, the agreement was signed on August 20, 2007, and took effect on July 1, 2008. Currently, over 92% of goods have experienced tariff reductions. Japan is one of Indonesia's major trading partners, and in 2015, the total trade value between the two countries reached \$31.2 billion USD (International Labour Office, 2013). Additionally, the ASEAN-Korea Comprehensive Economic Partnership, established in 2007, aims to boost trade by eliminating tariff and non-tariff barriers (Association of Southeast Asian Nations, 2024).

Indonesia's annual trade volume with South Korea was \$16 billion USD in 2015. Furthermore, Indonesia is part of the ASEAN-People's Republic of China Comprehensive Economic Cooperation Agreement, which was initially signed on November 4, 2002. This agreement, fully effective since January 1, 2010, involves reducing import tariffs on over 90% of traded goods among China and the original six ASEAN member states, including Indonesia, Malaysia, Brunei Darussalam, the Philippines, Singapore, and Thailand, among other objectives (Association of Southeast Asian Nations, 2024).

Indonesia is one of the members of the Association of Southeast Asian Nations, commonly known as ASEAN. ASEAN itself has agreements among its members known as the ASEAN agreement. ASEAN Free Trade Area (AFTA) is a trade bloc agreement aimed at promoting and strengthening local manufacturing across all ASEAN countries. It was signed on January 28, 1992, in Singapore (Syarip, *Defending Foreign Policy at Home: Indonesia and the ASEAN-Based Free Trade Agreements*, 2020).

Initially, the agreement included six ASEAN member countries: Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Over time, Vietnam joined in 1995, followed by Laos and Myanmar in 1997,

and Cambodia in 1999. As of now, AFTA encompasses all ten ASEAN countries (ASEAN, 2012).

### **2.3 Economic Relationship Indonesia and Singapore**

Indonesia and Singapore relationship go back to a month after Indonesia independence and the separation of Singapore in 1965, both countries started bilateral diplomatic ties in 1966. In 1967 the formal diplomatic relation was established after they founded ASEAN. Since then, Singapore and Indonesia have continued frequent high-level contacts, supported by robust economic cooperation in a variety of fields, including as health, military, and the environment. Singapore has continuously been the largest foreign investor in Indonesia (Singapore Government, 2024).

Indonesia has a close bilateral relationship with its neighboring country, Singapore. One of the largest commodities exported to Singapore is petroleum gas and oil, considering Indonesia is one of the world's oil and gas producing nations. Conversely, Singapore exports refined oil to Indonesia. Besides oil and gas, the most significant commodities that Indonesia exports to Singapore are precious metals and stones (OEC, 2024).

### **2.4 Previous Research**

Suvankulov & Ali (2012) use the gravity model to analyze recent trends in Pakistan-Turkey trade. Results show that from 1996 to 2009, Pakistan's exports to Turkey exceeded predictions, while Turkish exports fell short. In 2009, the model predicted \$749.2 million in Turkish exports, but the actual was \$163.1 million. The authors suggest a Turkish-initiated free trade agreement to align trade volumes. Pakistan's textile-centric exports face constraints, while Turkey's diverse exports offer growth potential. The study underscores the importance of trade complementarity for successful bilateral trade.

Rahman's (2009) examination, titled "Exploring Australia's Global Trade Potential," spans the years 1972 to 2006 and encompasses data from 57 trading partners. Through the application of the gravity model and panel data techniques, the study identifies factors positively influencing Australia's bilateral trade, including income, partner openness, shared language, and involvement in free trade agreements. Conversely, negative factors comprise per capita income disparities and geographical distance. The outcomes imply considerable trade potential for Australia with nations such as Mexico, Argentina, Uruguay, Austria, Peru, India, Brazil, and the USA.

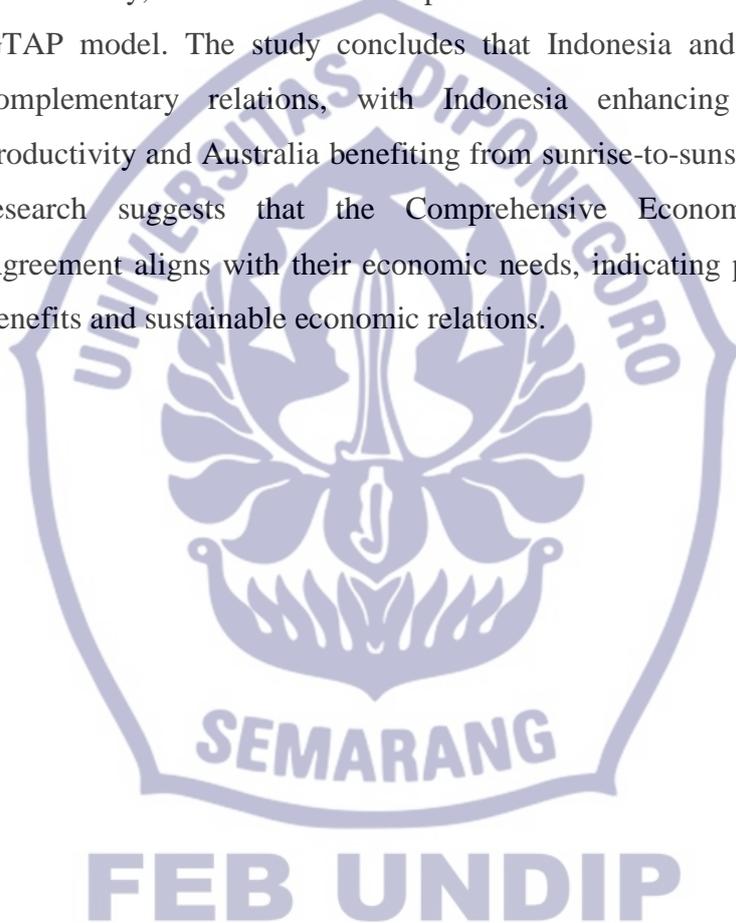
Batra (2006) uses the gravity model to analyze India's global trade potential, focusing on data from 2000. The study highlights the significance of traditional 'gravity' effects in international trade, emphasizing the positive impact of historical and cultural similarities on bilateral trade. Notably, the model identifies significant opportunities for India's trade with China, indicating the potential for substantial growth with barrier removal. Additionally, there is an estimated trade potential of approximately US\$6.5 billion with Pakistan.

Verico & Riefky (2022) analyze bilateral trade and investment relations between Indonesia and South Korea. Using methods of Revealed Comparative Advantage and Constant Market Share Analysis, the study suggests that both nations can benefit from complementary economic relations. Indonesia stands to gain insights from South Korea's experience in avoiding the Middle-Income Trap. The research indicates mutual advantages in short-term trade and long-term productivity improvement.

Lai & Bujang (2016) conduct a comparative analysis of the Heckscher-Ohlin and Linder's theories applied to Malaysia. The study seeks to offer a deeper understanding of Malaysia's trade dynamics, the determinants of its export destinations, and the relevance of different trade theories to its trade patterns. The results indicate a stronger alignment with

Linder's theory, specifically observed in the sign of the GDP per capita differential coefficient.

Verico (2020) analyzes Indonesia-Australia bilateral trade, aiming to assess potential relations and long-term investment using Revealed Comparative Advantage and Constant Market Share Analysis. Additionally, it evaluates the impacts of tariff elimination through the GTAP model. The study concludes that Indonesia and Australia have complementary relations, with Indonesia enhancing manufacturing productivity and Australia benefiting from sunrise-to-sunset relations. The research suggests that the Comprehensive Economic Partnership Agreement aligns with their economic needs, indicating potential mutual benefits and sustainable economic relations.



**Table 2.1**  
**Summary of Previous Research**

No	Title & Author(s)	Research Objectives	Research Methodology	Results
1	Recent Trends and Prospects of Bilateral Trade Between Pakistan and Turkey: A Gravity Model Approach (Suvankulov & Ali, 2012).	The passage outlines a two-fold investigation. Firstly, it delves into the recent increase in bilateral trade using the gravity model of international trade as an analytical framework. This involves assessing whether the trade volumes align with benchmarks generated by the augmented	The methodology used cross-sectional data to estimate a gravity model. The data is panel data for the years 1996 – 2009 for 165 countries.	Between 1996 and 2009, Pakistan's exports to Turkey exceeded gravity model predictions, while Turkish exports to Pakistan fell well below projections. In 2009, the model predicted \$749.2 million in Turkish exports, but the actual figure was \$163.1 million.

No	Title & Author(s)	Research Objectives	Research Methodology	Results
		<p>gravity model. Secondly, the passage examines the potential for future bilateral trade, specifically in the context of a proposed free trade agreement between Pakistan and Turkey.</p>		<p>The authors suggest that a Turkish-initiated free trade agreement could align trade volumes with model benchmarks. Pakistan's export structure, mainly textiles and cereals, faces constraints, whereas Turkey's diversified exports, including</p>

No	Title & Author(s)	Research Objectives	Research Methodology	Results
2	Exploring Australia's Global Trade Potential: A Gravity Approach With Panel Data (Rahman, 2009).	The paper explores Australia's global trade potential from 1972 to 2006 by analyzing data with 57 trading partners. It	The study uses estimated coefficients to predict Australia's trade potential with 57 countries	iron, steel, and machinery, offer growth potential under a free trade agreement. The study emphasizes the importance of trade complementarity for successful bilateral trade. The study finds that Australia's bilateral trade is positively influenced by factors like

No	Title & Author(s)	Research Objectives	Research Methodology	Results
		employs the gravity model approach and panel data estimation techniques. Beginning with a theoretical justification for using the gravity model, the paper then estimates augmented gravity models of trade.	globally, utilizing data from 1972 to 2006. Unlike classical gravity models that typically rely on cross-sectional data for specific time periods, this research employs a broader approach.	income, partner openness, shared language, and free trade agreements. Conversely, negative impacts include per capita income differences and distance. The results suggest significant trade potential for Australia with countries like Mexico, Argentina, Uruguay, Austria,

No	Title & Author(s)	Research Objectives	Research Methodology	Results
3	India's Global Trade Potential: The Gravity Model Approach (Batra, 2006).	The article employs the gravity model to estimate India's trade potential. This widely used empirical tool initially analyzes global trade flows in 2000. The coefficients derived from this analysis are subsequently applied to predict India's trade potential.	In this article an augmented gravity model equation has been used to analyze the world trade flows using a sample of 146 countries. The coefficients thus obtained are then used to predict trade potential for India. Ordinary Least Squares with	Peru, India, Brazil, the USA, and others. The study confirms the significance of traditional 'gravity' effects in international trade, backed by t-statistics often exceeding 50. Alternative measures of GNP and purchasing power parity don't alter the

No	Title & Author(s)	Research Objectives	Research Methodology	Results
			cross-section data for the year 2000 have been used for estimation.	significance of explanatory variables. Historical and cultural similarities positively impact bilateral trade. For India's trade potential, the model highlights significant opportunities with China, indicating potential for trade to more than double with barrier



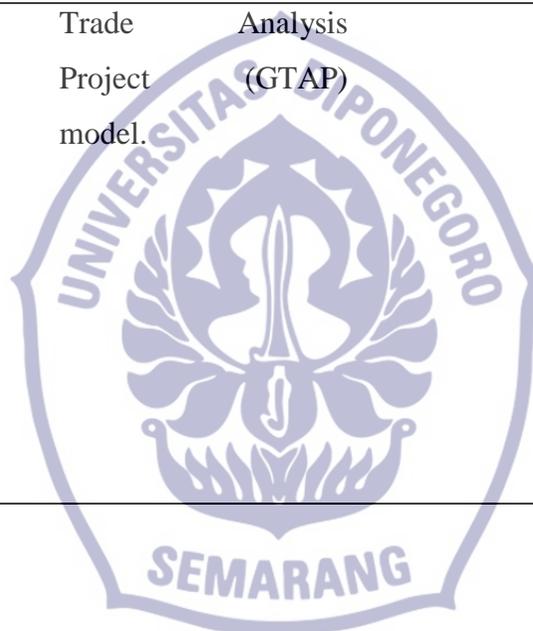
No	Title & Author(s)	Research Objectives	Research Methodology	Results
4	Bilateral Trade and Investment Relations Analysis: Indonesia and South Korea (Verico & Riefky, 2022).	The paper has dual objectives: firstly, evaluating potential trade and long-term investment relations using Revealed Comparative Advantage (RCA) and Constant Market Share Analysis	The paper assesses bilateral trade and investment creation between Indonesia and South Korea using static RCA and dynamic CMSA3 indices under various conditions. Short-	removal. The estimates also point to substantial potential, approximately US\$6.5 billion, with Pakistan. The paper concludes that Indonesia and South Korea can establish complementary bilateral economic relations, benefiting from trade and

