BATTLE OF THE GIANTS: INSPECTING HOW THE US-CHINA TRADE WAR IS SHAKING UP FDI INFLOWS IN THE ASEAN+3

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DECLARATION

We hereby declare that:

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

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

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

(4) The word count of this research report is 16970.

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LIST OF ABBREVIATIONS

ACFTA	ASEAN-China Free Trade Area
ACIA	ASEAN Comprehensive Investment Agreement
AEC	ASEAN Economic Community
AFTA	ASEAN Free Trade Area
AJCEP	ASEAN-Japan Comprehensive Economic Partnership
AKFTA	ASEAN-Korea Free Trade Area
ASEAN	Association of Southeast Asian Nations
BPLM	Breusch-Pagan Lagrange Multiplier
CD	Cross-sectional Dependence Test
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
DTA	Deep Trade Agreements
EU	European Union
FDI	Foreign Direct Investment
FEM	Fixed Effect Model
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GVC	Global Value Chain
ICT	Information and Communications Technology
IMF	International Monetary Fund
IP	Intellectual Property
LSCI	Liner Shipping Connectivity Index

LIST OF ABBREVIATIONS

MNC	Multinational Corporation
MNE	Multinational Enterprise
OECD	Organization for Economic Co-operation and Development
OLI Framework	Ownership, Location, and Internalization Framework
OLS	Ordinary Least Squares
PIIE	Peterson Institute for International Economics
PTA	Preferential Trade Agreement
RCEP	Regional Comprehensive Economic Partnership
REM	Random Effect Model
RTA	Regional Trade Agreement
TNC	Transnational Corporation
TPP	Trans-Pacific Partnership
U.S.	United States
UNCTAD	UN Trade and Development
WDI	World Development Indicators
WITS	World Integrated Trade Solution
WTO	World Trade Organization

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DEDICATION

We dedicate this project to all those who have guided, supported, and inspired us throughout this journey:

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Finally, we dedicate this research to future scholars and policymakers. May the insights and findings herein provide meaningful contributions to the understanding of trade tensions, tariff policies, and investment dynamics, particularly within ASEAN+3, and serve as a foundation for building more resilient economies in the future.

PREFACE

Since the US-China Trade War began in 2018, the global economic landscape has experienced a profound shift, largely driven by intensifying trade tensions. The conflict between the world's two largest economies has not only disrupted global value chains but also caused ripple effects on global foreign direct investment. ASEAN+3 economies, which are deeply integrated with both the U.S. and China, have been caught in the middle and significantly affected by the restructuring of trade and FDI.

According to the IMF, the US-China tensions have caused investment in ASEAN+3 to drop by 3.5%, lowered GDP by 0.4%, and led to 1% job losses. These effects were especially hard on developing countries with high levels of debt (Kassim, 2023). Within ASEAN+3, this can be seen in countries with high debt-to-GDP ratios, such as Japan and Singapore, where slower growth and reduced investment flows have contributed to further debt accumulation. Other ASEAN+3 countries have also experienced rising debt burdens following the growth of trade tensions, underscoring the importance of investigating these dynamics.

This study is motivated by the need to examine how global trade tensions affect FDI patterns, particularly in key sectors. While traditional determinants such as GDP, geographical distance, and trade volume have been widely studied, our analysis includes the capital–labour ratio and U.S. tariffs as control variables, both of which have received limited attention in previous literature. As global trade evolves, the role of tariffs and GVC participation becomes more significant, showing why a more complete and up-to-date investigation is needed.

In light with these developments, our study aims to fill the gap in the existing literature by examining how the US-China Trade War has influenced FDI inflows to ASEAN+3 countries, with a particular focus on sectoral dynamics in the manufacturing and services sectors. In short, our study seeks to provide a comprehensive understanding of the relationship between macroeconomic factors, trade policy, and investment behaviours in a rapidly changing global economy.

ABSTRACT

This study examines how tariffs and trade liberalization affect total FDI inflows to ASEAN+3 economies. Beyond this, it also highlights the main contribution of exploring the role of GVC integration and provides a closer analysis of sectoral FDI inflows, with particular attention to the manufacturing and services sectors. The analysis covers total trade data from 2010 to 2022 and sectoral data for the manufacturing and services sectors from 2017 to 2022. The research is motivated by the impact of the US–China Trade War, which has reshaped global trade dynamics and disrupted value chains. To fill in the research gap, this study focuses on how trade tensions have influenced sectoral FDI inflows during the recent period.

This study employs six augmented Gravity Models to examine the determinants of total FDI inflows and to provide a deeper analysis of sectoral FDI. The empirical analysis indicates that tariffs are not the primary factor influencing total FDI inflows; however, their effects are more apparent in the manufacturing sector. In contrast, trade liberalization serves as the key driver of FDI across ASEAN+3, consistently driving inflows in the contexts of total trade as well as GVC integration. The study finds that rising U.S. tariffs affect sectoral FDI in ASEAN+3 in opposite ways. Manufacturing FDI may increase as firms relocate to countries with more cost-efficient production networks, while services FDI tends to decline. This difference reflects the nature of GVCs where manufacturing responds to production costs, whereas services depend on globally dispersed end-user demand rather than local production sites.

CHAPTER 1 INTRODUCTION

1.1 Research Background

1.1.1 Historical Context of FDI in Trade Landscape

With the expansion of international free trade, the concept of Foreign Direct Investment (FDI) has introduced to the world. FDI involves an individual or business from one country investing in a company located in another country to establish a long-term relationship and a significant influence over the company's operations (UNCTAD, 2007). This investment includes the initial capital injection and ongoing cross-border financial transactions between investors and foreign enterprises (OECD, 2024). The emergence of MNCs and FDI surged after World War II due to the post-war recovery, including increasing global trade, technological advancement, and better logistics infrastructure (Gratton, 2024).

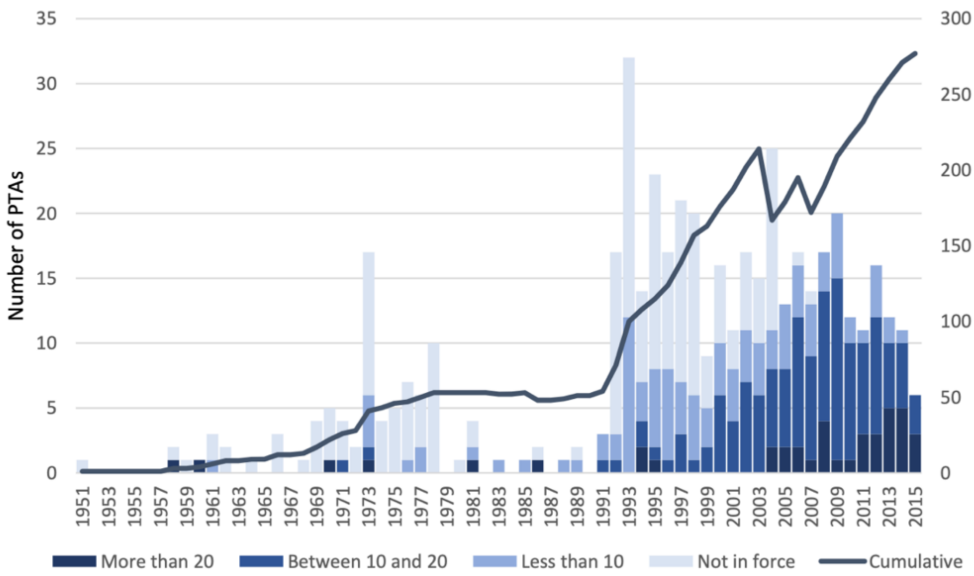
In the late 1980s, developing countries that had previously avoided free trade began to recognize the importance of tariff liberalization in attracting multinational enterprises (MNEs) from developed countries. MNEs stimulate domestic GDP growth and strengthen GVC by integrating into local economies, particularly in manufacturing sectors. Through franchising, licensing, and partnerships in foreign markets, MNEs not only enhance value creation through services, knowledge transfer, and local sourcing but also provide more job opportunities and attract FDI (Cadestin et al., 2018; IMF, 2003; Lee et al., 2024).

Furthermore, globalization and digitalization have significantly driven technological innovations, especially in transportation, information, and communication technologies (Kolb, 2024). Container shipping, air freight, the internet, and online platforms have greatly reduced the transportation and communication costs between businesses. These technologies have enhanced global connectivity by easing cross-border investment in accessing new markets and establishing operations in multiple nations. In addition, trade agreements such as AFTA, RCEP, and others have fostered international trade and investments by offering trade benefits, legal protections, and reduced trade barriers. As a result, these developments contributed to the formation of GVCs. According to UNCTAD (2013), around 60% of global trade involved intermediate goods and services rather than finished goods. This matters as it indicates that trade is no longer just about exporting but contributing to a global assembly line.

1.1.2 From Tariff Protection to Trade Integration: The Impact of FTAs on Global Trade Efficiency

FTAs with key partners can be seen as a political strategy to keep strong local trade ties and reduce conflict risk, maintaining peace in a globalized world (Mayer et al., 2010). The implementation of FTAs in the 1990s led to a 0.62% increase in global efficiency in manufacturing trade, according to Yotov & Anderson (2011). This suggests that FTAs helped reduce barriers to trade, improving efficiency and trade flows. As a result of tariff liberalization on intermediate goods, the protectionist policies historically aimed to protect domestic markets became increasingly counterproductive. The emergence of global production networks allows firms to distribute production across multiple countries, leveraging cost advantages in labour, infrastructure, and raw materials.

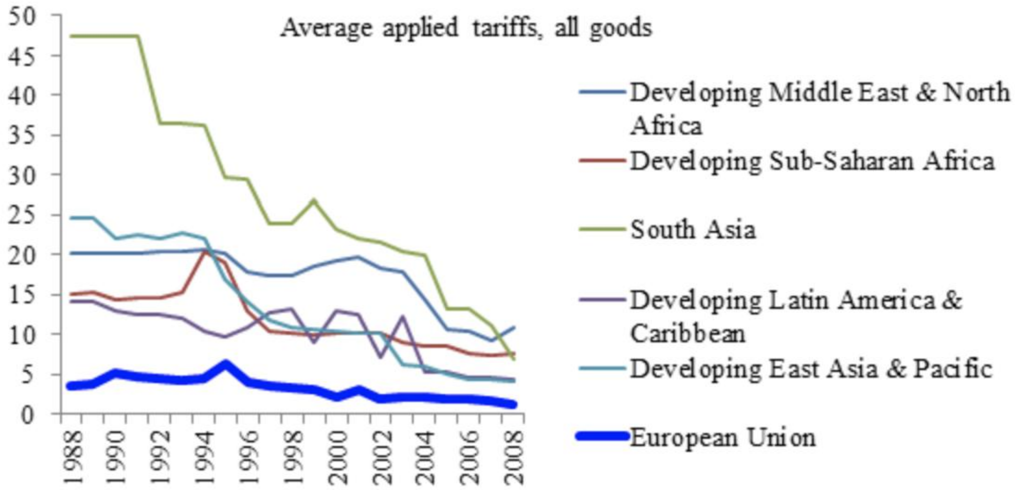
Figure 1.1 Number of Trade Agreements Over Depth and Time



Source: Hofmann et al. (2017)

Trade and investment agreements play a crucial role in facilitating trade in goods, services, and investments by streamlining the supply chain (Kowalski et al., 2015; Sauvé, 2018). Bilateral trade deals and Deep Trade Agreements (DTAs) have increased over time (see Figure 1.1), significantly contributing to tariff and trade barriers reduction, fostering interdependence in cross-border production linkage (Baldwin, 2014; Barfield, 2018; Ruta et al., 2018; Thipphaphone & Podoba, 2022). Developing countries began lowering tariffs on imported inputs (see Figure 1.2) and signing agreements, wishing to grab an advantage in the global supply chain, further increasing the global FDI flows (Elfaki & Ahmed, 2024; Martínez-Galán & Fontoura, 2018).

Figure 1.2 Tariff Liberalization



Source: Baldwin (2012)

However, FDI is highly vulnerable to major global economic shocks and geopolitical tensions, such as the Global Financial Crisis 2007 – 2008, the COVID-19 pandemic, etc. As a result, these events significantly disrupted GVCs and reduced global FDI inflows (Hayakawa et al., 2022; Saleh, 2023). Most notably, the US-China Trade War stands out as a major event that influenced the global FDI patterns and reshaped the GVC structures recently.