No	Title & Author(s)	Research Objectives	Research Methodology	Results
		<p>(CMSA), and secondly, assessing the short-term and long-term impacts following tariff rate removal through the Global Trade Analysis Project (GTAP) model simulation.</p>	<p>term impacts are analyzed through GTAP simulation of trade creation, while long-term impacts are assessed using GTAP simulation on gains from trade through productivity improvement.</p>	<p>investment collaboration. Indonesia stands to gain insights from South Korea's experience in avoiding the Middle-Income Trap through manufacturing development. The study suggests that both nations could experience mutual advantages in short-term trade and long-term</p>

No	Title & Author(s)	Research Objectives	Research Methodology	Results
5	The Heckscher-Ohlin versus Linder's Theory: Evidence from Malaysian Exports (Lai & Bujang, 2016).	The research aims to provide insights into Malaysia's trade dynamics, the factors influencing its export destinations, and the applicability of various trade theories to the country's trade patterns.	This paper analyzes the export destinations of Malaysia and top six trading partners (an average from 1995 – 2012) using gravity model and pooled ordinary least square (OLS) analysis.	productivity improvement. The findings suggest that Malaysia aligns more with Linder's theory, particularly indicated by the coefficient sign of GDP per capita differential.
6	How To Measure Bilateral Economic Relations? Case of Indonesia – Australia	The paper has two main objectives. Firstly, it aims to evaluate potential	This paper analyses the impacts on both the sectors and factors: The GTAP	The paper concludes that Indonesia and Australia have

No	Title & Author(s)	Research Objectives	Research Methodology	Results
	(Verico, 2020).	trade and long-term investment relations using a combination of Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA), with a focus on Terms of Trade (ToT) and Net Export (NX) as filters. Secondly, the paper seeks to measure the potential impacts of tariff rate elimination using the Global	model, this paper combines RCA and CMSA 3.	complementary relations: Indonesia can enhance manufacturing productivity, while Australia can benefit from sunrise to sunset relations. The study suggests that the Comprehensive Economic Partnership Agreement (CEPA) aligns

No	Title & Author(s)	Research Objectives	Research Methodology	Results
		Trade Analysis Project (GTAP) model.		with their economic needs, indicating the potential for mutual benefits and sustainable economic relations between the two countries.

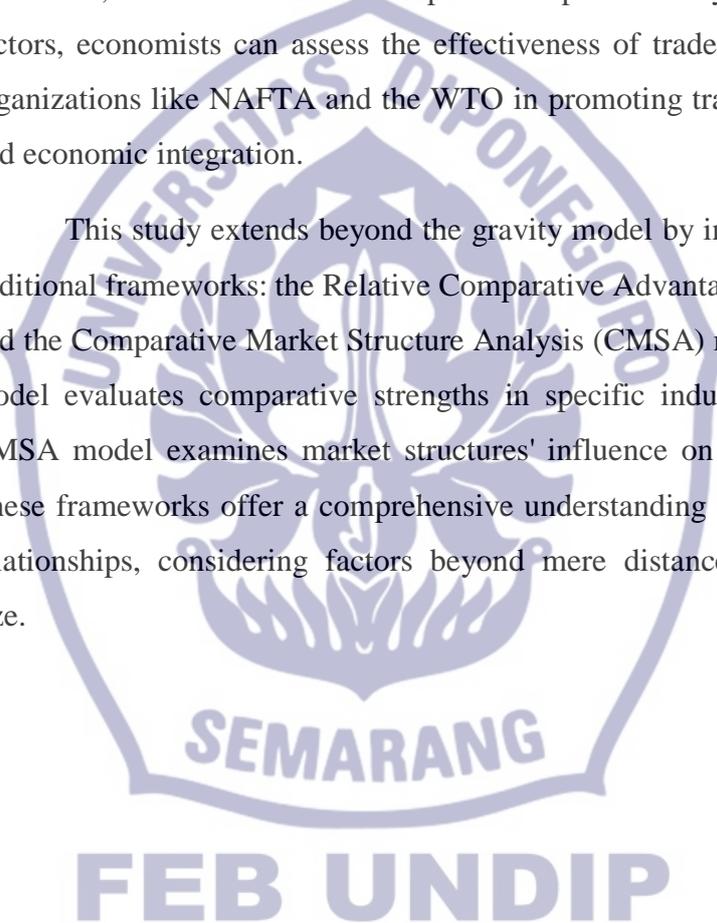


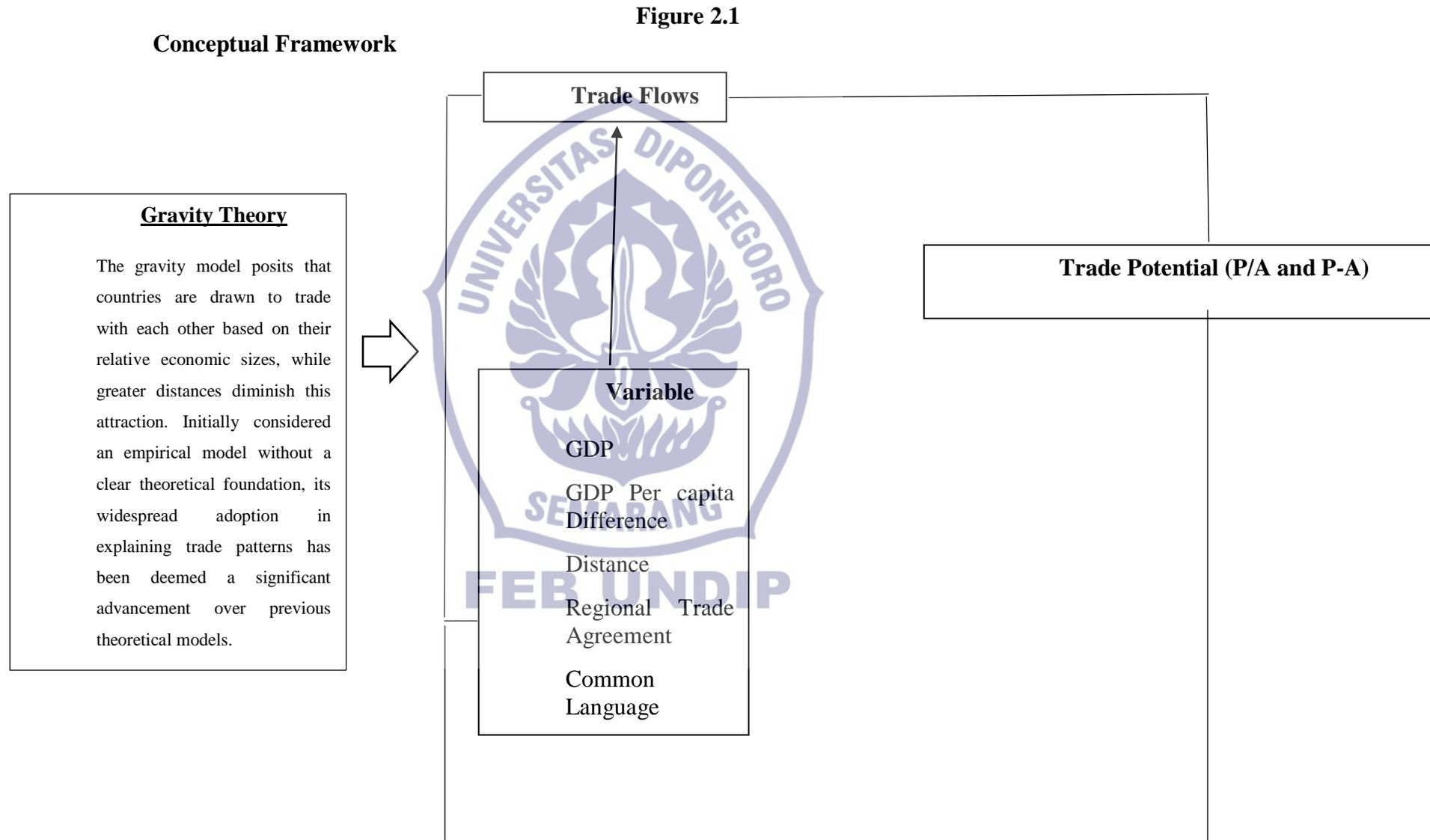
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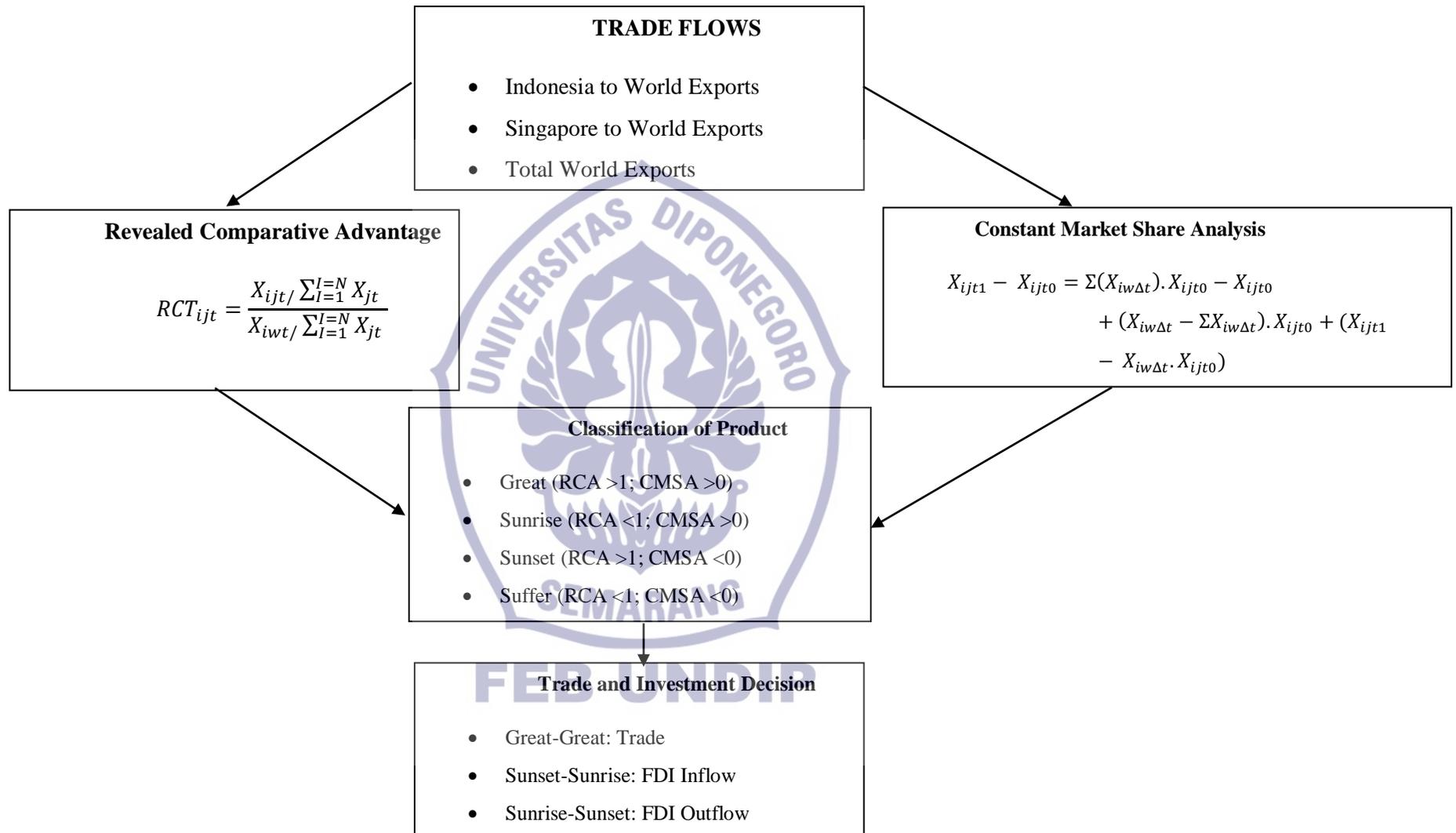
## 2.5 Conceptual Framework

This study adopts the conceptual framework of international trade theory, specifically focusing on the gravity model. This model illustrates how various factors influence bilateral trade flows. Variables such as economic sizes, distances, shared borders, languages, legal systems, currencies, and historical ties all impact trade potential. By analyzing these factors, economists can assess the effectiveness of trade agreements and organizations like NAFTA and the WTO in promoting trade liberalization and economic integration.

This study extends beyond the gravity model by incorporating two additional frameworks: the Relative Comparative Advantage (RCA) model and the Comparative Market Structure Analysis (CMSA) model. The RCA model evaluates comparative strengths in specific industries, while the CMSA model examines market structures' influence on trade dynamics. These frameworks offer a comprehensive understanding of bilateral trade relationships, considering factors beyond mere distance and economic size.



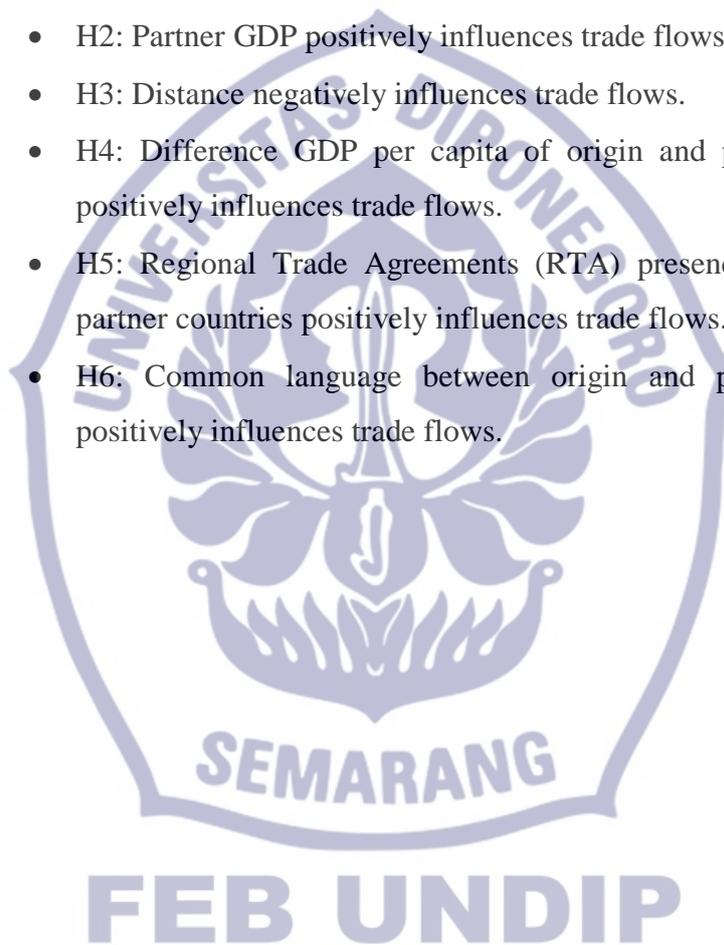




## 2.6 Research Hypothesis

Drawing upon theoretical foundations, the conceptual framework of this study entails:

- H1: There exists a positive influence between origin GDP and trade flows.
- H2: Partner GDP positively influences trade flows.
- H3: Distance negatively influences trade flows.
- H4: Difference GDP per capita of origin and partner countries positively influences trade flows.
- H5: Regional Trade Agreements (RTA) presence in origin and partner countries positively influences trade flows.
- H6: Common language between origin and partner countries positively influences trade flows.



## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Operational Definition of Variables**

First, a variable in research simply can refer to anything such as person, place, thing, phenomenon and many more, a variable is something you are trying to measure in some way. To test cause and effect relationship in a study usually it is measured with independent and dependent variables.

##### **3.1.1 Dependent Variables**

The variable that relies on measurements of other factors and is anticipated to undergo changes due to the deliberate alteration of the independent variable or variables is referred to as the dependent variable. This variable represents the expected outcome or result of the experiment's manipulation and is influenced by changes in the independent variable.

The dependent variable in this study is trade flows (measured in thousand USD), where trade flows are measured as the sum of total export and import of exporters' countries annually. Following the previous study such as Batra (2006), Rahman (2009), Ali (2012) they all use the same dependent variables which are trade flows to show the trade potential of a country in their gravity model approach.

##### **3.1.2 Independent Variables (Variables of Interest)**

The variable that remains constant and unaltered by the other variables being measured is known as the independent variable. This represents the aspect of an experiment that the researcher intentionally changes in a systematic manner. It is considered the assumed source of influence or causation (Bhandari, 2023).

The independent variables in this study are the GDP of origin and partner countries, the distance between most populated cities of the exporters and importers countries and GDP per capita difference of both countries. In previous study such as Rahman (2009) and Batra (2006) use the same independent variable.

The other independent variables in this study are 2 dummy variables which are RTA (regional trade agreement) of both countries and Common Official/ Primary language. The model control for RTA is because not only Indonesia and Singapore are neighboring countries, but we are also in the same association which is ASEAN (Association Southeast Asian Nations). The model control for Common Officials is because Indonesia and Singapore have a history that goes way back even before Singapore separated from Malaysia. Indonesia and Singapore have a long line of history because we have the same roots.

### 3.1.3 Operational Variables

No.	Variable	Scale Measurment
1.	Trade Flow ( $\ln X_{ijt}$ )	Logarithm
2.	GDP Origin Country ( $\ln GDP_{it}$ )	Logarithm
3.	GDP Destination Country ( $\ln GDP_{jt}$ )	Logarithm
4.	GDP Per Capita Difference ( $\ln GDP_{PERCAPDIFF}_{ijt}$ )	Logarithm
5.	Distance Between Country ( $\ln DISTANCE_{ij}$ )	Logarithm
6.	Regional Trade	Linear

	Agreement ( $RTA_t$ )	
7.	Common Language ( $Com.Lang_t$ )	Linear

### 3.2 Types and Data Sources

The data used in this study is collected from CEPII for the gravity model and Trade Map for the RCA-CMSA. CEPII is a gravity database that gathers a set of variables to estimate gravity equations. The data spans from 1948-2019 and includes 2 countries. In this study to calculate the trade potential of Indonesia and Singapore this study uses the date from 2015-2019 only. Trade map on the other hand is a form of tables, graphs, and maps - indicators on export performance, international demand, alternative markets, and competitive markets, as well as a directory of importing and exporting companies.

The data that this study collected from trade map are including Indonesia exports values to world, Singapore exports values to world, and world to world export values. The export data that this study uses for RCA-CMSA is from 2015-2019. This study chose 2015-2019 to observe the export dynamics and potential trade of Indonesia and Singapore within those time frame, where those periods were still in normal condition before the COVID-19 pandemic hit the global economies.

### 3.3 Data collection method

The data used in this study is secondary data, where data is collected through a variety of literature study by collecting information using the method of documentation. The basis data that this study uses is from CEPII and Trade map. CEPII sources are from the World Bank, WTO, IMF, and a variety of researchers. Trade map sources that this study uses are from IE Singapore, UN Comtrade, and BPS-Statistic Indonesia.

### 3.4 Data analysis method

#### 3.4.1 Augmented Gravity Model

To assess the trade potential between Indonesia and Singapore, this study adopts the augmented gravity model. The original gravity model first presented by Tinbergen in 1962, was rooted in a simple analogy of Newton Law of Universal Gravity which explained that trade flows are positively affected by the economic size of both origin and destination countries, and negatively affected by the distance between both countries. The main model equation of this study is:

$$\ln X_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln GDP_{PERCAPITA}_{ijt} + \beta_4 \ln DISTANCE_{ij} + \beta_5 \ln RTA_t + \beta_6 \ln Com.Lang_t + \varepsilon_{ij} \dots \dots \dots$$

(3.1)

Where:

**i** = Origin country

**j** = Partner Country

**t** = Time

This study use log of trade flows ( $\ln X_{ijt}$ ) which is the dependent variable, the variable control which is referred to the Tinbergen's gravity model are consist of log exporters' GDP ( $\ln GDP_{it}$ ), log of importers' GDP ( $\ln GDP_{jt}$ ), and log of distance between most populated city of the exporters and importers countries ( $\ln DISTANCE_{ij}$ ). The distance plays a big role because transportation cost is an important factor of trade.

Rahman (2009) implied that transport costs are proxied by the distance. Therefore, the volume of trade between two nations is inevitably influenced by their distance from one another. Doing business remotely involves three types of expenses: direct shipping costs, time-related costs, and costs connected to (cultural)

unfamiliarity. Shipping expenses stand out among them (Frankel 1997 cited Linnemann 1966).

To test whether Linder hypothesis or South-South (developing-developing countries) or Heckscher-Ohlin hypothesis or North-South (developed-developing countries) trade is more beneficial, referred to Atabay (2015) and Rahman (2009), this study also used the absolute value of GDP per capita differential between exporting and importing countries ( $\ln GDPPERCAPDIFF_{ijt}$ ), where negative coefficient of GDP per capita differential will attest that South-South trade is more preferable and positive coefficient GDP per capita differential will attest that North-South trade is more preferable.

This study uses 2 dummy variables for the control variables. The first one is Regional Trade Agreement ( $\ln RTA_t$ ). Following the previous study Rahman (2009) Countries frequently sign regional trading agreements to ease commerce. According to Oguledo and Macphee (1994), preferential agreements are both trade-enhancing and statistically significant. Because of their presumably comparable cultures or cultural ancestries, consumption and production patterns, member nations in the trade group are more likely to have incentives for trade with one another.

According to Conte et al. (2021), a country's  $RTA=1$  if that country is involved in any type of regional trade cooperation in a specific year. RTA, which refers to WTO classification, includes Partial Scope Agreements (PSA), Free Trade Agreements (FTA), Economic Integration Agreements (EIA), and Customs Union (CU). The second one is a common official or primary language ( $\ln Com.Lang_t$ ). Batra (2006) shows that distance is when two countries share a common language it is expected to reduce transaction cost as it helps facilitate trade negotiations.

This study uses gravity finding to assess the trade potential by contrasting the expected and actual value of trade flow, citing Batra (2006) and Rahman (2009). In those studies, it was further revealed that the ratio of expected to actual value ( $P/A$ ), along with the difference between predicted and actual value ( $P-A$ ), may be used to determine the potential for trade between two nations. Potential for bilateral trade is shown by a predicted-to-actual value ratio larger than 1 and a positive difference between the two.

In assessing the panel data regression, this study compares the estimation using Pooled OLS, fixed effect, and random effect, which also aimed to check the consistency of the gravity model estimation between those methodology. Pooled OLS estimation is simply an OLS technique on panel data. Therefore, all individually specific effects are completely ignored. Due to that, a lot of basic assumptions like orthogonality of the error term are violated.

Pooled OLS method that is used to estimate the relationship between a dependent variable and one or more independent variables in panel data while accounting for the correlations between observations within individuals or entities. Fixed effect assumes that differences between individuals can be accommodated from differences in intercepts. To estimate the fixed effects model panel data using a dummy variable technique to capture differences in intercepts between companies, differences in intercepts can occur due to differences in work culture, managerial and incentives.

Random effect model will estimate panel data where the disturbance variables may be related to each other over time and between individuals. In the random effect model, the difference in intercepts is accommodated by the error terms of each company. The advantage of using the random effects model is that it eliminates heteroscedasticity.