1.2 Tariffs, Global Value Chains, and Foreign Direct Investment prior to 2018

1.2.1 From Trade Barriers to Value Chains: The Role of Tariff Cuts in GVC Formation

In the late 1980s, developing countries that had previously avoided free trade began to recognize the importance of tariff liberalization in attracting MNEs to their economies. By integrating into GVCs, countries could focus on their comparative advantages rather than produce the entire goods domestically (Baldwin, 2012).

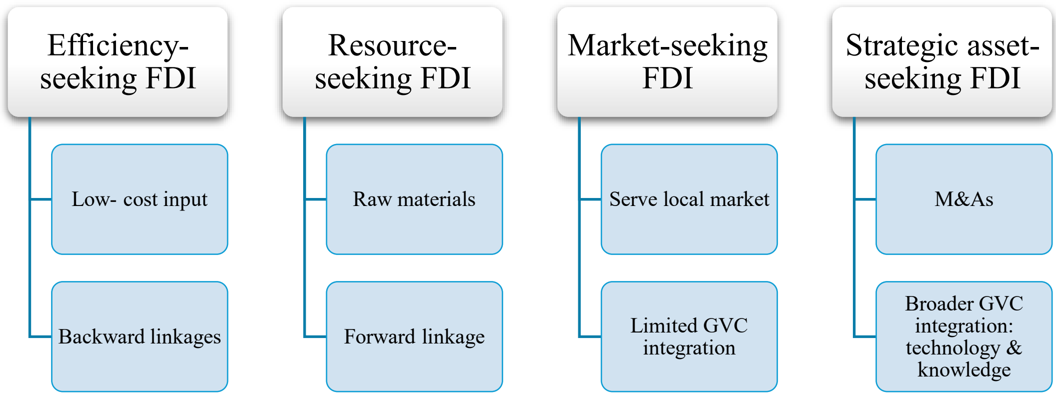
Even a small increase in tariff could discourage GVCs' participation in developing countries, particularly the manufacturing and low-tech sectors, by increasing not only the production cost but also the overall costs as these effects accumulate along the supply chain (Gao et al., 2023; OECD, 2013).

1.2.2 Global Value Chains as a Catalyst for Foreign Direct Investment

Cross-border production has become increasingly common, with a number of Transnational Corporations (TNCs) participating in GVCs to gain local advantage from lower cost and specific capabilities offered by different countries. Since around 2000, international trade and FDI have increased simultaneously, driven by these GVCs' expansion (Martínez-Galán & Fontoura, 2018). UNCTAD's estimation that TNCs coordinate 80% of world trade, further highlights their role in distributing value-added activities globally (UNCTAD, 2013; Cadestin et al., 2018).

Normally, a firm deciding to become a multinational considers several key factors the firm and sector characteristics, cost, and risk associated with the investment (Buelens & Tirpák, 2017). The four motive are efficiency-seeking, resource-seeking, market-seeking, and strategic asset-seeking, contributing to different extend of GVC integration effect (See figure 2.1).

Figure 1.3 Different FDI's Impact on GVC



Source: Author

All this means FDI, as a form of investment, often follows GVCs, where firms invest where they can plug into the value chain. The FDI in turn expands and intensifies GVCs, by not only involving intrafirm trade, but also arm's-length trade, suggesting the two-way relationship between GVCs and FDI (Buelens & Tirpák, 2017; Martínez-Galán and Fontoura, 2018). The findings by Adarov and Stehrer (2020) and UNCTAD (2017) further suggest that ICT acts as a bridge, facilitating this two-way connection between FDI and GVCs participation.

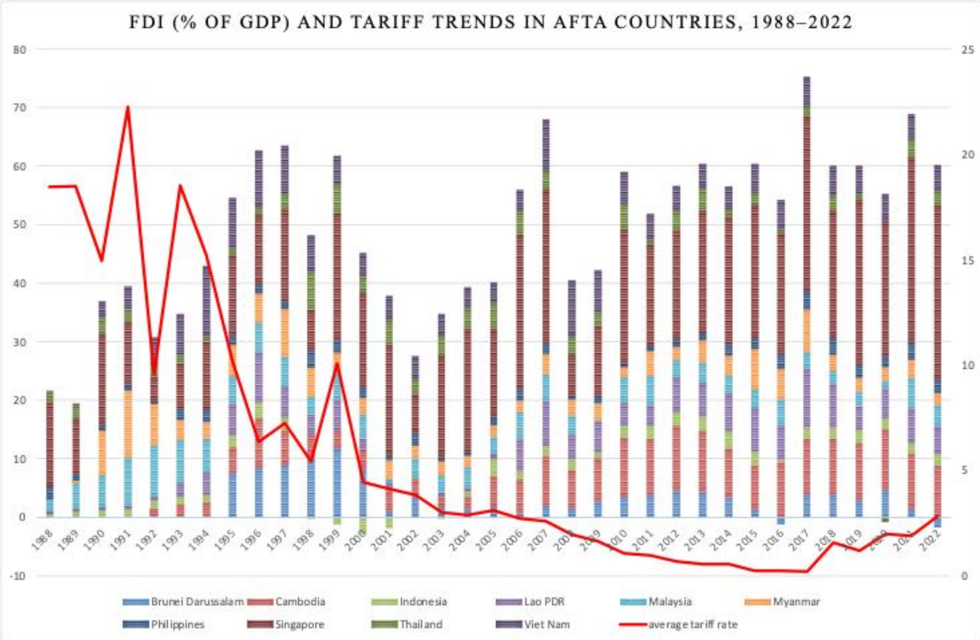
1.2.3 Trade Liberalization and the Dynamics of Foreign Direct Investment in ASEAN+3

According to Lesher and Miroudot (2008) and Vo and Ho (2021), while trade openness can attract FDI, tariff liberalization is necessary to fully maximize the benefits associated with foreign investment. Hofmann et al. (2017) found that agreements signed in more recent years tend to be deeper, encompassing a broader range of policy areas compared to traditional agreements. Prior to 2017, there were already 151 PTAs in force, reflecting its significance (UNESCAP, 2020). In the ASEAN region, agreements under ASEAN+1 and the ASEAN Free Trade Area (AFTA) have played a significant role in reducing tariffs and promoting FDI inflow among ASEAN and non-ASEAN partners (Thangavelu & Findlay, 2011).

Graziano et al. (2014) found that countries with DTAs have more subsidiaries in foreign countries than countries without by around 12%. DTAs enhance GVC and economic welfare by reducing trade costs and enforcing key provisions like antidumping and countervailing duties, liberalization of services, and pro-competition policies. The enforceability of these provisions, especially those that go beyond WTO commitments, is important in maximizing the benefits of DTAs to ensure a smooth global production network (Hofmann et al., 2017; Rocha et al., 2021).

AFTA was different from earlier trade agreements as it continues to push for deep trade liberalization, reducing tariffs and removing trade barriers on almost all goods and services, with ASEAN's expectation that the tariffs drop to just 0% to 5% (Kuan & Qiu, 2010).

Figure 1.4 Average Tariff Rate and the FDI Inflow in AFTA Member Countries from 1988 to 2022



Source: Author's calculation, using data from World Development Indicators

Trade liberalization, as reflected by falling tariffs, has contributed to an increase in FDI inflows in almost all AFTA member countries over time. The tariff rate of nearly 0% in 2017 actually aligned with ASEAN's expectation, followed by a surge in ASEAN's FDI to the peak in the same year (see Figure 2.2) despite heightened uncertainty in the trade environment due to the United States' withdrawal from the Trans-Pacific Partnership (TPP).

1.3 The Evolution of the US-China Trade War: Global Trade Under Pressure

1.3.1 Timeline of Key Events

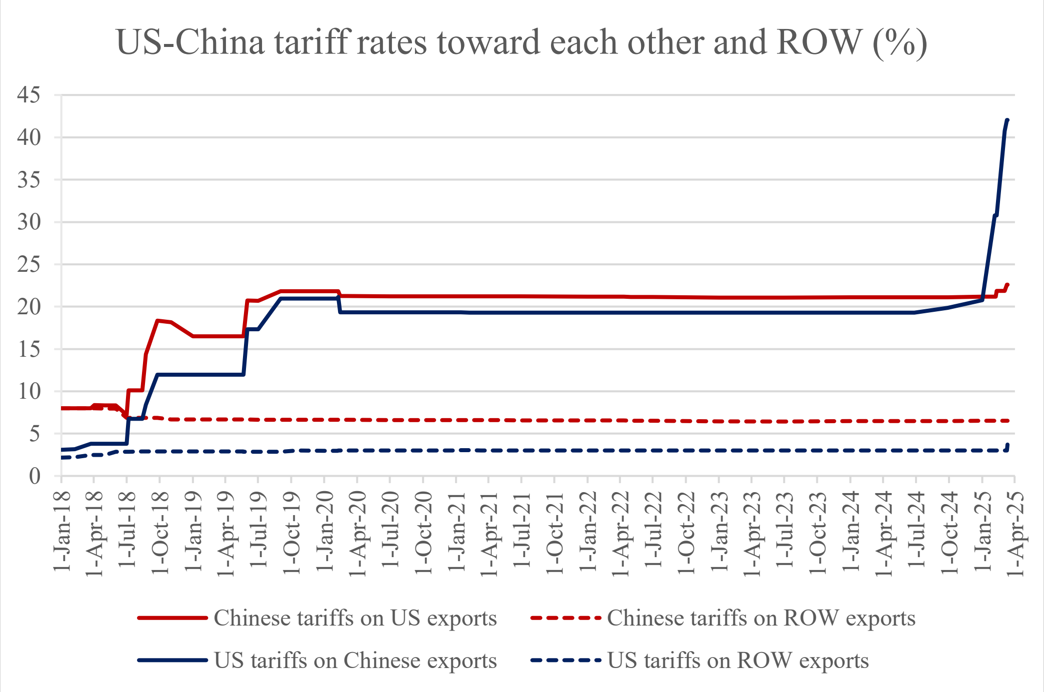
In early 2025, the U.S. president, Donald Trump, returned to the U.S. administration and started Tariff War 2.0 with the "America First Trade Policy" (The White House, 2025a). He imposed additional tariffs on China, Canada, and Mexico, which caused a $1 trillion trade deficit in the U.S. in 2023 (Bown, 2025; The White House, 2025b). As of April 2025, Trump announced "Liberation Day", which imposed 10% blanket tariffs on all imports and "reciprocal" tariffs on 60 trade partners with high trade deficits, with China levying the highest (34%) (Harithas et al., 2025; Mena, 2025).

However, the second wave of tariff warfare has been temporarily paused with a 90-day suspension of the additional tariff, which offers a critical window for diplomatic negotiation for the countries involved. This pause has temporarily stabilized bilateral trade flows, but the core issues remain unresolved. Notably, the current situation echoes the initial shift from global economic integration to rising protectionism that began in 2018. Donald Trump announced the first U.S. tariff on China, marking a pivotal moment in the current dynamics of the international trade flow, which significantly reshaped the economic relations worldwide.

In 2018, the global safeguard tariffs on the imports of solar panels and washing machines harmed the U.S. domestic industries, China and the key U.S. trading countries like South Korea, Malaysia, Japan, Mexico, Thailand, and Vietnam (Bown & Joseph, 2017; Bown & Kolb, 2018). In the same month, the U.S. followed up with tariffs on steel (25%) and aluminium (10%) imports, alongside accusing China of conducting unfair trade practices, including technology transfer, intellectual property (IP) theft, and innovation. In response, a 25% tariff was imposed on Chinese machinery and equipment, while China retaliated with tariffs on U.S. autos, aircraft, and agriculture. The tariffs have disrupted the global supply chain, increased the cost of intermediate and capital goods, and decreased U.S. imports from China (Bown, 2021). The 2020 Phase One Deal temporarily eased the US-China tension by the U.S. reducing tariffs on certain products, and China pledged to purchase an additional $200 billion in U.S. exports (Bown, 2020a; Bown, 2020b). Under the Biden administration, trade tension spread in the technology sector with industrial policies like the CHIPS and Science Act and the Inflation Reduction Act to boost domestic manufacturing, while China filed complaints with WTO and promoted self-reliance initiatives like Made in China 2025 (Nair, 2022; Shine, 2024). These conflicts have worsened the US-China decoupling and pushed multinationals to diversify production beyond China.