To address the issue of zero trade flows and heteroscedasticity, this study also exercises the Pseudo Poisson Maximum Likelihood (PPML) methodology, as suggested by Silva and Tenreyro (2006). As an alternative model, the PPML estimation presented in this study also using this alternative equation:

$$X_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DISTANCE_{ij} + \beta_4 RTA_{it} + v_{ij} \dots \dots \dots (3.2)$$

### 3.4.2 RCA-CMSA

This paper adopts Revealed Comparative Advantage (RCA) and Constant Market Share Analysis (CMSA). This is useful to figure out the bilateral economic relations between Indonesia and Singapore. This is also useful to know the types of products/commodities can enhance economic cooperation between Indonesia and Singapore as developing countries and the types of products/commodities can increase long-term investment between Indonesia and Singapore as developing countries.

This combination analysis adopts tradable goods of HS4 levels. The RCA is utilized to assess the static position of the product and the CMSA is applied to evaluate its dynamic movement. The study of Verico (2020) revealed that the combination of RCA CMSA can describe Indonesia and Singapore economic relation, either trade or long-run investment relations.

The equation for the RCA is:

$$RCT_{ijt} = \frac{\frac{x_{ijt}}{\sum_{i=1}^{i=N} x_{jt}}}{\frac{x_{iwt}}{\sum_{i=1}^{i=N} x_{jt}}} \dots \dots \dots (3.3)$$

Where:

**I** = tradable good of export (X) from country j in time t

**W** = world data

**N** = the latest HS 4 tradable goods

The Equation for the CMSA is:

$$X_{ijt1} - X_{ijt0} = \Sigma(X_{iw\Delta t}) \cdot X_{ijt0} - X_{ijt0} + (X_{iw\Delta t} - \Sigma X_{iw\Delta t}) \cdot X_{ijt0} + (X_{ijt1} - X_{iw\Delta t} \cdot X_{ijt0}) \dots \dots \dots (3.4)$$

Where:

$\Sigma(X_{iw\Delta t}) \cdot X_{ijt0} - X_{ijt0}$  is General Factor (CMSA1)

$(m_{iw\Delta t} - \Sigma m_{iw\Delta t}) \cdot X_{ijt0}$  is Composition Factor (CMSA2)

$(X_{ijt1} - m_{iwj\Delta t} \cdot X_{ijt0})$  is Comparative Factor (CMSA 3)

There are 3 models of CMSA, this paper applies the combination of the RCA with the comparative factors that are entitled to CMSA3. This study also referred to Verico (2020) to classify the industry and determine the bilateral economic cooperation potential which based on RCA-CMSA estimation as displayed in Table 3.1 and 3.2 below.

**Table 3. 1**  
**Industry Classification based on RCA-CMSA estimation**

<b>Classification</b>	<b>Explanation</b>	<b>Conditions</b>
<b>Great</b>	Great is when the industry of the product is good, and the product is also good.	$RCA > 1$ ; $CMSA3 > 0$
<b>Sunrise</b>	Sunrise is when the industry of the product is not that good but also is growing	$RCA < 1$ ; $CMSA3 > 0$
<b>Sunset</b>	Sunset is when the industry of the product is rising but the growth of the product is bad.	$RCA > 1$ ; $CMSA3 < 0$
<b>Suffer</b>	Suffer is when the industry of the product is bad, and the growth of the product is bad.	$RCA < 1$ ; $CMSA3 < 0$

Source: Verico (2020)

**Table 3. 2**  
**Bilateral potential based on product-status comparison**

<b>Bilateral Cooperation</b>	<b>Origin Country Classification</b>	<b>Partner Country Classification</b>
	Great	Great
<b>Trade</b>	Suffer	Suffer
<b>FDI Inflow</b>	Sunset	Sunrise
<b>FDI Outflow</b>	Sunrise	Sunset

Source: Verico (2020)

According to Table 3.2 when bilateral countries product classification is “Great-Great” or “Suffer-Suffer”, those products are potentially to be traded among those bilateral countries. If one countries product is “Sunset” and the other is “Sunrise”, the “Sunrise” countries should invest in “Sunset” countries, and vice versa.

The analysis' time frame is from 2015 to 2019. The reason is in line with the previous gravity estimation, to select the time frame within the normal economic condition before the global epidemic damages the global economy.

## **CHAPTER IV**

### **RESULTS AND DISCUSSIONS**

#### **4.1 Overview of Research Object**

##### **4.1.1 Research Area**

This study investigates the economic status of both Indonesia and Singapore. Indonesia, the leading economy in Southeast Asia, has undergone substantial progress and advancement in the recent years. In 2019, Indonesia's economy exhibited consistent expansion, featuring an anticipated 5.1 percent growth in GDP, buoyed by contributions from private consumption, government spending, and fixed investment (World Bank, 2019).

In the face of worldwide challenges such as diminishing global trade volume, falling international commodity prices, and a slowdown in global economic growth, Indonesia's economy displayed resilience. In 2019, it sustained a growth rate of 5.02%, primarily upheld by robust domestic demand (Bank Indonesia, 2019). The nation's economic expansion was additionally supported by increasing household incomes, employment opportunities, and minimal inflation, all of which played a role in fostering strong consumer expenditure (ADB, 2019).

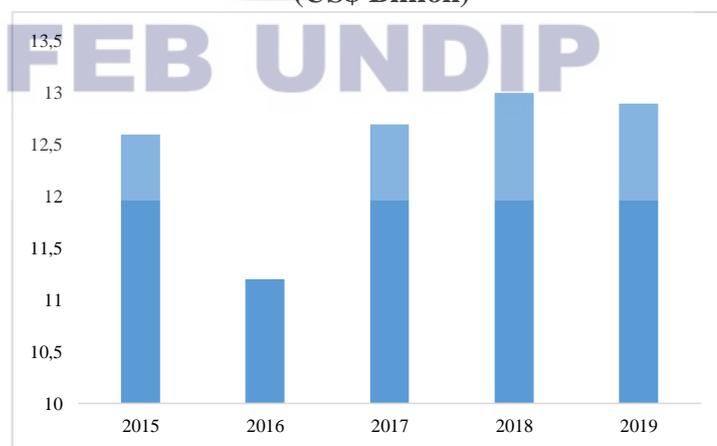
Despite Indonesia's significant standing as a major economy in Southeast Asia, it remains categorized as an emerging economy nation. In contrast, Singapore, its neighboring country, is recognized as a developed high-income economy boasting a gross national income of US\$54,530 per capita as of 2017 (World Bank, 2017). In 2019, the economic growth of Singapore registered a

0.7% increase, marking the slowest annual pace since 2009 and a decline from the 3.1% recorded in 2018 (Ting, 2019). The nation's economy depends significantly on exports, particularly in the fields of electronics, chemicals, and precision engineering (Ministry of Trade and Industry Singapore, 2019). Despite the difficulties encountered in 2019, the economy of Singapore continues to stand as one of the most competitive and business-friendly globally, emphasizing a robust commitment to innovation and technology.

#### 4.1.2 Trade and Investment in Indonesia and Singapore

In the case of Indonesia, the nation's trade metrics underscore the pivotal role of trade in its economic landscape, where both exports and imports play crucial roles in fostering growth and development (World Bank, 2015). Likewise, Singapore's trade value and trade balance serve as indicators of the vital role trade plays in its economic framework, with trade representing a substantial portion of its GDP. These trade metrics mirror the country's integration into the global economy and its dependence on trade for economic well-being (World Bank, 2019).

**Figure 4.1**  
**Indonesia Export Values to Singapore from 2015 – 2019**  
**(US\$ Billion)**



Source: United Nations COMTRADE (2024)

In 2015, Indonesia's intermediate goods trade recorded exports of US\$39,131 million and imports of US\$46,962 million. By 2019, raw materials exports were valued at US\$37,308 million, and imports were US\$21,660 million. Despite challenges, Indonesia achieved a trade surplus of USD 33.63 billion in 2019, with a 5.02% growth rate. The projected economic growth for the same year was 5.1%, driven by private consumption, government spending, and fixed investment, highlighting the country's resilience amid global economic slowdown (World Bank, 2019).

In 2015, Singapore's merchandise trade totaled USD 84.08 billion, growing to approximately USD 111.11 billion in 2019, with exports at USD 661.71 billion and imports at USD 44.39 billion (World Bank, 2019). Despite a general increase in trade, Singapore's economy slowed to a 0.7% growth rate in 2019 due to global economic challenges and the U.S.-China trade tensions affecting its export-focused economy (Al Jazeera, 2020).

Trade and investment are closely linked, and alterations in one can markedly influence the other. An advantageous trade setting has the potential to draw in investments, and concurrently, investments can strengthen a nation's trade capabilities and competitive position. Indonesia's Foreign Direct Investment (FDI) rose steadily from \$19.78 billion in 2015 to its peak at \$24.99 billion in 2019, marking a significant 32.17% increase from 2018. The FDI percentages relative to the country's GDP fluctuated during this period, reaching 2.30% in 2015, dipping to 0.49% in 2016, and rebounding to 2.23% in 2018 (World Bank, 2019). Nevertheless, Singapore's Foreign Direct Investment (FDI) demonstrates varying figures. It stood at 22.7% in 2015, declined to 20.5% in 2016, experienced an increase to 29.8% in 2017,

followed by a decrease to 21.5% in 2018, and settled at 22.5% in 2020 (World Bank, 2019).

#### 4.2 Descriptive Statistics

Table 4.1 below displays the summary statistics of the gravity estimation in this study. The gravity estimation adopts all observations from CEPII gravity database, which includes 252 countries within time frame of 1948-2021. However, there are some observations which excluded, such as observations which have the same origin and destination countries, and some filtered redundant observations.

**Table 4.1**  
**Summary Statistics**

Variable	Obs	Mean	Std.Dev.	Min	Max
Trade Flow	820000	407000	4610000	.001	4.80e+08
GDP origin	2830000	1.67e+08	9.37e+08	8824.746	2.30e+10
GDP destination	2830000	1.66e+08	9.37e+08	8824.746	2.30e+10
GDP per capita difference	1910000	11.197	18.891	0	193.705
Distance	3530000	8627.387	4721.298	0	19939
FTA	3530000	.039	.194	0	1
Common Language	3240000	.194	.396	0	1

Measured in thousands current US\$, trade flow observations in this gravity estimation in average is 407 million US\$. The average Gross Domestic Product across countries and years in this study is 167 billion US\$. GDP per capita difference in average is around 11.000 US\$, reflecting a considerably high gap of income per capita among observed countries. Bilateral distance in average is 8627.4 km, which almost tenfold

of distance between Indonesia and Singapore. FTA and common language as dummy variables in average are below 0.5, showing that most countries are bilaterally not involved in the regional trade agreement and does not have a common language.

### **4.3 Selection Methods for Panel Data Model**

Panel data model consists of at least three primary regression techniques: pooled ordinary least squares (OLS), fixed effects, and random effects. All those regression models have their strengths and weaknesses. This subchapter explains the selection process of determining the most appropriate model to estimate the gravity equation.

To determine the most suitable panel data model, this study conducts Chow test and Hausman test. Chow test can provide valuable information if there are structural differences between group or time periods, where structural change existence indicates individual-specific effects which preferring the econometric estimation using fixed effects relative to pooled OLS. The Chow test for the gravity model in this study shows p-value (Prob>F) of less than alpha (0.05). Therefore, fixed effect model is more preferred compared to pooled OLS.

To compare between fixed effects model and random effects model, this study conducts Hausman test. Hausman test can provide information about the endogeneity of unobserved individual effects with the independent variables. The Hausman test shows Prob>chi2 of less than alpha (0.05), which reject the hypothesis that the difference in coefficients is not systematic. Therefore, based on both Chow and Hausman test (see Appendix), fixed effect model is more suitable relative to random effect and pooled OLS model.

### **4.4 Gravity Estimation Results**

Table 4.2 below present the gravity estimation fixed effects and PPML. Based on the selection tests, this subchapter focuses more on the

discussion of the gravity estimation using the fixed effect model. Both GDP origin and destination show positive coefficients with higher coefficients of GDP origin, where a 1% increase in GDP origin would increase bilateral trade flows by 0.7%, and a 1% increase in GDP destination would increase bilateral trade flows by 0.5%. Distance's coefficient of -0.445 shows negative correlation with trade flows. Those results are in line with the gravity theory and previous studies that used gravity estimation (Suvankulov & Ali, 2012; Rahman, 2009; Batra, 2006).

Regarding the GDP per capita differential, it shows negative coefficients, where a 1% increase in GDP per capita differences would decrease bilateral trade flows by 0.18%. This finding supports the Linder hypothesis similar with the result that conducted by Lai and Bujang (2016) that bilateral trade is preferably for countries with similar GDP per capita (developing-developing and developed-developed) and opposes the Heckscher-Ohlin hypothesis. Although this finding does not support bilateral trade between Indonesia and Singapore, it does not imply that Indonesia and Singapore trade has achieved the optimum level.

This study uses two control variables: RTA and common language. The augmented gravity model shows a positive relationship between RTA and bilateral trade activity. Specifically, when two countries engage in RTA, their trade volume tends to increase by 0.2%. This finding is similar to previous research conducted by Dianzah & Nathania (2022), which shows that RTA has positive outcomes with trade flows.

In this model, the common language variable is excluded due to the fixed effect model's strategy of omitting one category from a series of dummy variables to prevent perfect multicollinearity. However, alternative models show a positive correlation, consistent with previous research indicating that a common language positively influences trade flows, as demonstrated by Kataria & Raman (2022).

Overall, compared with other models (pooled OLS, random effect, and PPML), all variables show similar results which support the gravity theory and Linder hypothesis.

**Table 4. 2**  
**Augmented Gravity Estimation**

Independent Variables	(1) FE	(2) PPML
Origin GDP	0.712*** (0.00435)	0.793*** (0.00486)
Destination GDP	0.503*** (0.00429)	0.776*** (0.00511)
GDP per Capita differential	-0.178*** (0.00429)	
Distance	-0.445*** (0.0773)	-0.678*** (0.00820)
RTA	0.203*** (0.00927)	0.248*** (0.0212)
Common Language		0.515*** (0.0231)
Constant	-9.141*** (0.665)	-11.68*** (0.181)
Observations	729,863	733,077
R-squared	0.382	0.590
Number of country pairs	32,776	

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Author's calculation (2023)

#### 4.5 Classical Assumption Tests

This research also conducts several classical assumption tests to detect the presents of heteroscedasticity, autocorrelation and multicollinearity test. Some tests are conducted: modified Wald test, Woolridge test, and variance inflation factor test.

##### Heteroscedasticity Test

To detect the possibility of heteroscedasticity, which occurs when the residuals' variance is not constant that may lead to biased standard error. This study adopts modified Wald test. This test can detect the presence of heteroscedasticity in the fixed effect model.

**Table 4.3**  
**Heteroscedasticity Test**

Chi2 (32778)	9.6e+31
Prob > Chi2	0.0000

Based on table 4.3, given that the prob>chi2 is less than the significance level (0.05), than the data used in this study is detected with heteroscedasticity issue. To address this issue, this study adopts Pseudo-Poisson Maximum Likelihood (PPML) to estimate the trade potential.

##### Autocorrelation Test

To detect the possibility of autocorrelation, which occurs when the error terms in the model are correlated over time, this study adopts Woolridge test. This test is modified from Breusch-Godfrey LM test for fixed effect model. Based on table 4.4, given that the prob>F is less than the significance level, the data indicated with the issue of autocorrelation.

**Table 4. 4**  
**Woolridge Test**

F (1, 25821)	3890.217
Prob > F	0.0000

#### Multicollinearity Test

Multicollinearity occurs when there is linear correlation among independent variables. To detect the multicollinearity issue, this study adopts variance inflation factor (VIF) to measure the correlation within the independent variables in the model. Based on table 4.4, overall, there is strong correlation ( $VIF > 10$ ) among independent variables in the model. It is not uncommon to have multicollinearity issue in gravity model, given that bilateral distance and economic size are likely interrelated.

**Table 4. 5**  
**Variance Inflation Factor Test**

Variable	VIF	1/VIF
Distance	73.50	0.013606
GDP Origin	52.41	0.019081
GDP Destination	39.26	0.025474
GDP per Capita Difference	3.11	0.321940
FTA	1.38	0.722928
Mean VIF	33.93	

#### 4.6 Measuring Trade Potential of Indonesia and Singapore

Referring to Batra (2006) and Rahman (2009), this research utilizes gravity models to estimate trade potential through a comparison of predicted and actual trade flow values. These studies elaborate on the idea that anticipating trade potential between two nations involves computing the ratio of predicted to actual values (P/A) and considering the gap

between predicted and actual values (P-A). The identification of bilateral trade potential is signaled by a ratio of predicted to actual values greater than 1, accompanied by a positive gap between predicted and actual values.

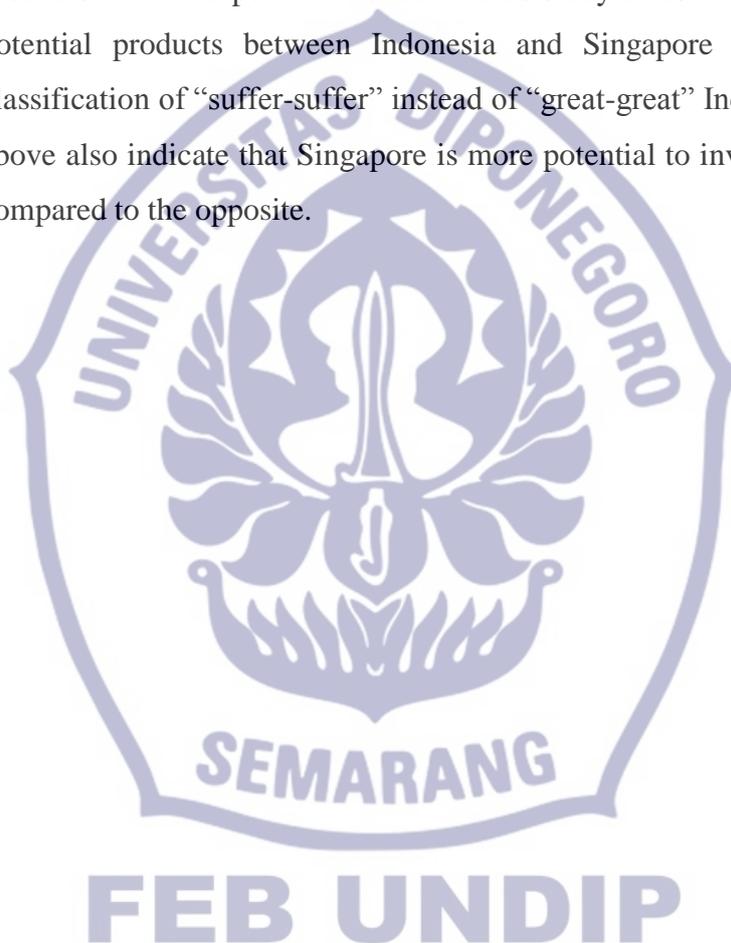
**Table 4. 6**  
**Gap of predicted and actual trade flow (P-A), Indonesia-Singapore**

	<b>Predicted Value/Actual Value (natural form)</b>	<b>Predicted Value-Actual Value (natural form) Billion USD</b>
<b>2015</b>	0,441164698	-6,32999194
<b>2016</b>	61661,82951	622808,0201
<b>2017</b>	66298,78247	745768,9932
<b>2018</b>	72076,88259	818823,8087
<b>2019</b>	83200,11442	863614,2039

This study estimates the trade potential between Indonesia and Singapore using PPML model to address issue of heteroskedasticity and zero trade flows. It calculates the predicted trade flows value of Indonesia and Singapore using the specific gravity data of Indonesia and Singapore within 2015-2019, which calculated with the previous PPML estimation in table 4.2 column (5). According to trade potential estimation in table 4.5, Indonesia and Singapore over the years are increasing their trade potential gaps. Indonesia and Singapore only have optimized their trade flows in 2015, which indicated by negative gap of predicted and actual trade flows. With increasing trade potential, which its untapped trade potential in 2019 reached 863 trillion USD, Indonesia and Singapore has higher room to increase their trade.

#### 4.7 RCA-CMSA

Table 4.6 below explains HS4 products which classified into some categories (suffer, sunset, sunrise, and great) between Indonesia and Singapore. Indonesia has “suffer-suffer” and “great-great” trade potential with Singapore which is 338 and 13 products. There’s a sum of 351 products that have potential to trade. This study finds that the most trade potential products between Indonesia and Singapore come from the classification of “suffer-suffer” instead of “great-great” Indonesia the table above also indicate that Singapore is more potential to invest in Indonesia compared to the opposite.



**Table 4. 7**  
**Product Classification Comparison, Indonesia-Singapore (HS4 Products)**

RCA-CMSA	Singapore					
	Suffer	Sunset	Sunrise	Great	Total	
Indonesia	Suffer	<b>338</b>	31	156	40	565
	Sunset	63	9	<b>30</b>	5	107
	Sunrise	213	<b>20</b>	127	28	388
	Great	86	13	40	<b>13</b>	152
	Total	700	73	353	86	1212

Singapore has 30 products in Indonesia that potentially became investment aims, as we can see from the “sunset-sunrise” table which are the FDI inflow classification. On the other hand, Indonesia has 20 products in Singapore that potentially became investment aim, as we can see from the “sunrise-sunset” table which are the FDI outflow classification. The detail products which potentially to be traded and of investment aims (FDI inflow and outflow) between Indonesia and Singapore are displayed in the Appendix 3-6.

**Table 4. 8**  
**FDI Inflows (Sunset – Sunrise)**

HS Code	Product Label	HS Code	Product Label
'0208	Meat and edible offal of rabbits, hares, pigeons and other animals, fresh, chilled or frozen ...	'5513	Woven fabrics containing predominantly, but < 85% synthetic staple fibres by weight, mixed ...
'0901	Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes ...	'6105	Men's or boys' shirts, knitted or crocheted (excl. nightshirts, T-shirts, singlets and other ...
'0902	Tea, whether or not flavoured	'6204	Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, ...
'1203	Copra	'6402	Footwear with outer soles and uppers of rubber or plastics (excl. waterproof footwear of heading ...
'1513	Coconut "copra", palm kernel or babassu oil and fractions thereof, whether or not refined, ...	'6403	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...
'1704	Sugar confectionery not containing cocoa, incl. white chocolate	'6404	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...
'2302	Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, ...	'6909	Ceramic wares for laboratory, chemical or other technical uses; ceramic troughs, tubs and similar ...
'2619	Slag, dross, scalings and other waste from the manufacture of iron or steel (excluding granulated ...	'6911	Tableware, kitchenware, other household articles and toilet articles, of porcelain or china ...
'2701	Coal; briquettes, ovoids and similar solid fuels manufactured from coal	'7201	Pig iron and spiegeleisen, in pigs, blocks or other primary forms
'2711	Petroleum gas and other gaseous hydrocarbons	'7207	Semi-finished products of iron or non-alloy steel
'3401	Soap; organic surface-active products and preparations for use as soap, in the form of bars, ...	'7408	Copper wire (excl. surgical sutures, stranded wire, cables, plaited bands and the like and ...
'4003	Reclaimed rubber in primary forms or in plates, sheets or strip	'8476	Automatic goods-vending machines, e.g. postage stamp, cigarette, food or beverage machines, ...