1.3.2 From Trade Deficits to Tariff Wars: The Return of U.S. Protectionism

Figure 1.5 US-China Tariff Rates Towards Each Other and Rest of the World (RoW)



Source: Author, using data from Bown (2025)

The growing concern of the U.S. over the trade deficits, where the U.S.'s imports substantially exceed exports, raises fears over its long-term economic sustainability (Ghosh & Ramakrishnan, 2023). China remained as U.S.'s largest trade deficit country, amounting to $270.4 billion (World Population Review, 2025), hence it triggered the U.S. to impose tariffs to reduce the reliance on China's imports. Trump claimed that the trade deficits can be addressed through tariff revenues. As a result, this tariff strategy contributed to a rise in global trade barriers and brought back the protectionism approach in the U.S. This situation severely reshaped global trade and diversified the global supply chain, further affecting the FDI inflows in various countries. The ripple effects of the tariffs were observed beyond the US-China bilateral trade, rising prices, and costs across GVCs (Cerutti et al., 2019).

As a result, the US-China trade deficit was reduced by $122 billion in 2024, aligning with the purpose of President Trump imposing tariffs (See Figure 1.4). However, the trade deficits of the U.S. with the World are getting higher in 2024, which leads to a reduction of 0.1% in U.S. GDP growth, and it is unbeneficial to the U.S. as well. Overall, the US-China Trade War has revealed deep geopolitical tension and brought huge impacts on the global economy, which leads to the focus of our research.

Figure 1.6 U.S. Trade in Goods with China and the World (US$ Million)

Source: Author's calculation, using data from the United States Census Bureau (2025a & 2025b)

1.3.3 ASEAN+3: Regional Cooperation Amid Global Trade Tensions

Over time, ASEAN+3 has evolved into a comprehensive economic group through its efforts towards deeper regional integration (ASEAN Plus Three, 2017). The ASEAN+3 countries include the ten ASEAN nations, along with China, Japan, and South Korea. However, instead of creating an ASEAN+3 FTA, each country has decided to make separate trade agreements with ASEAN, signing the ASEAN-China Free Trade Area (ACFTA) in 2005, ASEAN–Korea Free Trade Area (AKFTA) in 2006, and ASEAN–Japan Comprehensive Economic Partnership (AJCEP) in 2008. For example, China has become ASEAN's biggest trade partner after the implementation of ACFTA, which cut down tariffs on nearly 90% of imports to zero by 2010 (Medina, 2021).

South Korea and Japan, as major trade partners of both the U.S. and China, have seen increasing FDI inflows from 2018 to 2024. For instance, Intel expanded its chip packaging and testing factory to Malaysia in 2024, and Samsung Electronics shifted its refrigerator production from China to Thailand (Chiang, 2024; Miura, 2019). Japanese firms such as Nintendo, Kyocera, and Sharp also planned to relocate part of their manufacturing operations from China to Vietnam. The outward investment reflects market-seeking FDI, aiming to avoid high tariff and preserve the market amidst trade tensions.

Vietnam, classified as a lower-middle-income country, serves as a special case, attracting efficiency-seeking FDI. It benefits from both friend-shoring and near-shoring strategies, as it is geographically close to China and has the lowest labour cost among CPTPP members. These structural advantages led to a significant spike in FDI inflows from China in 2019 (Miura, 2019). In contrast to high-income economies like Japan and South Korea, Vietnam's ability to attract diverted FDI is rooted in its cost competitiveness and strategic location, reflecting the heterogeneous impact of the US-China Trade War across ASEAN+3 countries with different income levels.

1.4 Not All FDIs Are Alike: Manufacturing vs. Services

1.4.1 Does Manufacturing FDI Continue to Outpace Services FDI in GVCs?

Since the mid-2000s, there has been a noticeable shift in FDI patterns, with the share of services FDI overtaking manufacturing FDI. The rise in investment in services has led to a sharp drop in investment in manufacturing, which has decreased by half over the past two decades, from 26% to 13% (United Nations, 2024). This is a result of digitalization has facilitated remote delivery, allowing for the centralization of service resources. Service FDI is overtaking manufacturing FDI because service industries often require fewer physical assets and can be more easily adapted to local markets.

When discussing FDI broadly, both the manufacturing and services sectors are included. However, when we narrow the focus to GVC-related FDI, the definition becomes more specific. GVC-related FDI mainly refers to foreign investments engaged in the production of intermediate goods, as GVCs depend on the cross-border movement of these goods at various production stages, making trade in intermediate goods a common measure of GVC participation (Hummels et al., 2001;

Choi et al., 2021; Cigna et al., 2022; Klimek, 2024). Therefore, manufacturing FDI is the form most closely linked to GVCs.

Yet, the integration of the service sector into GVC is not as straightforward as manufacturing FDI which involves tangible goods that can be physically moved across borders. According to (WTO, 2014), services are embedded in goods and traded indirectly through GVCs. This indirect participation of services is a key feature of what is referred to as the "servicification" of manufacturing, where services are increasingly used as inputs at various stages of the production process rather than being final outputs themselves (Kim, 2019; Kowalkowski et al., 2017; Miroudot, 2019; Pattnayak & Chadha, 2022).

This distinction makes it harder to directly link service FDI to GVCs. Unlike manufacturing FDI, which involves tangible goods, services are multifunctional, often supporting activities like international logistics or financing cross-border trade. However, services can also cater to local market demands, making it difficult to pinpoint whether a service FDI specifically supports GVC-related activities.

In certain developing countries like Vietnam, the manufacturing sector plays a major role in GVC participation, contributing more than 60% to their overall involvement (Presbitero et al., 2017). As shown in Figure 11, the manufacturing sector plays a more significant role in GVCs than the services sector, particularly in developing countries, where backward integration predominates. Meanwhile, developed nations are more focused on forward integration or exhibit lower overall participation in GVCs.

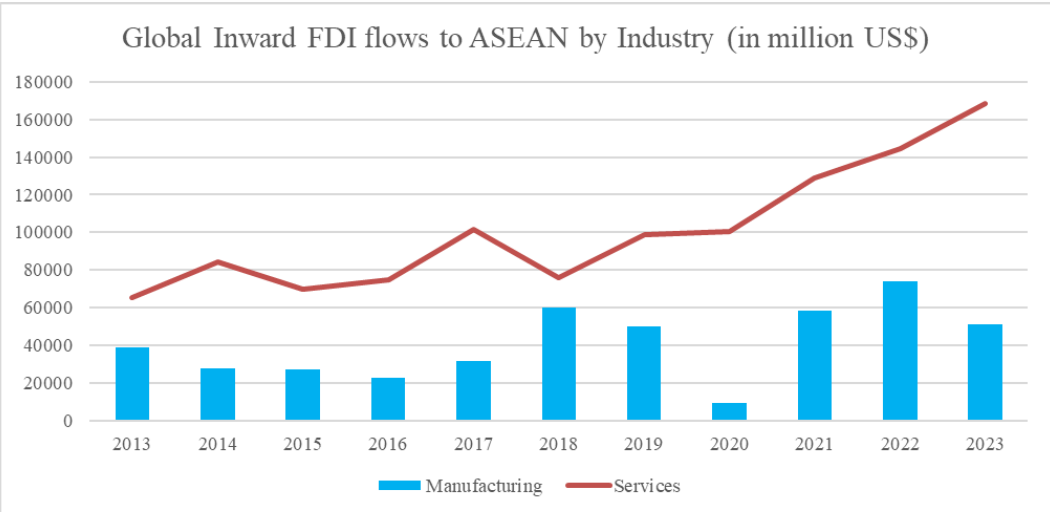
Due to the tangible nature of manufacturing FDI and its crucial role in the production of intermediate goods, it remains more directly tied to GVCs, particularly in developing economies where backward integration is prevalent. Based on this, we assume that manufacturing FDI outpaces services FDI during the trade war, as the trade war impacts tangible goods production and intermediate goods trade more directly than services.

1.4.2 The Varied Impact of Tariffs on Different Types of Foreign Direct Investment

The imposition of tariffs on goods during the US-China trade war had a different impact on the FDI of the manufacturing and service sectors. The tariffs, which were primarily targeted at manufacturing goods rather than services, had a more pronounced impact on manufacturing FDI. These tariffs increased the costs of manufacturing inputs (Fajgelbaum et al., 2019; Flaaen & Pierce, 2019; York, 2018) and reduced the profitability of export-oriented manufacturing ventures of counterparties (Abraham et al., 1988; Yang et al., 2021). The impact of higher tariffs was further intensified by GVCs, especially in multistage production processes where goods progress through sequential stages from upstream to downstream, with value added at each step (European Central Bank, 2019).

The percentage of all goods imported by the U.S. that come from China dropped from 21.6% to 13.93% between 2017 and 2023. Tariffs led to a decline in imports from China and stimulated export growth in other countries (Freund et al., 2023). China, which relies on imported intermediate and final goods for the production of certain finished products, increasingly turned to Southeast Asian countries as key suppliers (Yin, 2011). Among East Asian countries, Vietnam, the Philippines, and Cambodia have the greatest potential to replace Chinese exports relative to the scale of their economies (Calì, 2018). To minimize the impact of tariffs and taxes, many firms started sourcing from alternative suppliers and relocating production stages to other countries, driving up FDI inflows to third-party countries.

Figure 1.7 Global inward FDI flows to ASEAN by industry



Source: Author’s calculation, using data from ASEAN Stats (2025)

The FDI flows to ASEAN countries show a different impact on the manufacturing and services sectors (see Figure 2.3). FDI inflows in ASEAN manufacturing spiked in 2018 by 90.16% reflecting relocation of manufacturing from China to ASEAN to bypass U.S. tariffs. Services FDI hurt during 2018 but marked a positive growing trend since then. This difference in impact is largely because U.S. tariffs primarily target physical goods, making manufacturing more vulnerable to trade barriers. When tariffs rise, manufacturing firms often relocate operations to reduce export costs and maintain market access. Conversely, services are less affected by tariffs since many of them such as finance, digital services, and logistics are not subject to border taxes.

However, Prazeres (2019) emphasizes that tariffs also affect the services industry. When the U.S. imposes higher tariffs on manufactured goods, the adjustment is usually observed immediately in manufacturing FDI, as MNEs expand or relocate production to ASEAN+3 countries. This, in turn, indirectly stimulates the services FDI, since manufacturing activities rely heavily on complementary services such as logistics, warehousing, finance, insurance, and professional support. For example, approximately 30% of a car's total value is derived from services like research, design, engineering, distribution, logistics, and marketing. Hence, when a country imposes tariffs on cars, it not only affects the manufacturers but also disrupts the service providers involved in the value chain. As a result, service FDI does not react instantly but tends to follow with a lagging effect, as MNEs often expand service-related activities to support the growing manufacturing base. In this way, manufacturing FDI serves as a catalyst for subsequent inflows of service FDI, amplifying the overall impact on ASEAN+3 economies.

1.5 Problem Statement

As the world's two largest economic giants imposed tariffs on each other's goods, the foundation of global trade integration began to fracture, accelerating the economic decoupling. The growing use of tariffs and protectionist trade policies has created uncertainties in the global economy and weakened confidence in international trade cooperation. While the U.S. is stepping away from global trade agreements, China's growing power has raised concerns among nations that are heavily reliant on its market. This shift has raised new uncertainties in the global trade landscape, particularly leading to adverse effects on GVC participation, supply chain diversification, FDI inflows, and sectoral FDI inflows.

The US-China Trade War is no longer just a bilateral dispute, it has become a major global issue that has impacted trade, investments, and production processes globally. The war had raised serious concerns about future economic cooperation and development, especially in ASEAN+3, which is closely linked with the U.S. and China. In 1997, the ASEAN+3 was founded to promote cooperation in East Asia. It aims to build stronger ties in the East Asian community, with ASEAN leading the way.

The problem lies in how the US-China Trade War has affected the FDI decisions of ASEAN+3 countries, many of them are caught in the middle of the US-China rivalry. To tackle the uncertainties, ASEAN+3 economies have implements strategies to encourage FDI inflows, including deepening trade partnerships between countries and reduce trade barriers. But, since China is their main trading partner, it is not easy for these countries to shift away from China to alternative markets despite vulnerability and pressure from the U. S. Hence, there is an urgent need to understand how changes in trade liberalization, tariffs, and GVCs are currently affecting total and sectoral FDI inflows in the ASEAN+3 countries during the US-China Trade War period. In response, policymakers and investors are able to make more informed decisions in an uncertain global environment.