HS Code	Product Label	HS Code	Product Label
'4414	Wooden frames for paintings, photographs, mirrors or similar objects	'8528	Monitors and projectors, not incorporating television reception apparatus; reception apparatus ...
'4822	Bobbins, spools, cops and similar supports of paper pulp, paper or paperboard, whether or not ...	'9202	String musical instruments, e.g. guitars, violins, and harps (excl. with keyboard)
'5202	Cotton waste, incl. yarn waste and garnetted stock		
'5509	Yarn of synthetic staple fibres (excl. sewing thread and yarn put up for retail sale)		

**Table 4. 9**  
**FDI Inflows (Sunrise – Sunset)**

HS Code	Product Label	HS Code	Product Label
'1505	Wool grease and fatty substances derived therefrom, incl. lanolin	'8543	Electrical machines and apparatus, having individual functions, n.e.s. in chapter 85 and parts ...
'2208	Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs and other spirituous ...	'8706	Chassis fitted with engines, for tractors, motor vehicles for the transport of ten or more ...
'2710	Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing ...	'8905	Light-vessels, fire-floats, dredgers, floating cranes, and other vessels the navigability of ...
'2906	Cyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives	'9006	Photographic cameras, photographic flashlight apparatus and flashbulbs (excl. discharge lamps ...
'2933	Heterocyclic compounds with nitrogen hetero-atom[s] only	'9015	Surveying, incl. photogrammetrical surveying, hydrographic, oceanographic, hydrological, meteorological ...
'2935	Sulphonamides	'9018	Instruments and appliances used in medical, surgical,

HS Code	Product Label	HS Code	Product Label
'3809	Finishing agents, dye carriers to accelerate the dyeing or fixing of dyestuffs and other products ...	'9020	dental or veterinary sciences, incl. ... Breathing appliances and gas masks (excluding protective masks having neither mechanical parts ...
'3902	Polymers of propylene or of other olefins, in primary forms	'9026	Instruments and apparatus for measuring or checking the flow, level, pressure or other variables ...
'4014	Hygienic or pharmaceutical articles, incl. teats, of vulcanised rubber (excl. hard rubber), ...	'9033	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, ...
'4811	Paper, paperboard, cellulose wadding and webs of cellulose fibres, coated, impregnated, covered, ...		
'8484	Gaskets and similar joints of metal sheeting combined with other material or of two or more ...		

**Table 4. 10**  
**Trade (Suffer – Suffer and Great – Great)**

HS Code	Product Label	Indonesia's Export to World	Singapore's Export to World	Share to Total Indonesia's Export	Share to Total Singapore's Export
'7108	Gold, incl. gold plated with platinum, unwrought or not further worked than semi-manufactured ...	3552076	11562255	2,12%	2,96%
'4802	Uncoated paper and	2242034	651320	1,34%	0,17%

HS Code	Product Label	Indonesia's Export to World	Singapore's Export to World	Share to Total Indonesia's Export	Share to Total Singapore's Export
'2709	paperboard, of a kind used for writing, printing or other graphic purposes, ... Petroleum oils and oils obtained from bituminous minerals, crude	1726630	15	1,03%	0,00%
'8708	Parts and accessories for tractors, motor vehicles for the transport of ten or more persons, ...	1705438	1879407	1,02%	0,48%
'3004	Medicaments consisting of mixed or unmixed products for therapeutic or prophylactic uses, put ...	412130	4331831	0,25%	1,11%
'9503	Tricycles, scooters, pedal cars and similar wheeled toys; dolls' carriages; dolls; other toys; ...	405292	81881	0,24%	0,02%
'8504	Electrical transformers, static converters, e.g. rectifiers, and inductors; parts thereof	335643	1422519	0,20%	0,36%
'3923	Articles for the conveyance or packaging of goods, of plastics; stoppers, lids, caps	330844	280291	0,20%	0,07%



HS Code	Product Label	Indonesia's Export to World	Singapore's Export to World	Share to Total Indonesia's Export	Share to Total Singapore's Export
'4002	and other ... Synthetic rubber and factice derived from oils, in primary forms or in plates, sheets or strip; ...	274195	1002754	0,16%	0,26%
'8518	Microphones and stands therefor (excl. cordless microphones with built-in transmitter); loudspeakers, ...	255211	422875	0,15%	0,11%
'3808	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth ...	244431	460078	0,15%	0,12%
'8429	Self-propelled bulldozers, angledozers, graders, levellers, scrapers, mechanical shovels, excavators, ...	243144	174634	0,15%	0,04%
'7308	Structures and parts of structures "e.g., bridges and bridge-sections, lock-gates, towers, ...	205955	185320	0,12%	0,05%
'8421	Centrifuges, incl. centrifugal dryers (excl. those for	196209	704386	0,12%	0,18%

HS Code	Product Label	Indonesia's Export to World	Singapore's Export to World	Share to Total Indonesia's Export	Share to Total Singapore's Export
	isotope separation); filtering or purifying ...				



## **CHAPTER V**

### **CONCLUSION**

#### **5.1 Conclusion**

The bilateral trade and investment relations between Indonesia and Singapore from 2015 to 2019 showcase a significant evolution from uncertainty to robust collaboration. This relationship, marked by the establishment of ASEAN, has led to substantial economic cooperation, with Singapore emerging as a major investor in Indonesia since 2014. The trade volume between the two nations reached \$6.5 billion in 2019, underscoring their deep economic engagement. Furthermore, collaboration extends beyond economics into areas such as education, culture, defense, and environmental initiatives. The partnership is mutually beneficial, with investment playing a crucial role in Indonesia's economic progress. Sustaining this relationship requires continued efforts to foster prosperity and stability in the region amidst evolving geopolitical and economic dynamics. Therefore, it is imperative to assess the extent to which the bilateral relations between Indonesia and Singapore foster reciprocal advantages capable of perpetuating the durability of their trade and investment partnerships. Consequently, the primary focus of this inquiry lies in conducting a thorough evaluation entitled "**Analysis of Bilateral Trade and Investment Relations between Indonesia and Singapore during the Period 2015 – 2019.**"

This research employed international trade theory, utilizing the augmented gravity model and RCA-CMSA. The dependent variable examined in this study is trade flows, while the independent variables include the GDP of Indonesia and Singapore, as well as the distance between their most populated cities. Additionally, GDP per capita for both nations is considered. Two dummy variables were incorporated to account for the regional trade agreement of both countries and their common official language. The dataset

spans from 1948 to 2019, focusing on Indonesia and Singapore. However, the analysis of trade potential was conducted for the period between 2015 and 2019. The statistical software STATA 17 was utilized for data analysis.

Based on the calculations conducted, the following conclusions can be drawn from this study:

1. In the fixed effect model, both Indonesia's and Singapore's GDP exhibit positive coefficients, with Indonesia showing a stronger impact. Distance has a negative correlation with trade flows, consistent with gravity theory. Negative coefficients for GDP per capita differences indicate a preference for bilateral trade between countries with similar GDP per capita levels. Regional Trade Agreements (RTA) are positively correlated with trade flows, and common language also shows a positive association in other models.
2. In 2015, Indonesia and Singapore managed to optimize their trade flows, as evidenced by a negative gap between predicted and actual trade flows. With the increasing trade potential, reaching an untapped trade potential of 863 trillion USD in 2019, Indonesia and Singapore have significant room for further increasing their trade.
3. The most potential trade products between Indonesia and Singapore fall under the “suffer-suffer” classification. Singapore shows greater potential for investing in Indonesia, with 30 products identified for investment, compared to Indonesia's 20 products for potential investment in Singapore.

## 5.2 Research Limitation

Because this study confines its analysis to the specific timeframe of 2015 to 2019, several limitations arise:

1. The study focuses solely on the period from 2015 to 2019, potentially overlooking longer-term trends or fluctuations.
2. The analysis relies on available data, which may not encompass all relevant factors or nuances.
3. Certain factors or nuances may not have been accounted for in the analysis, potentially affecting the comprehensiveness of the findings.

## 5.3 Suggestion and Further Research

Drawing from the findings and recognizing the research limitations, the following recommendations are proposed for this study:

1. Expand the temporal scope of the study to include a longer period beyond 2019 to capture more comprehensive trends and fluctuations.
2. Incorporate a deeper analysis of contextual factors such as economic policies, geopolitical shifts, and trade agreements to enhance understanding of Indonesia-Singapore trade dynamics.
3. Policymakers should prioritize domestic economic growth to stimulate trade, strengthen existing RTAs or negotiate new ones, bridge the gap in GDP per capita for maximum trade potential, replicate successful trade optimization strategies, and focus on removing barriers, improving infrastructure, and enhancing trade facilitation to capitalize on untapped opportunities.

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SEMARANG  
FEB UNDIP

## APPENDIX

### Appendix 1 Data

	Predicted value (log form)		Predicted value (natural form)
2015	15.424	2015	4997123
2016	27.158	2016	622818120688
2017	27.338	2017	745780242013
2018	27.431	2018	818835169252
2019	27.484	2019	863624583944

	Actual value (log form)		Actual value (natural form)
2015	16.243	2015	11327115.38
2016	16.128	2016	10100545.6
2017	16.236	2017	11248777.34
2018	16.246	2018	11360579.7
2019	16.155	2019	10380088.9

	Predicted Value/Actual Value (log form)		Predicted Value/Actual Value (natural form)
2015	0.949618197	2015	0.441164698
2016	1.68386359	2016	61661.82951
2017	1.68379429	2017	66298.78247
2018	1.688521651	2018	72076.88259
2019	1.701251842	2019	83200.11442

	Predicted Value - Actual Value (log form)		Predicted Value - Actual Value (natural form), thousand USD
2015	-0.818	2015	-6329992
2016	11.029	2016	622808020142
2017	11.102	2017	745768993235
2018	11.185	2018	818823808673
2019	11.329	2019	863614203855

	Predicted Value - Actual Value (natural form), billion USD
2015	-6.32999194
2016	622808.0201
2017	745768.9932
2018	818823.8087
2019	863614.2039



## Appendix 2 Regression Test

### Chow Test

```

Fixed-effects (within) regression           Number of obs   =   729,955
Group variable: countrypair                Number of groups =    32,778

R-sq:                                       Obs per group:
  within = 0.3816                           min =           1
  between = 0.5228                          avg =          22.3
  overall = 0.5151                           max =           59

corr(u_i, Xb) = 0.3275                      F(5,697172)     =   86025.30
                                           Prob > F        =    0.0000

```

### Hausman Test

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fe	(B) re		
loggdp_o	.7121695	.7571984	-.045029	.003059
loggdp_d	.5031382	.4794364	.0237018	.0030335
loggdpcapd~f	-.1787951	-.1719329	-.0068622	.0015684
logdist	-.4408022	-1.324367	.8835648	.0757542
fta_wto	.2031577	.1946609	.0084968	.0012487

b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
        = 5967.40
Prob>chi2 = 0.0000

```

### Heterocedasticity Test

Modified Wald test for groupwise heteroskedasticity  
 in fixed effect regression model

H0:  $\sigma(i)^2 = \sigma^2$  for all i