1.6 Research Objectives

The US-China trade war is a global current issue, creating a mean of urgency to investigate the associated impacts on FDI. Therefore, we aim to study the key factors shaping FDI, particularly focusing on the effect of tariffs, GVC participation, and trade liberalization. Accordingly, we seek to achieve the following objectives:

1. To analyze how the interaction of U.S. tariffs and ASEAN+3 domestic tariffs in shaping the FDI inflows.
2. To assess the role of GVC participation in mediating the domestic tariff effects on FDI.

3. To investigate the impact of trade liberalization on FDI inflows in ASEAN+3 economies.
4. To investigate how U.S. tariffs exert heterogeneous effects on manufacturing and services FDI in ASEAN+3 countries in the context of GVC participation.

1.7 Research Questions

In line with the outlined research objectives above, we have formulated the following questions:

1. Does the diversion effect from U.S. tariffs offset the deterrent effect of domestic tariffs on ASEAN+3's FDI inflows?
2. How GVC participation mediate the domestic tariff effects on FDI inflow in ASEAN+3?
3. How has trade liberalization impacted FDI inflows in ASEAN+3 economies?
4. How U.S. tariffs exert heterogeneous effects on manufacturing and services FDI in ASEAN+3 countries in the context of GVC participation?

1.8 Expected Contributions

This study holds significant value in examining how the trade war's impact extends through 2022, specifically on how tariffs, disruptions to GVCs, and trade liberalization influence FDI inflows. It is particularly important for addressing a critical research gap: understanding how FDI inflows are affected differently across various sectors, as the trade war's effects may vary depending on the industry and region, as well as the GVC participation. This research mainly focused on investigating the FDI inflows in the manufacturing and service sectors in the ASEAN+3 economies since the US-China Trade War intensified. By filling this gap, the research provides critical insights for policymakers, investors, and businesses, guiding them in adapting their strategies to the ongoing global economic disruption caused by the trade conflict.

CHAPTER 2 LITERATURE REVIEW

2.0 Introduction

The literature review provides a thorough overview of tariffs, GVC, and FDI inflow, particularly the manufacturing and service FDI, forming an essential basis for our study. This chapter helps to identify key themes and patterns and highlight the underexplored area, by critically examining the existing and current research. This is especially important in the context of an evolving global economic environment, where trade policies, particularly tariff impositions by the U.S. have a growing impact on the composition of GVC and investment decisions in ASEAN+3. With a focus on tariff-induced shocks, our research aims to study how sectoral differences in FDI, specifically between manufacturing and services in responding to the changes in tariff.

The literature review covers global trade evolution, tariff impacts on supply chains and FDI, MNEs' risk-hedging strategies, and the uneven sectoral effects of FDI. A comparative analysis is drawn between manufacturing FDI and service FDI to capture the heterogenous effect triggered by the GVC participation and U.S. tariff.

2.1 Linkages Between GVCs, Trade Liberalization, and FDI

According to the World Bank (2020), GVC and FDI centrality have a significant positive correlation in almost all countries around the world. GVCs are increasingly linked to FDI flows, with subsidiaries supplying inputs to parent firms (Sanfilippo et al., 2018; George et al., 2021). Martínez-Galán and Fontoura (2018) found that the higher the GVC participation, the greater the FDI inward stocks, indicating countries with deeper GVC engagement tend to attract more FDI over the long run. Hence, the investment strategies are shaped by how well a country is integrated into GVCs, linking different types of FDI to different GVC strategies (Buelens & Tirpák, 2017; Kowalski et al., 2015; Lai et al., 2022; Martínez-Galán and Fontoura, 2018). Although GVCs are complex, a study by George et al. (2021) and Kowalski et al. (2015) suggests that countries with higher GVC participation tend to attract more FDI, with backward linkages more significant than forward ones. While GVC participation will lead to increased FDI inflow in general, Lai et al. (2022) challenge the notion of the automatic or universal relationship, pointing to the roles of institutional and regulatory environments in shaping whether GVC participation will directly translate into higher FDI inflow (see also OECD, 2013).

Moreover, UNESCAP (2017) found that regional integration efforts, such as the ASEAN Economic Community (AEC) and the ASEAN Comprehensive Investment Agreement (ACIA), have significantly improved ASEAN's FDI inflows. This again underscores the importance of trade liberalization and investment-friendly policies in attracting FDI, which is supported by a substantial body of literature like Yeyati et al. (2002), Büthe and Milner (2008), Jang (2011), Ghazalian and Amponsem (2018), Wahyuningsih (2021) and Albahouth and Tahir (2024). The statement is further validated by the findings of Krieger-Boden and Görg (2011), stating that the protectionist policies negatively affected FDI inflows, by reducing trade openness and investor confidence. However, Shah and Khan (2016) found that while PTAs positively affect FDI, RTAs have an insignificant relationship with FDI, questioning the broader claim that trade liberalization leads to increased FDI. Jang (2011) also argued that FTAs actually reduce FDI between developed countries due to trade and investment substitutability.

2.2 The Economic Consequences of the Tariff War

2.2.1 U.S. Tariff: Spillover Effects on Domestic Tariffs and Total FDI

Domestic tariffs serve as a protectionist measure that raises the relative cost of imports to protect domestic firms from external competition. Higher tariffs increase the marginal cost of imported goods and discourage foreign firms from exporting to the domestic market. As domestic tariffs rise, MNEs face higher production and export costs, prompting them to consider alternative destinations for investment. In some cases, such tariffs may also encourage horizontal FDI through tariff-jumping motives, as firms establish local production to bypass trade barriers (Blonigen, 2002; Chen & Moore, 2010; Wang & Lahiri, 2022).

Several studies (Kowalski et al., 2015; Salvatici, 2020; Wijesinghe & Yogarajah, 2022; Yanikkaya et al., 2023) have emphasized that higher tariffs tend to reduce GVC participation. While Kowalski et al. (2015) underscore the importance of low import tariffs in facilitating both backward and forward integration, Yanikkaya et al. (2023) suggested that domestic tariff has a more pronounced effect. Conversely, Salvatici (2020) as well as Wijesinghe and Yogarajah (2022) points out that the negative effects of tariffs are particularly significant in the food-related sector's GVC participation. Thus, developing countries are increasingly enhancing regional integration and GVC participation, trading intermediate goods with other developing countries, while reducing reliance on North America and the EU.

During the US-China Tariff War, the tariffs imposed by the U.S. on China and other countries must also be considered. The U.S. tariff raises trade costs on intermediate goods and can reduce vertical FDI. At the same time, U.S. tariffs could potentially benefit the ASEAN+3 by redirecting investment away from the heavily taxed economies toward ASEAN+3, which has a strong GVC integration. The MNEs may still expand their investment in ASEAN+3 as the benefits of established GVC networks outweigh the production and export costs. In this sense, could offset the impact of domestic, leading to increasing FDI inflows into ASEAN+3. Hence, it showed a positive relationship between the U.S.-imposed tariffs and the FDI inflows, which is supported by Celebi and Roeger (2025), International Trade Council (2025) and Pyun (2025).

2.2.2 Tariff-induced Shift in FDI with GVC Disruptions

The beginning of the tariff war had disrupted and restructured the GVCs around the world. Tariffs imposed on any goods are an additional cost when imported into a foreign country; they not only affect the importing country but also ripple and accumulate to other nations in the global supply chain (Blanchard, 2019; Eugster et al., 2022; Hadden, 2025; Koopman et al., 2012). In this situation, the increasing bilateral tariffs between the U.S. and China affected the third-party countries' participation in different parts of the value-added process (IMF, 2019).

In order to reduce production costs, the U.S. and China began to implement risk-hedging plans and supply chain diversification strategies. Factories for intermediate goods will be relocated to nearer, lower-cost countries, which is known as near-shoring (Freund et al., 2024). ASEAN has become a significant US-China intermediary due to its proximity to China and lower tariff costs (Gao et al., 2023).

Hence, it proved that low tariffs on third-party countries attracted FDI inflows through increasing GVC participation during the trade war.

Duan et al. (2023) underscored that tariff reduction aids in increasing manufacturing GVC participation in China. Eugster et al. (2022) also highlighted that the higher upstream and downstream tariffs reduced value added by 19.4% and 14.5%, respectively. Studies from Yanikkaya et al. (2023) also showed a negative relationship between tariff and GVC participation and a positive relationship between GVC participation and FDI. However, Wen et al. (2022) argued that GVC participation is mainly determined by comparative advantage in the long run, suggesting that tariff reduction is not a decisive factor in determining GVC integration.

2.2.3 FDI Restructuring through Trade Liberalization

The Tariff War has reshaped the global supply chain by forcing firms to find alternative trade routes and partners, leading to the idea of friend-shoring. Friend-shoring is a strategic shift in supply chains to politically and economically aligned allies. These countries are identified as trusted and low-risk partners due to shared norms and political values, participation in multilateral trade blocs, and matching supply chain needs (Manak & Miller, 2023). It reduce dependency on rival countries. However, friend-shoring complements trade liberalization by reducing trade barriers and encouraging economic cooperation in trusted partner nations.

During the US-China Trade War, countries actively engaged in existing or newly formed trade agreements to mitigate tariff exposure and attract FDI (Ellerbeck, 2023). For example, agreements like the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP) were formed in 2018, which function to strengthen participating countries' trade relations, promote trade and investment and address regional economic uncertainties (ASEAN, 2024; DFAT, 2025; Sun et al., 2022). CPTPP has assisted China in mitigating U.S. tensions, boosting its economic growth, and broadening its market access with the elimination of tariffs in certain industries and lower preferential tariff rates (DFAT, 2021; Petri & Plummer, 2019).

According to Miura (2019), Vietnam participated in CPTPP and has the lowest labor cost among the partner countries. Hence, Vietnam's involvement in trade agreements with a neighbouring location led to a significant spike in FDI inflow from China in 2019. Hence, it proved that trade liberalization helped a country to increase FDI inflows. Studies from Albahouth and Tahir (2024) and Vo and Ho (2021) supported that trade liberalization caused a significant restructuring of FDI inflow. Xue (2024) highlighted that higher inward FDI stocks are typically found in countries that are more exposed to trade diversion (substitution of goods and services to low-efficiency countries in the FTA) caused by Trump's tariffs. Graziano et al. (2014) supported that deeper economic integration agreements like FTAs increase the number of subsidiaries in participating countries, and foster greater GVC participation and FDI inflows. Investment liberalization also attracts FDI by encouraging multinationals to set up local operations instead of exporting, particularly in sectors where China holds a competitive edge (Zheng, 2021).

2.3 Control Variables

2.3.1 Gross Domestic Product (GDP)

GDP measures the total value of goods and services produced within a country over a year and serves as a key indicator of economic growth. According to the market size hypothesis, a country's market size is a crucial factor influencing FDI inflows, as a larger market implies greater economic scale and stronger demand for goods and services. GDP is widely used as a proxy for market size in empirical studies. Historical studies like Scaperlanda and Mauer (1969) and Torrisi (1985) suggest that a larger market size, as measured by GDP, is more attractive to foreign investors due to economies of scale and increased profitability in the host country. Barrell et al. (2017) and Dellis et al. (2017) have shown a significant positive relationship between GDP and FDI. Both studies indicate that a high GDP is associated with greater inflows of FDI, as it reflects stronger market potential in terms of purchasing power and overall market size. However, the study by Matsuura (2022) showed that GDP had a negative and insignificant effect, suggesting that larger or wealthier host economies do not necessarily attract more FDI.

2.3.2 Geographical Distance

Geographical distance refers to the physical separation between the home and host countries. Greater distance often leads to higher transportation costs and can create communication and coordination challenges for foreign investors. These factors increase the complexity and risk associated with managing overseas operations. Empirical studies by Bi et al. (2020), Ly et al. (2018), Nguyen (2020), Tang (2012), and Yeyati et al. (2002) have demonstrated that geographical distance has a significant negative effect on FDI flows. Their findings suggest that as distance increases, the likelihood and volume of FDI decrease, primarily due to increased information asymmetry, cultural differences, and the higher transportation costs of doing business in geographically distant countries.

2.3.3 Trade Volume

Trade volume is the total of exports and imports. In real-world data, trade and FDI are often seen as complements, where FDI can lead to more trade, and trade can encourage FDI (Fontagné, 1999; Bouras & Raggad, 2015; Obashi, 2022). Although most existing studies analyze the relationship between FDI and trade openness, exports, or imports separately, fewer directly investigate the impact of total trade volume. However, trade volume can be considered a broader and more comprehensive proxy for global integration, especially in the context of GVCs. Blackhurst and Otten (1996) and Sahoo and Dash (2022) emphasize that FDI contributes more significantly to exports than to imports. Although they do not compare exports and imports, their analysis supports the complementary effect between total exports and total FDI. This aligns with GVC dynamics, where FDI often drives increased exports as MNCs engage in cross-border production. While these studies did not use trade volume as a variable, their findings suggest that higher trade activity, whether through exports, imports, or trade openness, creates favorable conditions for foreign investment. More recent research also shows that being part of GVCs plays an important role in encouraging FDI. Since trade volume includes both the import of inputs and the export of finished goods, it can be a useful way to measure a country's involvement in GVCs.

2.3.4 Capital-Labour Ratio

Neoclassical theory suggests that capital tends to flow from capital-rich developed countries to capital-scarce developing countries in search of higher returns. This is supported by Alfaro et al. (2014) and Liu et al. (2010) show that MNCs often choose to locate in countries with lower labour costs, which is consistent with the Heckscher-Ohlin framework and vertical FDI models, where capital-abundant countries invest in labour-abundant ones to exploit comparative advantages. Yet, Hoang and Bui (2015), Nguyen et al. (2024), and Sağlam and Böke (2017) report that FDI is shifting away from labour-intensive to capital-intensive sectors. Mensah and Mensah (2021) proved a positive relationship between FDI and volatility is stronger in capital-intensive industries. Although the study does not directly refer to the capital-labour ratio, this implies that countries with a lower capital-labour ratio may be more attractive to foreign investors. Capital-labour ratio refers to the amount of capital available per worker in a firm or economy. A higher ratio suggests the country is more capital-intensive, where more automation and technology are used, and normally has higher skilled labour and is more productive and has access to better technology. While a lower ratio suggests the country is more labour-intensive, normally associated with lower labour costs.

2.4 Hypotheses Development

The research will be conducted with the following hypotheses, where Hypothesis 1 and Hypothesis 2 serve as foundational elements to test Hypothesis 3. This study aims to provide a deeper analysis of how tariffs affect FDI across different industries, distinguishing it from previous research. Our unique contribution lies in examining the specific impacts of tariffs on FDI, with a focus on industry-level variations, rather than treating FDI as a homogeneous flow.

Hypothesis 1: U.S. tariffs divert FDI inflows toward ASEAN+3 economies, while lower domestic tariffs strengthen this effect by attracting additional FDI through greater GVC participation**.**

> **H1a:** The diversion effect from U.S. tariffs offsets the deterrent effect of domestic tariffs on FDI inflows.

H1b: Lower domestic tariffs attract more FDI, especially through GVC participation in the ASEAN+3 economies.

Hypothesis 2: Trade liberalization significantly impacts FDI inflows in the ASEAN+3 economies.

Hypothesis 3: In the presence of GVC participation, U.S. tariffs have heterogeneous effects on manufacturing and services FDI in ASEAN+3 countries.

2.5 Conclusion

While many studies have investigated the overall impact of tariffs on FDI, there is a noticeable gap in the literature when it comes to disaggregating the impact by FDI type. Most research studies the overall effect of tariffs on FDI without separating the impact on different types of FDI. However, manufacturing and service FDI respond differently to trade policies due to their unique roles in GVCs. The impact of tariffs on service FDI is yet to be tested, but we assume that the service FDI faced a greater impact on the US-China trade war due to the increasing trend of servicification. This study aims to fill that gap by analyzing how tariffs affect these two types of FDI separately, especially in the context of the US-China trade war. An analysis of which industry suffers a greater impact on the US-China in the context of ASEAN+3 using an augmented gravity model for this thesis will be introduced and further discussed in Chapter 3.

CHAPTER 3 METHODOLOGY

3.0 Introduction

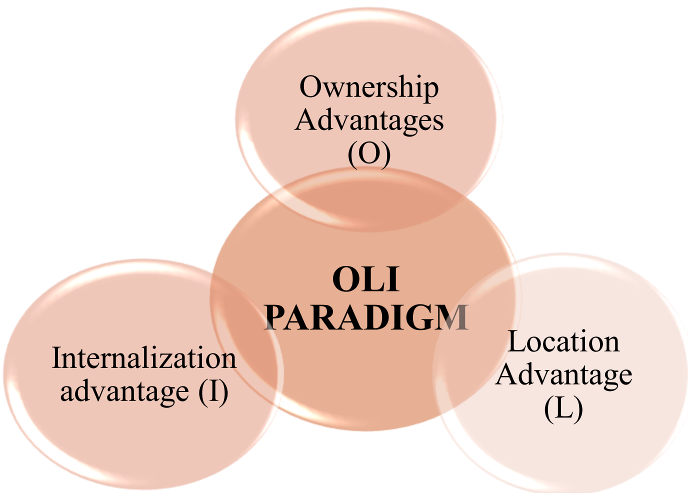
This chapter outlines the methodological framework employed to investigate the effects of the main independent variables, including tariff and trade liberalization, on the dependent variable, FDI while controlling for a range of structural and macroeconomic variables. The control variables are selected based on the gravity model of trade, including GDP, trade volume, capital-labour ratio, and geographical distance. Our study adopts a panel data approach, focusing on ASEAN+3 countries over 2010 to 2022. Our main objective of the study is to observe the effects of US China Trade war especially on the sectoral FDI inflow. We have employed secondary data mainly sourced from WDI, Google Maps, Penn World Tables, and UNCTAD.

3.1 Theoretical Framework

3.1.1 The Ownership, Location, and Internalization (OLI) Framework

The OLI framework was first presented by Dunning in 1976, aiming to identify the key factors influencing MNEs to invest in foreign countries and how these investments evolve over time (Dunning, 1988a). The model combines three main factors: Ownership Advantages (O), Location Advantages (L), and Internalization Advantages (I).

Figure 3.1 The OLI Paradigm



Source: Author

Ownership Advantages refer to unique assets, like technology, that give a firm a competitive edge as compared to the local firms. Location Advantages explain why a firm chooses a particular region, such as access to cheaper raw materials, low labour costs, or even favourable trade policies, while Internalization Advantages describe why a firm might prefer to control its key operations rather than outsourcing. When all three advantages are met, MNEs are more likely to invest in foreign countries, leading to FDI inflows. Over time, Dunning also identified four key motivations for investment, including market-seeking, efficiency-seeking, resource-seeking, and strategic asset-seeking (refer Figure 2.1) (Dunning, 1988b).

As MNEs operate in a diverse environment, shaped by economic, political, and social differences between countries. The "rules of the game" in each country can impact MNEs severely, especially in emerging markets, which have different challenges as compared to the developed ones. These challenges include weak institutions, government pressure, and changes in domestic law and regulation, all of which affect MNEs' flexibility. Therefore, it is clear that the role of institutions such as laws, and political systems can significantly improve market efficiency, making the location more attractive for investment through formal and informal policies. By integrating institutional theory, the OLI model provides a broader understanding of the dynamics at both the national and firm levels, facilitating decision-making for MNEs by allowing them to consider regional conditions, rather than focusing solely on national factors (Cruz et al., 2020).

3.2 Putting Theory into Work: A Gravity Model in Trade, Tariff, and Investment

The gravity model in international trade was first applied by Jan Tinbergen (1962), which was modified from Newton's Law of Gravitation. The gravity model suggests that trade between two countries increases with their GDP and decreases with the distance between them. The gravity model of trade has shown strong empirical accuracy, with Tinbergen's initial specification achieving an R^2 of 0.7, highlighting its effectiveness in explaining bilateral trade flows. The basic gravity model, which traditionally accounts for the GDP of two countries and the geographic distance between them, has been gradually extended into various augmented forms.

Empirical studies have extended the gravity model by incorporating FDI as a key determinant of trade. The use of the gravity model in analyzing FDI flows can be traced back to early studies such as Wei and Frankel (1997), who applied the framework with FDI as the dependent variable. Thangavelu and Findlay (2011), Wahyuningsih (2021), and Yeyati et al. (2002) utilized the FDI gravity model to examine the effects of trade liberalization, with some focusing on bilateral agreements and others on multilateral arrangements. Gnutzmann-Mkrtchyan and Hugot (2022) explored the broader impact of tariffs and trade liberalization on FDI, while Zeng and Kim (2024) specifically analyzed the implications of the US-China trade war, incorporating trade liberalization and tariff-related variables into the gravity framework.

3.2.1 The Theoretical Model

To analyze the determinants of FDI inflow to ASEAN+3 in practice, particularly in the context of the US-China trade war, we have adopted the FDI gravity model. In basic form, the model is expressed as:

FDI Gravity Model:

$$FDI_{ij} = \frac{GDP_{it} \times GDP_{jt}}{DISTANCE}$$

In this equation, i, j, and t represent indices for host country, home country, and year, respectively. The model tests the extent to which the economic mass and distance influence the bilateral FDI flow between two economies. Based on the model, larger economies tend to invest more with each other, while distance could reduce the flow.

To facilitate estimation, the model is logarithmically transformed to linearize the relationship between variables. This approach also standardizes the scale of the variables, reduces heteroscedasticity, and minimizes the presence of outliers. Which then derives into:

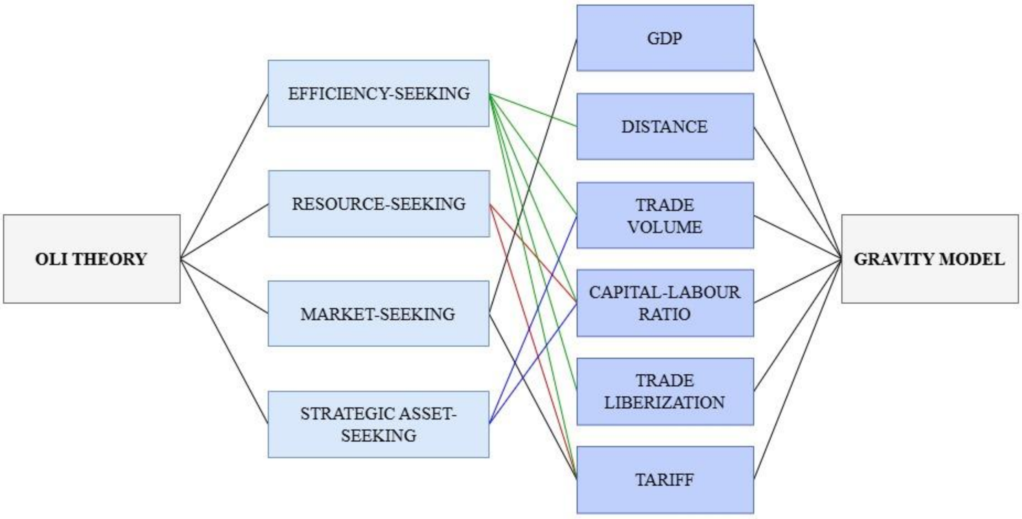
$$\ln FDI_{ijt} = \ln GDP_{it} + \ln GDP_{jt} - \ln DIST_{ij} \tag{3.1}$$

Where, FDI_{ijt} represents foreign direct investment inflow from host countries i to home country j. GDP_{it} represents the total gross added value of all final goods and services produced by host country i in a given period of time t. GDP_{jt} represents the total gross added value of all final goods and services produced by home country j in a given period of time t. $DIST_{ij}$ represents the geographical distance between countries i and j. ln denotes that our equation is in natural logarithm form. The gravity model suggests that bilateral FDI between countries i and j is positively related to their GDP and negatively influenced by the distance between them (Barrell et al., 2017). The significant positive relationship between GDP and FDI inflows has been further supported by Ravikumar et al. (2024) and Azizov et al. (2023), while the negative association between distance and FDI is confirmed by Bi et al. (2020).

3.2.2 Integration of OLI framework into the Gravity Model

Within the structure of the FDI gravity model, the integration of OLI theory provides a strong theoretical foundation for selecting and interpreting the variables that affect FDI inflows. The theory identifies four key types of FDI motivations: efficiency-seeking, resource-seeking, market-seeking, and strategic asset-seeking, which can be linked to specific variables in the gravity model. Efficiency-seeking FDI is driven by the goal of reducing production costs by relocating parts of the production process to more cost-effective countries. This type of FDI is influenced by a country's participation in GVCs, labour quality and cost reflected by transportation and the capital-labour ratio, the extent of trade liberalization, and tariff levels. Resource-seeking behaviour may occur when source countries face high tariffs, they may relocate production to countries with lower trade barriers and lower labour costs. Market-seeking FDI focuses on gaining access to large and growing consumer markets, which is represented by the host country's GDP as well as the ease of market entry indicated by trade liberalization and tariff levels. Strategic asset-seeking FDI, aimed at acquiring advanced technologies, skills, and innovation, is linked to higher human capital that capture by capital-labour ratio and deeper integration in GVCs.