```

chi2 (32778) = 9.6e+31
Prob>chi2 = 0.0000

```

### Multicollinearity Test

Variable	VIF	1/VIF
logdist	<b>73.50</b>	<b>0.013606</b>
loggdp_o	<b>52.41</b>	<b>0.019081</b>
loggdp_d	<b>39.26</b>	<b>0.025474</b>
loggdpdpcapd~f	<b>3.11</b>	<b>0.321940</b>
fta_wto	<b>1.38</b>	<b>0.722928</b>
Mean VIF	<b>33.93</b>	



**Appendix 3 Trade Potential Products Indonesia – Singapore (Suffer-Suffer)**

Trade		
Live horses, asses, mules and hinnies	Woven fabrics of carded wool or of carded fine animal hair (excl. fabrics for technical use ...	Propellent powders
Live bovine animals	Woven fabrics of cotton, containing $\geq$ 85% cotton by weight and weighing $> 200 \text{ g/m}^2$	Prepared explosives (excluding propellent powders)
Meat of swine, fresh, chilled or frozen	Flax, raw or processed, but not spun; flax tow and waste, incl. yarn waste and garnetted stock	Ferro-cerium and other pyrophoric alloys in all forms; metaldehyde, hexamethylenetetramine ...
Meat of horses, asses, mules or hinnies, fresh, chilled or frozen	True hemp "Cannabis sativa L.", raw or processed, but not spun; tow and waste of true hemp, ...	Photographic film in rolls, sensitised, unexposed, of any material other than paper, paperboard ...
Edible offal of bovine animals, swine, sheep, goats, horses, asses, mules or hinnies, fresh, ...	Woven fabrics of flax	Photographic paper, paperboard and textiles, sensitised, unexposed
Fish, fresh or chilled (excl. fish fillets and other fish meat of heading 0304)	Woven fabrics of jute or of other textile bast fibres of heading 5303	Tall oil, whether or not refined

Trade		
Milk and cream, not concentrated nor containing added sugar or other sweetening matter	Artificial filament yarn, incl. artificial monofilament of < 67 decitex (excl. sewing thread ...	Residual lyes from the manufacture of wood pulp, whether or not concentrated, desugared or ...
Milk and cream, concentrated or containing added sugar or other sweetening matter	Artificial monofilament of $\geq$ 67 decitex and with a cross sectional dimension of $\leq$ 1 mm; strip ...	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth ...
Bones and horn-cores and their powder and waste, unworked, defatted, simply prepared, treated ...	Man-made filament yarn, put up for retail sale (excluding sewing thread)	Residual products of the chemical or allied industries, n.e.s.; municipal waste; sewage sludge; ...
Bulbs, tubers, tuberous roots, corms, crowns and rhizomes, dormant, in growth or in flower, ...	Synthetic filament tow as specified in Note 1 to chapter 55	Floor coverings of plastics, whether or not self-adhesive, in rolls or in the form of tiles; ...
Cut flowers and flower buds of a kind suitable for bouquets or for ornamental purposes, fresh, ...	Artificial staple fibres, carded, combed or otherwise processed for spinning	Plates, sheets, film, foil and strip, of plastics, reinforced, laminated, supported or similarly ...
Potatoes, fresh or chilled	Woven fabrics containing $\geq$ 85% synthetic staple fibres by weight	Baths, shower-baths, sinks, washbasins, bidets, lavatory pans, seats and covers, flushing cisterns ...

Trade		
Tomatoes, fresh or chilled	Woven fabrics of artificial staple fibres	Articles for the conveyance or packaging of goods, of plastics; stoppers, lids, caps and other ...
Cabbages, cauliflowers, kohlrabi, kale and similar edible brassicas, fresh or chilled	Nonwovens, whether or not impregnated, coated, covered or laminated, n.e.s.	Builders' ware of plastics, n.e.s.
Carrots, turnips, salad beetroot, salsify, celeriac, radishes and similar edible roots, fresh ...	Gimped yarn, gimped strip and the like of heading 5404 or 5405; chenille yarn, incl. flock ...	Compounded rubber, unvulcanised, in primary forms or in plates, sheets or strip (excl. mixtures ...
Leguminous vegetables, shelled or unshelled, fresh or chilled	Knotted netting of twine, cordage or rope, by the piece or metre; made-up fishing nets and ...	Vulcanised rubber thread and cord (excluding ungimped single thread with a diameter of > 5 ...
Other vegetables, fresh or chilled (excl. potatoes, tomatoes, alliaceous vegetables, edible ...	Articles of yarn, strip or the like of heading 5404 or 5405, or of twine, cordage, ropes or ...	Retreaded or used pneumatic tyres of rubber; solid or cushion tyres, tyre treads and tyre flaps, ...
Vegetables, uncooked or cooked by steaming or boiling in water, frozen	Carpets and other textile floor coverings, of textile materials, knotted, whether or not made ...	Hard rubber, e.g. ebonite, in all forms, incl. waste and scrap; articles of hard rubber, n.e.s.

Trade		
Dried leguminous vegetables, shelled, whether or not skinned or split	Carpets and other textile floor coverings, woven, not tufted or flopped, whether or not made ...	Tanned or crust hides and skins of bovine "incl. buffalo" or equine animals, without hair on, ...
Bananas, incl. plantains, fresh or dried	Carpets and other floor coverings, of felt, not tufted or flopped, whether or not made up	Tanned or crust skins of sheep or lambs, without wool on, whether or not split (excl. further ...
Melons, incl. watermelons, and papaws "papayas", fresh	Terry towelling and similar woven terry fabrics, tufted textile fabrics (excl. narrow woven ...	Leather further prepared after tanning or crusting "incl. parchment-dressed leather", of bovine ...
Apples, pears and quinces, fresh	Tulles and other net fabrics (excl. woven, knitted or crocheted fabrics); lace in the piece, ...	Composition leather with a basis of leather or leather fibre, in slabs, sheets or strip, whether ...
Apricots, cherries, peaches incl. nectarines, plums and sloes, fresh	Hand-woven tapestries of the type Gobelin, Flanders, Aubusson, Beauvais and the like, and needle-worked ...	Articles of gut, goldbeater's skin, bladders or tendons (excluding silkworm gut, sterile catgut, ...
Fresh strawberries, raspberries, blackberries, back, white or red currants, gooseberries and ...	Embroidery on a textile fabric ground, in the piece, in strips or in motifs	Articles of apparel, clothing accessories and other furskin articles (excl. gloves made of ...

Trade		
Fruit and nuts, provisionally preserved, e.g. by sulphur dioxide gas, in brine, in sulphur ...	Linoleum, whether or not cut to shape; floor coverings consisting of a coating or covering ...	Artificial fur and articles thereof (excluding gloves made of leather and artificial fur, footwear ...
Mate	Impregnated, coated or covered textile fabrics; painted canvas being theatrical scenery, studio ...	Fuel wood, in logs, billets, twigs, faggots or similar forms; wood in chips or particles; sawdust ...
Seeds of anis, badian, fennel, coriander, cumin or caraway; juniper berries	Textile products and articles, for technical use, specified in Note 7 to chapter 59	Metallised wood and other densified wood in blocks, plates, strips or profile shapes
Ginger, saffron, turmeric "curcuma", thyme, bay leaves, curry and other spices (excl. pepper ...	Knitted or crocheted fabrics, of a width $\leq$ 30 cm, containing by weight $\geq$ 5% of elastomeric ...	Mechanical wood pulp, not chemically treated
Barley	Knitted or crocheted fabrics, of a width $\leq$ 30 cm (excl. those containing by weight $\geq$ 5% of ...	Chemical wood pulp, sulphite (excl. dissolving grades)
Maize or corn	Fabrics, knitted or crocheted, of a width of $>$ 30 cm (excl. warp knit fabrics "incl. those ...	Wood pulp obtained by a combination of mechanical and chemical pulping processes
Buckwheat, millet, canary seed and other cereals (excl.	Special garments for professional, sporting or other purposes,	Vegetable parchment, greaseproof papers, tracing papers and

Trade		
wheat and meslin, rye, barley, oats, ...	n.e.s., knitted or crocheted	glassine and other glazed transparent ...
Cereal groats, meal and pellets	Made-up clothing accessories, knitted or crocheted; knitted or crocheted parts of garments ...	Filter blocks, slabs and plates, of paper pulp
Groundnuts, whether or not shelled or broken (excl. roasted or otherwise cooked)	Articles for interior furnishing, of all types of textile materials (excl. blankets and travelling ...	Wallpaper and similar wallcoverings of paper; window transparencies of paper
Seeds, fruits and spores, for sowing (excl. leguminous vegetables and sweetcorn, coffee, tea, ...	Sets consisting of woven fabric and yarn, whether or not with accessories, for making up into ...	Envelopes, letter cards, plain postcards and correspondence cards, of paper or paperboard; ...
Cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form ...	Hat-shapes, plaited or made by assembling strips of any material (excluding blocked to shape, ...	Toilet paper and similar paper, cellulose wadding or webs of cellulose fibres, of a kind used ...
Other animal fats and oils and their fractions, whether or not refined, but not chemically ...	Artificial flowers, foliage and fruit and parts thereof, and articles made of artificial flowers, ...	Paper or paperboard labels of all kinds, whether or not printed
Groundnut oil and its fractions, whether or not refined, but not chemically	Human hair, dressed, thinned, bleached or otherwise worked; wool, other animal hair or other ...	Printed books, brochures and similar printed matter, whether or not in single sheets (excl. ...

Trade		
modified		
Olive oil and its fractions obtained from the fruit of the olive tree solely by mechanical ...	Setts, curbstones and flagstones, of natural stone (excluding slate)	Newspapers, journals and periodicals, whether or not illustrated or containing advertising ...
Vegetable waxes, beeswax, other insect waxes and spermaceti, whether or not refined or coloured ...	Millstones, grindstones, grinding wheels and the like, without frameworks, for milling, grinding, ...	Music, printed or in manuscript, whether or not bound or illustrated
Cocoa shells, husks, skins and other cocoa waste	Natural or artificial abrasive powder or grain, on a base of textile material, paper, paperboard ...	Transfers "decalcomanias"
Vegetables, fruit, nuts and other edible parts of plants, prepared or preserved by vinegar ...	Slag-wool, rock-wool and similar mineral wools; exfoliated vermiculite, expanded clays, foamed ...	Silkworm cocoons suitable for reeling
Tomatoes, prepared or preserved otherwise than by vinegar or acetic acid	Panels, boards, tiles, blocks and similar articles of vegetable fibre, of straw or of shavings, ...	Raw silk "non-thrown"
Mushrooms and truffles, prepared or preserved otherwise than by vinegar or acetic acid	Articles of plaster or of compositions based on plaster (excl. plaster bandages for	Silk waste, incl. cocoons unsuitable for reeling, yarn waste and garnetted stock

Trade		
	straightening ...	
Vegetables, fruit, nuts, fruit-peel and other edible parts of plants, preserved by sugar "drained, ...	Articles of cement, concrete or artificial stone, whether or not reinforced	Silk yarn (excluding that spun from silk waste and that put up for retail sale)
Fruit juices, incl. grape must, and vegetable juices, unfermented, not containing added spirit, ...	Friction material and articles thereof, e.g., sheets, rolls, strips, segments, discs, washers, ...	Woven fabrics of silk or of silk waste
Beer made from malt	Roofing tiles, chimney pots, cowls, chimney liners, architectural ornaments and other ceramic ...	Wool, neither carded nor combed
Vinegar, fermented vinegar and substitutes for vinegar obtained from acetic acid	Ceramic pipes, conduits, guttering and pipe fittings (excluding of siliceous fossil meals or ...	Waste of wool or of fine or coarse animal hair, incl. yarn waste (excl. garnetted stock, waste ...
Unroasted iron pyrites	Glazed ceramic flags and paving, hearth or wall tiles; glazed ceramic mosaic cubes and the ...	Garnetted stock of wool or of fine or coarse animal hair, neither carded nor combed
Natural graphite	Ceramic sinks, washbasins, washbasin pedestals, baths, bidets, water closet pans, flushing	Carded wool yarn (excl. that put up for retail sale)

Trade		
	...	
Natural sands of all kinds, whether or not coloured (excl. gold- and platinum-bearing sands, ...	Cullet and other waste and scrap of glass; glass in the mass (excluding glass in the form of ...	Carded or combed yarn of fine animal hair (excl. that of wool or that put up for retail sale)
Clays, andalusite, kyanite and sillimanite, whether or not calcined; mullite; chamotte or dinas ...	Cast glass and rolled glass, in sheets or profiles, whether or not having an absorbent, reflecting ...	Yarn of wool or fine animal hair, put up for retail sale
Chalk	Glass mirrors, whether or not framed, incl. rear-view mirrors (excl. optical mirrors, optically ...	