Figure 3.2 The Theoretical Framework



Source: Author

While the graph links FDI motivations to specific variables based on dominant patterns identified in the literature, the real-world FDI decisions often involve overlapping and interconnected factors. For instance, distance can also impact other types of FDI, such as efficiency-seeking, by affecting logistics and the ability to manage cross-border operations. Therefore, while the diagram provides a structured framework to understand the main drivers of FDI, it may not fully capture the broader, dynamic nature of FDI decisions, where factors can have a wider influence that is not fully represented in the plot.

3.2.3 The Empirical Model

An augmented FDI Gravity Model that is integrated with the OLI paradigm is formed to explain the motivations behind the trade, capital-labour ratio, trade liberalization, and tariff towards FDI in response to trade policy changes. This leads to the formation of our empirical model.

$$\ln FDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DISTCONNECT_{ij} + \beta_4 \ln TRADE_{iRoWt} + \beta_5 \ln CLRATIO_{it} + \beta_6\, lnFTA_{it} + \beta_7 TARIFF_{it} + \beta_8 USTARIFF_{it} + \beta_9 USTARIFF_{it} \times TARIFF_{it} + \beta_{10} WAR_{it} + \beta_{11} HIGH\_INC_{it} + \varepsilon_{ijt} \tag{3.2}$$

Where,

FDI_{ijt}	=	Foreign direct investment inflow from home countries *j* to host country *i* in a given period of time *t*
GDP_{it}	=	The total gross added value of all final goods and services produced by country *i* in a given period of time *t*
GDP_{jt}	=	The total gross added value of all final goods and services produced by country *j* in a given period of time *t*
$DISTCONNECT_{ij}$	=	Geographical distance between countries *i* and *j*
$TRADE_{iRoWt}$	=	Trade volume of country *i* with the rest of the world
$CLRATIO_{it}$	=	Level of capital intensity in county *i* in a given period of time *t*
FTA_{it}	=	Number of FTAs signed by country *i* in a given period of time *t*
$TARIFF_{it}$	=	Average tariff rate of country *i* in a given period of time *t*
$USTARIFF_{it}$	=	U.S. tariff rate on country *i* exports to U.S. in a given period of time *t*
$USTARIFF_{it} \times TARIFF_{it}$	=	The combined effect of U.S. tariff and the country *i* tariff in a given period of time, *t*
WAR_{it}	=	Dummy variable that equals 1 if country *i* at time *t* is under U.S. China trade war; otherwise, it equals 0
$HIGH\_INC_{it}$	=	Dummy variable that equals 1 if country *i* at time *t* is classified as a high-income country; otherwise, it equals 0
ε_{ijt}	=	Error term
ln	=	Natural logarithm

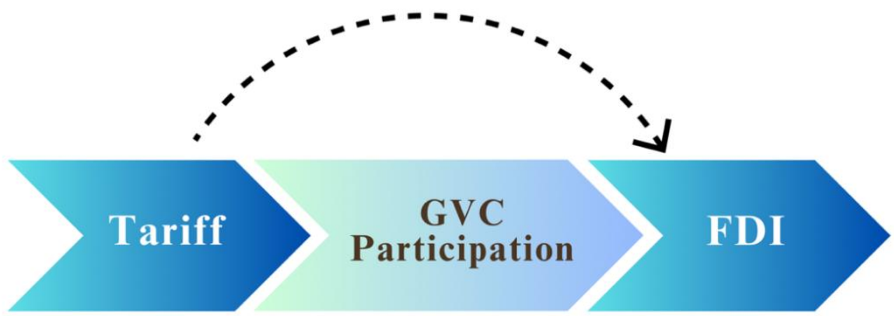
The model adopts variable $DISTCONNECT_{ij}$, defined as the bilateral distance between the host and home country divided by the Liner Shipping Connectivity Index (LSCI) of the home country. This distance-adjusted LSCI captures the role of logistics efficiency in mitigating the relevance of geographical distance. It reflects the idea that, markets are able to attract more FDI if it has a strong maritime connectivity and shorter distance, as it could significantly reduce the delivery time and cost.

$USTARIFF_{it} \times TARIFF_{it}$ is included to capture the combined effect of U.S. tariffs and the ASEAN+3's own tariffs when they occur simultaneously. Instead of looking at their effects separately, the interaction shows whether the impact of one tariff varies depending on the degree of the other. If the interaction term is significant, it means that the effect of U.S. tariffs is not constant, as it varies depending on how high the domestic tariff is, and vice versa.

The dummy variable $HIGH\_INC_{it}$ is included to control for income-level differences across countries. While the US-China Trade War has reshaped global FDI and GVC structures, the heterogeneity of the ASEAN+3 countries may cause trade tension to have differential effects on the magnitude and direction of FDI inflows. Therefore, including this dummy helps isolate the effect of income-related structural differences on FDI inflows, especially within the heterogeneous ASEAN+3 region.

Besides, GVC participation has played a mediating role between tariffs and FDI. Although tariffs generally have a negative effect on FDI, the relationship is neither universal nor direct. Instead, it is largely shaped by the extent of GVC participation in the tariff-affected countries, which then influences the pattern of FDI inflows (see Figure 3.3).

Figure 3.3 The relationship between Tariff, GVC Participation and FDI



Source: Author's drawing

To investigate the relationship between GVC participation by the host country and its ability to attract FDI, the general empirical model (Equation 3.2) is modified by replacing $TRADE_{iRoWt}$ with GVC trade, which serves as a proxy for GVC participation and is denoted as GVC_{iRoWt} as shown in Equation 3.3.

$$\begin{aligned}\ln FDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \\ \beta_3 \ln DISTCONNECT_{ij} + \beta_4 \ln GVC_{iRoWt} + \\ \beta_5 \ln CLRATIO_{it} + \beta_6 lnFTA_{it} + \beta_7 TARIFF_{it} + \\ \beta_8 USTARIFF_{it} + \beta_9\, WAR_{it} + \beta_{10} HIGH\_INC_{it} + \varepsilon_{ijt} \qquad (3.3)\end{aligned}$$

To particularly examine the role of GVC participation in explaining the effect of the U.S. tariff on FDI, partial specification as shown in Equation 3.4 is used to highlight the interaction effect of tariff and GVC participation, while other variables are held constant or controlled for in the full model:

$$FDI = \alpha_0 + \alpha_1 USTARIFF + \alpha_2 GVC + \alpha_3 (USTARIFF \times GVC) \qquad (3.4)$$

$$\frac{\delta FDI}{\delta USTARIFF} = \alpha_1 + \alpha_3 \text{GVC}$$

The Equation 3.4 is employed to capture both α_1 and α_3 x GVC, representing the direct effect of tariffs on FDI, and the indirect effect through the interaction effect, depending on the GVC participation, respectively. The coefficients for U.S. tariffs, α_1 is expected to be negative, reflecting the hypothesis that higher trade barriers discourage FDI inflows. Conversely, the coefficient for the interaction term, α_3 captures how GVC participation modifies the effect of tariffs on FDI. If α_3 is positive, it suggests that GVC participation mitigates the negative impact of tariffs on FDI, vice versa.

Similarly, the same steps are applied to the domestic tariff of ASEAN+3 to examine the role of GVC participation in explaining the effect of the domestic tariff on FDI. Thus, the complete GVC equation is formed:

$$\begin{aligned}\ln FDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln DISTCONNECT_{ij} + \\ \beta_4 \ln GVC_{iRoWt} + \beta_5 \ln CLRATIO_{it} + \beta_6 lnFTA_{it} + \ \beta_7 TARIFF_{it} +\end{aligned}$$

$$\beta_8 USTARIFF_{it} + \beta_9\, WAR_{it} + \beta_{10}\, TARIFF_{it}\, X\, lnGVC_{it} +$$
$$\beta_{11}\, USTARIFF_{it} X\, lnGVC_{it} + \beta_{12} HIGH\_INC_{it} + \varepsilon_{ijt}$$

(3.5)

In order to investigate the impact of tariffs on different sectoral FDI inflows, the empirical model, as shown in Equation 3.5, is again modified to test the sectoral FDI empirically. However, when studying total sectoral FDI, the initial bilateral distance measure $DISTCONNECT_{ij}$ is not applicable. Instead, the study constructs a GDP-weighted average distance, $WGHTAVRDIST_i$, between the host country and all potential source countries in ASEAN+3. The weights are based on the GDP shares of the source countries, as GDP size is often correlated with outward FDI capacity. The formula is as below:

$$WGHTAVRDIST_i = \sum_{j \neq i} \left(\frac{GDP_j}{\sum_{k \neq i} GDP_k} \right) \text{x } DIST_{ij}$$

To provide sector-specific insights, the total FDI inflow is substituted with manufacturing FDI inflow, denoted as $MANUFDI_{ijt}$, as presented in Equation 3.6. Similarly, in Equation 3.7, the total FDI inflow is replaced with service FDI inflow, represented as $SERVFDI_{ijt}$. The dummy variable WAR_{it} is excluded from the sectoral FDI model, as the time period under study already coincides with the tariff war. Besides, the variable $TARIFF_{it}\, X\, lnGVC_{it}$ is also excluded to avoid redundant interpretations, since the sectoral differences in GVC integration are already inherent, where manufacturing is naturally more embedded in GVCs than service.

Manufacturing-based FDI model:

$$\begin{aligned} \ln MANUFDI_{ijt} = {} & \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \\ & \beta_3 \ln WGHTAVRDIST_{ij} + \beta_4 \ln TRADE_{iRoWt} + \\ & \beta_5 \ln CLRATIO_{it} + \beta_6 FTA_{it} + \beta_7 TARIFF_{it} + \\ & \beta_8 USTARIFF_{it} + \beta_9 USTARIFF_{it}\, X\, TARIFF_{it} + \\ & \beta_{10} HIGH\_INC_{it} + \varepsilon_{ijt} \end{aligned} \quad (3.6)$$

Service-based FDI model:

$$\ln SERVFDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln WGHTAVRDIST_{ij} + \beta_4 \ln TRADE_{iRoWt} + \beta_5 \ln CLRATIO_{it} + \beta_6 FTA_{it} + \beta_7 TARIFF_{it} + \beta_8 USTARIFF_{it} + \beta_9 USTARIFF_{it}\ X\ TARIFF_{it} + \beta_{10} HIGH\_INC_{it} + \varepsilon_{ijt} \quad (3.7)$$

To examine the GVC effects across the sectoral FDI, the complete GVC equation used in total FDI (Equation 3.5) has employed:

Manufacturing-based FDI model:

$$\ln MANUFDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln WGHTAVRDIST_{ij} + \beta_4 \ln GVC_{iRoWt} + \beta_5 \ln CLRATIO_{it} + \beta_6 FTA_{it} + \beta_7 TARIFF_{it} + \beta_8 USTARIFF_{it} + \beta_9 USTARIFF_{it}\ X\ lnGVC_{it} + \beta_{10} HIGH\_INC_{it} + \varepsilon_{ijt} \quad (3.8)$$

Service-based FDI model:

$$\ln SERVFDI_{ijt} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln WGHTAVRDIST_{ij} + \beta_4 \ln GVC_{iRoWt} + \beta_5 \ln CLRATIO_{it} + \beta_6 FTA_{it} + \beta_7 TARIFF_{it} + \beta_8 USTARIFF_{it} + \beta_9 USTARIFF_{it}\ X\ lnGVC_{it} + \beta_{10} HIGH\_INC_{it} + \varepsilon_{ijt} \quad (3.9)$$

3.3 Data Description

Based on the empirical model, several key variables are identified to explain the determinants of FDI inflows in ASEAN+3 regions from the year 2010 to 2022. The countries involved in ASEAN+3 included: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, China, Japan, and the Republic of Korea, and each is represented by a measurable proxy. The details and proxies of the selected variables are summarised in Table 3.1.

Table 3.1 Summary of proxies and data sources for variables

Variables	Abbreviation	Description	Expected Sign	Database
Foreign Direct Investment Inflows	FDI	Net inflows of investment from country *j* to country *i* in a given period of time (% on GDP)	N/A	WDI
Manufacturing Foreign Direct Investment Inflows	MANUFDI	Net inflows of manufacturing investment from country *j* to country *i* in a given period of time (% on GDP)	N/A	WDI
Service Foreign Direct Investment Inflows	SERVFDI	Net inflows of service investment from country *j* to country *i* in a given period of time (% on GDP)	N/A	WDI
Gross Domestic Product	GDP	Total gross added value of all final goods and services produced by country *i* or *j* in a given period of time (USD)	+	WDI
Distance-Adjusted LSCI	DISTCONNECT	Bilateral distance between the country *i* and country *j*, divided by the LCSI of the country *j* (km)	–	UNCTAD, Google Earth

GDP-Weighted Average Distance	WGHTAVRDIST	The GDP-weighted average distance of country *i* to all partner countries *j*, where distances are weighted by the GDP of country *j* (km)	-	Google Earth
Total Trade	TRADE	Trade volume of country *i* with the rest of the world (% GDP)	+	World Bank, WITS
GVC Participation	GVC	Trade in intermediate good (% of gross trade)	+	WITS
Capital-Labour Ratio	CLRATIO	Level of capital intensity in county *i* in a given period of time *t*	+	Penn World Tables, WDI, National Department of Statistics
Trade Liberalization	FTA	Number of FTAs signed by country *i*	+	UNCTAD
Tariff	TARIFF	Average tariff rate of country *i* (%)	–	WITS, WTO
U.S. Tariff	USTARIFF	U.S. tariff rate on country *i* exports to U.S. in a given period of time *t* (%)	_	WITS
Tariff War	WAR	Dummy variable that indicates the existence of the US-China Tariff War in the period of time *t*	N/A	PIIE

Income Classification	HIGH_INC	Dummy variable that equals 1 if country *i* at time *t* is classified as a high-income country; otherwise, it equals 0.	N/A	Our World In Data

3.4 Model Estimation

To examine the relationship between FDI inflows and the selected independent variables, our study adopts a range of panel data within the ASEAN+3 regions from the year 2010 to 2022, such as Pooled Ordinary Least Squares model (Pooled OLS), Fixed Effects Model (FEM), and Random Effect Model (REM). Each approach has its own distinct methodological advantages and inherent limitations. Hence, comparisons between the approaches will be done thoughtfully to ensure the robustness and credibility of the empirical findings.

3.4.1 Pooled Ordinary Least Squares model (Pooled OLS)

Pooled OLS model applies the Ordinary Least Squares (OLS) to panel data by merging the cross-sectional and time-series dimensions into a single regression model. In this estimator, it is assumed that intercepts and slopes are constant across all entities, together with no individual or time-specific effects being considered.

The OLS that the estimation of parameters is unbiased, efficient, and consistent. It assumes that there is a linear relationship between dependent and independent variables, no perfect multicollinearity, no autocorrelation, and the error terms are uncorrelated with independent variables. Additionally, the error terms must be independently and identically distributed with zero mean and constant variance, which is also known as homoscedasticity, to ensure a valid hypothesis testing.

The basic equation for Pooled OLS is expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + \varepsilon_{it}$$

Where Y_{it} represents the dependent variable, β_0 is the intercept, $\beta_1, \beta_2, \cdots, \beta_k$ are the estimated coefficients, $X_{1it}, X_{2it}, \cdots, X_{kit}$ are the independent variables and ε_{it} is the error term.

However, the Pooled OLS model is considered too simplistic for panel data as it ignores unobserved heterogeneity, which assumes all entities behave the same and does not take individual effects and time effects into account. This leads to omitted variable bias, misleading coefficients, and inefficient or inconsistent estimates, making the model less reliable for robust analysis. As noted by Baltagi et al. (2008), pooling data can increase efficiency in estimation, but this advantage may be offset by bias if the assumption of slope homogeneity is incorrectly assumed. In such a case, the Pooled OLS model will become invalid, making FEM and REM more suited for the analysis.

3.4.2 Fixed Effect Model (FEM)

The Fixed Effect Model (FEM) is commonly used to control for unobserved individual-specific characteristics in the panel data analysis. It assumes that each individual has a different intercept that captures all time-invariant factors unique to the individual, has constant slopes across entities, does not have time effects, and individual effects are correlated with independent variables.

The basic equation for FEM is expressed as follows:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + \varepsilon_{it}$$

Where α_i represents the fixed effects for unit i.

The purpose of FEM is to eliminate bias from omitted variables that are constant over time but correlated with independent variables, allowing for more accurate and consistent estimation for the empirical model. However, the key limitation of FEM is that it cannot identify the impact of time-invariant variables efficiently with too many dummy variables (Hill et al., 2019). The individual-specific intercept absorbs all heterogeneity that may exist in the dependent and independent variables. Therefore, FEM is not the most appropriate choice if the unobserved effects are uncorrelated with the regressors and REM may be preferred.

3.4.3 Random Effect Model (REM)

The Random Effect Model (REM) is a statistical model where some parameters are treated as random variables, allowing for individual-specific effects or heterogeneity. The intercepts of the individual units are randomly drawn from a much larger population with a constant mean value (Raudenbush, 1994). Unlike the FEM which controls for unobserved heterogeneity by using individual-specific intercepts, REM treats it as part of the error term and models them as random variables which is uncorrelated with explanatory variables.

The basic equation for REM is expressed as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + \mu_i + \varepsilon_{it}$$

Where μ_i represents the random effects for unit i.

The purpose of REM is to capture variation across entities while still retaining time-invariant variables in the model. REM is generally more efficient than FEM as it assumed that unobserved effects are uncorrelated with the regressors. However, this assumption is often difficult to verify, and REM produces biased and inconsistent estimates if violated. Additionally, REM may not adequately control for omitted variable bias if important individual-specific effects are ignored, and it can also suffer from inefficiency when the variance of the random effects is small.

3.5 Model Selection

To identify the most appropriate model estimator for the panel data analysis, several tests are conducted to evaluate the suitability of the Pooled OLS, FEM, and REM. These tests examine different combinations of model estimators, which make the panel data model unbiased, efficient, and consistent, including the Poolability F-test, the Breusch-Pagan Lagrange Multiplier (BPLM) test, and the Hausman test.

3.5.1 Poolability F-test

The poolability F-test is commonly conducted in panel data analysis to determine the suitability of Pooled OLS and FEM. It is used to determine whether individual-specific effects are statistically significant or fixed effects need to be included in the model. Specifically, it tests whether the intercepts across all individuals are equal. The hypotheses for the test are as follows:

$$H0: Pooled\ OLS\ is\ preferable$$

$$H1: FEM\ is\ preferable$$

The null hypothesis will be rejected if the test statistic value is greater than the critical value. Otherwise, we do not reject the null hypothesis, which refers to Pooled OLS being preferable and more appropriate to fit the data significantly. On the contrary, rejecting the null hypothesis indicates that FEM is preferable and better at fitting the data significantly.

3.5.2 Breusch-Pagan Lagrange Multiplier (BPLM) Test

The BPLM test can be conducted in panel data analysis to decide the suitability of Pooled OLS and REM. The LM test is important in examining and detecting heteroscedasticity, which refers to the relationship between the variance of the error terms and the independent variables.

The hypotheses for the test are as follows:

$$H0: Pooled\ OLS\ is\ preferable$$

$$H1: REM\ is\ preferable$$

The null hypothesis will be rejected if the test statistic value is greater than the critical value. Otherwise, we do not reject the null hypothesis, which refers to Pooled OLS being preferable for the dataset, as there is no heteroscedasticity in the model. On the contrary, rejecting the null hypothesis indicates that REM is preferable and provides a better statistical fit for the data.

3.5.3 Hausman Specification Test

The Hausman Specification Test is functioned to decide the suitability of FEM and REM in panel data analysis. It is normally used to compare the efficiency and consistency of FEM and REM. The Hausman test is used to examine whether the unobserved individual-specific effects, which are the error terms, are correlated with the explanatory variables. The hypotheses for the test are as follows:

$$H0: REM\ is\ preferable$$

$$H1: FEM\ is\ preferable$$

The null hypothesis will be rejected if the test statistic value is greater than the critical value. Otherwise, we do not reject the null hypothesis, which refers to REM being preferable and more appropriate to fit the data significantly, efficiently, and consistently. In contrast, rejecting the null hypothesis indicates that FEM is preferable, more efficient, consistent, and better in fitting the data significantly.

3.6 Diagnostic Checking

After model estimation, diagnostic checking is conducted to ensure the validity and robustness of the results. Violations such as heteroscedasticity, autocorrelation, or cross-sectional dependence can lead to inefficient estimates or biased inference. In our panel, the time dimension is relatively short, so the risk of severe autocorrelation is minimal, and we assume it does not pose a major concern. Instead, greater emphasis is placed on testing for groupwise heteroscedasticity and cross-sectional dependence, as these issues are more relevant in short panels and can significantly affect the reliability of standard errors and hypothesis testing.

3.6.1 Cross-Section Heteroskedasticity (Groupwise Heteroskedasticity)

Groupwise heteroskedasticity occurs when the variance of the error term differs across predefined groups in the panel dataset, such as countries. The variance may be constant within each group but vary between groups due to differences in GDP, economic structure, or other factors. This problem is common in panel data, and ignoring it can lead to inefficient estimates and biased standard errors, affecting the validity of hypothesis testing. The null hypothesis assumes homoscedasticity, while the alternative assumes heteroskedasticity. Detecting groupwise heteroskedasticity is therefore important to determine whether heteroskedasticity-robust estimation techniques are required in subsequent analysis (Baum, 2006).

3.6.2 Pesaran Cross-Sectional Dependence Test

The Pesaran (2004) Cross-sectional Dependence (CD) test is a widely used method for detecting correlation between cross-sectional units in panel data. It calculates the average pairwise correlations of residuals from individual regressions for each unit in the panel. The test can be applied to different panel data models, including those with heterogeneous dynamics, short time periods (T), and many cross-sectional units (N). It is a strong method to solve issues in macroeconomic data like unit roots, structural breaks, and changes in variance. The CD test works well even in small samples size and has a strong satisfactory power. This, it is suitable for this study's dataset, which involves multiple countries over time and may exhibit interdependence due to trade and economic linkages (Pesaran, 2004). The null hypothesis states that the cross-sectional units are independent; a statistically significant result will reject the null, indicating dependency among cross-sectional units.

CHAPTER 4 DATA ANALYSIS

4.0 Introduction

This chapter highlights the results of the empirical analysis and findings based on the models that discussed in the previous chapter. The results are reported in three main sections. First, descriptive statistics and correlation analysis are provided to offer an overview of the data distribution and the relationships among variables. Second, the regression results are presented, highlighting the effects of tariffs, GDP, trade openness, and other control variables on FDI inflows. Third, the discussion interprets these findings in relation to existing theories and previous studies, drawing attention to sectoral differences.

4.1 Descriptive Statistics

In this study, three datasets are used: TOTAL_FDI, MANU_FDI, and SERV_FDI, each analyzed separately to provide comprehensive results for the research. As shown in Table 4.1, the Total FDI dataset covers the period from 2010 to 2022, although the number of observations varies across variables due to missing data, with maximum 676 to minimum 587 observations. For the sectoral FDI analysis, data availability is more limited. Both MANU_FDI and SERV_FDI are examined for the period 2017 to 2022, yielding 66 observations in total, with 65 observations available for the $Clratio_{it}$.

For TOTAL_FDI, the mean FDI_{ijt} is 0.99, but the high standard deviation (3.37), strong skewness (4.21), and extreme kurtosis (20.55) indicate that most FDI inflows are small, near the minimum of −8.08, with only a few very large inflows reaching up to 25.29. GDP_{it} has a mean of 2,297,929.26 but a much lower median of 661,406.86, indicating that most ASEAN+3 countries are small, while a few very large economies raise the average, as confirmed by the high variation and positive skewness. GDP_{jt} has a mean of 7,767,425.99 and a median of 4,376,627.83, indicating a more balanced distribution with fewer extreme values, as reflected by its moderate skewness and slight negative kurtosis. $DistConnect_{ij}$ averages 2,459,570.53, ranging widely, reflecting both short regional and long-distance connections. $Trade_{it}$ averages 106.82, indicating moderate openness, while $Clratio_{it}$

is highly uneven, with a mean of 41,713,275.10 compared to a median of 223,249.05, showing that a few economies dominate capital–labor ratios, as reflected in the high skewness and kurtosis.