Natural barium sulphate "barytes"; natural barium carbonate "witherite", whether or not calcined ...	Glass envelopes, incl. bulbs and tubes, open, and glass parts thereof, without fittings, for ...	
Siliceous fossil meals, e.g. kieselguhr, tripolite and diatomite, and similar siliceous earths, ...	Glassware of a kind used for table, kitchen, toilet, office, indoor decoration or similar purposes ...	

Trade		
Marble, travertine, ecaussine and other calcareous monumental or building stone of an apparent ...	Base metals clad with silver, not further worked than semi-manufactured	
Gypsum; anhydrite; plasters consisting of calcined gypsum or calcium sulphate, whether or not ...	Base metals, silver or gold, clad with platinum, not further worked than semi-manufactured	
Limestone flux; limestone and other calcareous stone, of a kind used for the manufacture of ...	Ferrous waste and scrap; remelting scrap ingots of iron or steel (excl. slag, scale and other ...	
Borates, natural, and concentrates thereof, whether or not calcined, and natural boric acids ...	Iron and non-alloy steel in ingots or other primary forms (excl. remelting scrap ingots, products ...	
Feldspar; leucite, nepheline and nepheline syenite; fluorspar	Flat-rolled products of iron or non-alloy steel, of a width of $\geq 600$ mm, cold-rolled "cold-reduced", ...	
Cobalt ores and concentrates	Flat-rolled products of iron or non-alloy steel, of a width of $< 600$ mm, hot-rolled or cold-rolled ...	

Trade		
Tin ores and concentrates	Bars and rods, of iron or non-alloy steel, cold-formed or cold-finished, whether or not further ...	
Chromium ores and concentrates	Steel, alloy, other than stainless, in ingots or other primary forms, semi-finished products ...	
Uranium or thorium ores and concentrates	Sheet piling of iron or steel, whether or not drilled, punched or made from assembled elements; ...	
Precious-metal ores and concentrates	Railway or tramway track construction material of iron or steel, the following : rails, check-rails ...	
Ores and concentrates (excl. iron, manganese, copper, nickel, cobalt, aluminium, lead, zinc, ...)	Tubes, pipes and hollow profiles, of cast iron	
Peat, incl. peat litter, whether or not agglomerated	Tube or pipe fittings "e.g. couplings, elbows, sleeves", of iron or steel	
Pitch and pitch coke, obtained from coal tar or from other mineral tars	Structures and parts of structures "e.g., bridges and bridge-sections, lock-gates, towers, ...	

Trade		
Petroleum oils and oils obtained from bituminous minerals, crude	Reservoirs, tanks, vats and similar containers, of iron or steel, for any material "other than ...	
Bitumen and asphalt, natural; bituminous or oil-shale and tar sands; asphaltites and asphaltic ...	Cloth, incl. endless bands, grill, netting and fencing, of iron or steel wire, expanded metal ...	
Electrical energy	Chain and parts thereof, of iron or steel (excl. watch chains, necklace chains and the like, ...	
Fluorine, chlorine, bromine and iodine	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter pins, washers, incl. ...	
Carbon "carbon blacks and other forms of carbon", n.e.s.	Stoves, ranges, grates, cookers, incl. those with subsidiary boilers for central heating, barbecues, ...	
Alkali or alkaline-earth metals; rare-earth metals, scandium and yttrium, whether or not intermixed ...	Table, kitchen or other household articles, and parts thereof, of iron or steel; iron or steel ...	
Diphosphorus pentaoxide; phosphoric acid; polyphosphoric	Sanitary ware, and parts thereof, of iron or steel (excl. cans, boxes and similar	

Trade		
acids, whether or not chemically defined	containers ...	
Oxides of boron; boric acids	Master alloys of copper (excluding phosphorus-copper compounds "copper phosphide" containing ...	
Chromium oxides and hydroxides	Plates, sheets and strip, of copper, of a thickness of > 0,15 mm (excl. expanded sheet and ...	
Cobalt oxides and hydroxides; commercial cobalt oxides	Copper tubes and pipes	
Lead oxides; red lead and orange lead	Stranded wire, cables, plaited bands and the like, of copper (excluding electrically insulated ...	
Hydrazine and hydroxylamine and their inorganic salts; inorganic bases, metal oxides, hydroxides ...	Nails, tacks, drawing pins, staples and similar articles, of copper or with shafts of iron ...	
Chlorides, chloride oxides and chloride hydroxides; bromides and bromide oxides;	Table, kitchen or other household articles, sanitary ware, and parts thereof, of copper;	

Trade		
iodides and ...	pot ...	
Dithionites and sulfoxylates	Unwrought nickel	
Sulphites; thiosulphates	Unwrought aluminium	
Phosphinates "hypophosphites", phosphonates "phosphites" and phosphates; polyphosphates, whether ...	Powder and flakes, of aluminium (excl. pellets of aluminium, and spangles)	
Cyanides, cyanide oxides and complex cyanides	Plates, sheets and strip, of aluminium, of a thickness of > 0,2 mm (excl. expanded plates, ...	
Salts of inorganic acids or peroxyacids, incl. aluminosilicates whether or not chemically defined ...	Aluminium tube or pipe fittings "e.g., couplings, elbows, sleeves"	
Compounds, inorganic or organic, of rare-earth metals, of yttrium or of scandium or of mixtures ...	Structures and parts of structures "e.g., bridges and bridge-sections, towers, lattice masts, ...	

Trade		
Phosphides, whether or not chemically defined (excluding ferrophosphorus, and inorganic or ...	Stranded wire, cables, plaited bands and the like, of aluminium (excl. such products electrically ...	
Carbides, whether or not chemically defined	Table, kitchen or other household articles, sanitary ware, and parts thereof, of aluminium, ...	
Compounds, inorganic or organic, of mercury, whether or not chemically defined (excl. amalgams)	Unwrought lead :	
Polycarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, ...	Unwrought zinc :	
Amine-function compounds	Tin waste and scrap (excluding ash and residues from the manufacture of tin of heading 2620, ...	
Nitrile-function compounds	Articles of tin, n.e.s.	
Nucleic acids and their salts, whether or not chemically defined;	Tantalum and articles thereof, n.e.s.; tantalum waste and scrap (excl. ash and	

Trade		
heterocyclic compounds (excl. ...	residues containing ...	
Separate chemically defined organic compounds, n.e.s.	Bismuth and articles thereof, n.e.s.; bismuth waste and scrap (excl. ash and residues containing ...	
Medicaments consisting of mixed or unmixed products for therapeutic or prophylactic uses, put ...	Cadmium and articles thereof, n.e.s.; cadmium waste and scrap (excluding ash and residues containing ...	
Animal or vegetable fertilisers, whether or not mixed together or chemically treated; fertilisers ...	Beryllium, chromium, hafnium, rhenium, thallium, cadmium, germanium, vanadium, gallium, indium ...	
Pigments, incl. metallic powders and flakes, dispersed in non-aqueous media, in liquid or paste ...	Hand tools, the following: spades, shovels, mattocks, picks, hoes, forks and rakes, of base ...	
Shoe polish, furniture wax and floor waxes, polishes and creams for coachwork, glass or metal, ...	Files, rasps, pliers, incl. cutting pliers, pincers and tweezers for non-medical use, metal-cutting ...	

Trade		
Gelatin, whether or not in square or rectangular sheets, whether or not surface-worked or coloured, ...	Hand-operated spanners and wrenches, incl. torque meter wrenches (excl. tap wrenches), of base ...	



**Appendix 4 Trade Potential Products Indonesia – Singapore (Great – Great)**

Trade	
Cocoa powder, not containing added sugar or other sweetening matter	Uncoated paper and paperboard, of a kind used for writing, printing or other graphic purposes, ...
Sulphur, sublimed or precipitated; colloidal sulphur	Gold, incl. gold plated with platinum, unwrought or not further worked than semi-manufactured ...
Hydrogen peroxide, whether or not solidified with urea	Tubes, pipes and tube or pipe fittings "e.g., couplings, elbows, sleeves", of nickel
Printing ink, writing or drawing ink and other inks, whether or not concentrated or solid	Tin bars, rods, profiles and wire, n.e.s.
Synthetic rubber and factice derived from oils, in primary forms or in plates, sheets or strip; ...	Parts and accessories suitable for use solely or principally with sound reproducing and recording ...
Tanned or crust hides and skins of goats or kids, pigs, reptiles and other animals, without ...	Electrical resistors, incl. rheostats and potentiometers (excl. heating resistors); parts thereof
Typewriter or similar ribbons, inked or otherwise prepared for giving impressions, whether ...	

**FEB UNDIP**

**Appendix 5 FDI Inflow Potential Products Indonesia – Singapore  
(Sunset – Sunrise)**

FDI Inflow	
Meat and edible offal of rabbits, hares, pigeons and other animals, fresh, chilled or frozen ...	Yarn of synthetic staple fibres (excl. sewing thread and yarn put up for retail sale)
Coffee, whether or not roasted or decaffeinated; coffee husks and skins; coffee substitutes ...	Woven fabrics containing predominantly, but < 85% synthetic staple fibres by weight, mixed ...
Tea, whether or not flavoured	Men's or boys' shirts, knitted or crocheted (excl. nightshirts, T-shirts, singlets and other ...
Copra	Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, ...
Coconut "copra", palm kernel or babassu oil and fractions thereof, whether or not refined, ...	Footwear with outer soles and uppers of rubber or plastics (excl. waterproof footwear of heading ...
Sugar confectionery not containing cocoa, incl. white chocolate	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...
Bran, sharps and other residues, whether or not in the form of pellets, derived from the sifting, ...	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of ...
Slag, dross, scalings and other waste from the manufacture of iron or steel (excluding granulated ...	Ceramic wares for laboratory, chemical or other technical uses; ceramic troughs, tubs and similar ...
Coal; briquettes, ovoids and similar solid fuels manufactured from coal	Tableware, kitchenware, other household articles and toilet articles, of porcelain or china ...

FDI Inflow	
Petroleum gas and other gaseous hydrocarbons	Pig iron and spiegeleisen, in pigs, blocks or other primary forms
Soap; organic surface-active products and preparations for use as soap, in the form of bars, ...	Semi-finished products of iron or non-alloy steel
Reclaimed rubber in primary forms or in plates, sheets or strip	Copper wire (excl. surgical sutures, stranded wire, cables, plaited bands and the like and ...
Wooden frames for paintings, photographs, mirrors or similar objects	Automatic goods-vending machines, e.g. postage stamp, cigarette, food or beverage machines, ...
Bobbins, spools, cops and similar supports of paper pulp, paper or paperboard, whether or not ...	Monitors and projectors, not incorporating television reception apparatus; reception apparatus ...
Cotton waste, incl. yarn waste and garnetted stock	String musical instruments, e.g. guitars, violins, and harps (excl. with keyboard)

**Appendix 6 FDI Outflow Potential Products Indonesia – Singapore  
(Sunrise – Sunset)**

FDI Outflow	
Wool grease and fatty substances derived therefrom, incl. lanolin	Gaskets and similar joints of metal sheeting combined with other material or of two or more ...
Undenatured ethyl alcohol of an alcoholic strength of < 80%; spirits, liqueurs and other spirituous ...	Electrical machines and apparatus, having individual functions, n.e.s. in chapter 85 and parts ...
Petroleum oils and oils obtained from bituminous minerals (excl. crude); preparations containing ...	Chassis fitted with engines, for tractors, motor vehicles for the transport of ten or more ...
Cyclic alcohols and their halogenated, sulphonated, nitrated or nitrosated derivatives	Light-vessels, fire-floats, dredgers, floating cranes, and other vessels the navigability of ...
Heterocyclic compounds with nitrogen hetero-atom[s] only	Photographic cameras, photographic flashlight apparatus and flashbulbs (excl. discharge lamps ...
Sulphonamides	Surveying, incl. photogrammetrical surveying, hydrographic, oceanographic, hydrological, meteorological ...
Finishing agents, dye carriers to accelerate the dyeing or fixing of dyestuffs and other products ...	Instruments and appliances used in medical, surgical, dental or veterinary sciences, incl. ...
Polymers of propylene or of other olefins, in primary forms	Breathing appliances and gas masks (excluding protective masks having neither mechanical parts ...
Hygienic or pharmaceutical articles, incl. teats, of vulcanised rubber (excl. hard rubber), ...	Instruments and apparatus for measuring or checking the flow, level, pressure or other variables ...

FDI Outflow	
Paper, paperboard, cellulose wadding and webs of cellulose fibres, coated, impregnated, covered, ...	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, ...