For both MANU_FDI and SERV_FDI, FDI_{ijt} are generally modest, with means of 1.01 and 2.67 and medians of 0.36 and 0.51, respectively. In both sectors, a few very large inflows dominate, as reflected in strong skewness and high kurtosis, with ranges from −2.20 to 7.01 for manufacturing and −1.10 to 29.91 for services. GDP_{it} varies widely in both cases, reflecting the mix of developing and advanced economies, while GDP_{jt} is more clustered, showing slight negative skewness. $WghtAvrDist_i$ averages 113,883 km in both sectors, indicating that FDI is globally distributed. $Trade_{it}$ averages around 103–104, highlighting varying openness, and $Clratio_{it}$ ranges from roughly 19,500 to nearly 586 million, with high skewness and kurtosis, reflecting large differences in technology intensity and efficiency across countries.

The descriptive statistics show that all variables in TOTAL_FDI, MANU_FDI, and SERV_FDI have very large dispersion, indicating the presence of outliers that may distort the results. To address this, the variables are transformed into logarithmic form to reduce skewness and stabilize variance in the subsequent stages of the research.

Table 4.1

Descriptive Statistics

Variable	N	Mean	Median	Max	Min	Std. Deviation	Skewness	Kurtosis
				TOTAL_FDI				
FDI_{ijt}	587	0.99	0.03	25.29	-8.08	3.37	4.21	20.55
GDP_{it}	676	2297929.26	661406.86	20012262.65	13000.44	4403958.14	2.86	7.17
GDP_{jt}	676	7767425.99	4376627.83	21443388.43	742031.41	6816091.47	0.72	-1.05
$DistConnect_{ij}$	676	2459570.53	1754664.50	13093053.00	64694.52	2550497.47	1.34	1.40
$Trade_{it}$	676	106.82	86.25	379.10	11.86	85.57	1.88	2.97
$Clratio_{it}$	671	41713275.10	223249.05	586030941.12	10510.78	114049427.52	3.33	11.00
				MANU_FDI				
FDI_{ijt}	66	1.01	0.36	7.01	-2.20	1.65	2.04	4.72
GDP_{it}	66	2612074.68	601100.33	20012262.65	13000.44	4983336.93	2.64	5.94
GDP_{jt}	66	3630891.97	3644807.48	3702231.00	3522914.64	58437.38	-0.74	-0.49
$WghtAvrDist_{i}$	66	113883.31	112972.02	120677.63	111353.40	3205.90	1.48	0.75
$Trade_{it}$	66	103.87	78.06	332.98	31.33	79.82	1.91	3.21
$Clratio_{it}$	65	90453493.60	848181.98	586030941.12	19521.60	154750261.94	1.97	3.14
				SERV_FDI				
FDI_{ijt}	66	2.67	0.51	29.91	-1.10	6.36	3.32	10.68
GDP_{it}	66	2612074.68	601100.33	20012262.65	13000.44	4983336.93	2.64	5.94
GDP_{jt}	66	3630891.97	3644807.48	3702231.00	3522914.64	58437.38	-0.74	-0.49
$WghtAvrDist_{i}$	66	113883.31	112972.02	120677.63	111353.40	3205.90	1.48	0.75
$Trade_{it}$	66	103.87	78.06	332.98	31.33	79.82	1.91	3.21
$Clratio_{it}$	65	90453493.60	848181.98	586030941.12	19521.60	154750261.94	1.97	3.14

Note: Vietnam and Laos are excluded from the analysis due to data constraint.

4.2 Correlation Analysis

Table 4.2

Correlation

TOTAL_FDI

	FDI_{ijt}	GDP_{it}	GDP_{jt}	$DistConnect_{ij}$	$Trade_{it}$	$Clratio_{it}$
FDI_{ijt}	1					
GDP_{it}	-0.0652	1				
GDP_{jt}	0.2260	-0.0262	1			
$DistConnect_{ij}$	0.0210	0.0529	0.1776	1		
$Trade_{it}$	0.0699	-0.3165	-0.0003	-0.1685	1	
$Clratio_{it}$	0.1335	-0.0099	0.0732	0.0583	0.2003	1

MANU_FDI

	FDI_ij	GDP_i	GDP_j	$WghtAvrDist_i$	Trade_i	Clratio_i
FDI_{ijt}	1					
GDP_{it}	-0.2230	1				
GDP_{jt}	0.1571	0.0212	1			
$WghtAvrDist_i$	-0.1567	-0.0265	-0.9262	1		
$Trade_{it}$	0.6342	-0.3648	0.0595	-0.0545	1	
$Clratio_{it}$	0.1906	-0.0221	-0.0578	0.1145	0.3240	1

SERV_FDI

	FDI_ij	GDP_i	GDP_j	$WghtAvrDist_i$	Trade_i	Clratio_i
FDI_{ijt}	1					
GDP_{it}	-0.1553	1				
GDP_{jt}	0.0195	0.0212	1			
$WghtAvrDist_i$	-0.0043	-0.0265	-0.9262	1		
$Trade_{it}$	0.8439	-0.3648	0.0595	-0.0545	1	
$Clratio_{it}$	0.5627	-0.0221	-0.0578	0.1145	0.3240	1

The correlation matrices suggest that multicollinearity is unlikely to be a serious concern for TOTAL_FDI, as most correlations between independent variables are low. However, for MANU_FDI and SERV_FDI, there is a very strong negative correlation between $WghtAvrDist_i$ and GDP_i (-0.926), which indicates potential multicollinearity between these two variables. While other correlations are moderate or weak, this high correlation should be considered when specifying regression models, as it could inflate standard errors and affect coefficient estimates for MANU_FDI and SERV_FDI However, both $WghtAvrDist_i$ and GDP_i are equally important as they are the main components in the Gravity Model, therefore both variables are kept for cautious interpretation.

4.3 Long Run Regression and Diagnostic Tests

Table 4.3

Long Run Regression and Diagnostic Tests

	TOTAL_FDI	**MANU_FDI**	**SERV_FDI**
Specification test			
Poolability F test	379.2165 (0.0000)***	8.6048 (0.5700)	68.3129 (0.0000)***
BPLM test	563.2657 (0.0000)***	4.1442 (0.0418)**	11.2634 (0.0008)***
Hausman test	25.7090 (0.0072)***	6.1578 (0.8018)	8.3949 (0.5903)
Best Fit:	**FEM**	**REM**	**REM**
Diagnostic test			
Groupwise heteroskedasticity test	3175.7941 (0.0000)***	154.2101 (0.0000)***	119.3018 (0.0000)***
Cross-sectional dependency test	19.6577 (0.0000)***	2.3709 (0.0177) **	-0.6502 (0.5156)

The model specification of the three types of FDI is tested based on Model 5 as stated in Section 4.4.1. The specification test confirms that the FEM is the most suitable for explaining TOTAL_FDI, as pooled OLS and REM are rejected. Diagnostic results indicate the presence of groupwise heteroskedasticity and cross-sectional dependence, implying that error variances differ across countries and that error terms are correlated simultaneously across countries. To address these issues, TOTAL_FDI is estimated using cross-sectional effects FEM with Cross-sectional weights as GLS weights and Cross-section SUR (PSCE) as coefficient covariance method to correct for cross-sectional dependence and heteroskedasticity to thereby adjusting the standard errors and ensuring robustness against the correlations. This combination is particularly suitable for the short panel (N=52, T=13).

Specification tests show that the REM is the most appropriate estimator for both SERV_FDI and MANU_FDI, as pooled OLS is rejected and REM is consistent. Diagnostic tests reveal groupwise heteroskedasticity in both models. MANU_FDI has both heteroskedasticity and cross-sectional dependence, and is estimated using White Period (Cross-Section), which corrects for differences in error variance across countries and allows for common shocks within periods, providing reliable results even with a short time dimension (T=6) and multiple countries (N=11). SERV_FDI shows heteroskedasticity but no cross-sectional dependence, so it is estimated using Cross-Section SUR (PCSE), which is well-suited for short panels with many cross-sections and robustly corrects for groupwise heteroskedasticity.

4.4 Results and Findings

4.4.1 Total Trade Model

The empirical results under the total trade model are presented from two perspectives: total FDI inflows and sectoral FDI inflows: manufacturing FDI and services FDI. This approach allows for a comprehensive examination of how the selected independent variables influence FDI inflows into ASEAN+3 economies.

4.4.1.1 Total FDI Inflows Model

The baseline Gravity Model (Model 1) was progressively expanded to Model 5 through the sequential inclusion of variables to assess their impact on total FDI inflows into ASEAN+3 countries, as reported in Table 4.4.

Table 4.4

Research Findings of Total FDI using Total Trade

Variables	Model				
	1	2	3	4	5
$lnGDP_{it}$	-0.0027 (0.0914)*	-0.0031 (0.0375)**	-0.0041 (0.0087)***	-0.0044 (0.0043)***	-0.0049 (0.0015)***
$lnGDP_{jt}$	0.0060 (0.0194)**	0.0056 (0.0465)**	0.0076 (0.0337)**	0.0076 (0.0386)**	0.0079 (0.0205)**
$lnDISTCONNECT_{ij}$	0.7062 (0.0011)***	0.6537 (0.0041)***	1.3174 (0.0000)***	1.5022 (0.0000)***	1.1082 (0.0000)***
$lnTRADE_{iRoWt}$	0.0042 (0.1487)	0.0033 (0.2682)	0.0071 (0.0598)*	0.0076 (0.0379)**	0.0085 (0.0256)**
$lnCLRATIO_{it}$	9.13E-05 (0.5173)	2.11E-06 (0.9879)	-0.0002 (0.3837)	-0.0002 (0.2320)	-0.0003 (0.1271)
$lnFTA_{it}$		0.003343 (0.1766)	0.0068 (0.0714)*	0.0066 (0.0866)*	0.0122 (0.0241)**
$TARIFF_{it}$			-0.0358 (0.3845)	0.0436 (0.4274)	0.0054 (0.9433)
$USTARIFF_{it}$			-0.0096 (0.8558)	0.0892 (0.2165)	0.0443 (0.5804)
$USTARIFF_{it}$ $TARIFF_{it}$				-2.6271 (0.0294)**	-1.8283 (0.1346)
$HIGH\_INC_{it}$* $TARIFF_{it}$					0.0823 (0.3597)
DUM_WAR* $USTARIFF_{it}$					-0.0141 (0.4510)
Adjusted R^2	0.7100	0.7132	0.7341	0.7347	0.7265

F-test	26.40431 (0.0000)***	26.34783 (0.0000)***	28.0883 (0.0000)***	27.7286 (0.0000)***	25.8092 (0.0000)***

Note. The p-values are shown in parentheses. * indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

For TOTAL_FDI, Model 1 applies the Gravity Model as a baseline model. It includes the GDP_{it}, GDP_{jt}, $DISTCONNECT_{ij}$, $TRADE_{iRoWt}$, and $CLRATIO_{it}$. Model 2 introduces FTA_{it}. Model 3 incorporates tariff-related variables, such as $TARIFF_{it}$ *And* $USTARIFF_{it}$. Model 4 then introduces the interaction term $USTARIFF_{it} \times TARIFF_{it}$ to examine their joint effect on FDI inflows.

Model 5 further expands the specification with two interaction terms, including the $HIGH\_INC_{it}*TARIFF_{it}$ and $DUM\_WAR* USTARIFF_{it}$. *These* terms capture income-based heterogeneity and the influence of geopolitical trade tensions. By expanding the models, it helps us to examine the individual effects of each single variable to shape the total FDI inflows in ASEAN+3 countries.

Among all the models, the adjusted R^2 values remain high between 0.7100 and 0.7347, with Model 4 performing best due to the inclusion of the tariff interaction term. The slight decline in Model 5 (0.7265) reflects the addition of interaction terms that are only partially significant.

The F-statistics across all models are highly significant at the 1% level of significance, confirming the joint relevance of the regressors and validating the overall model specifications. This underscores that the set of independent variables provides a robust and reliable explanation for the total FDI inflows into the ASEAN+3 region.

According to Model 5 in Table 4.4, both the coefficient of domestic tariffs and the bilateral U.S. tariff with country i showed a positive coefficient, which are 0.0054 and 0.0443, respectively. It indicated that higher domestic tariffs and U.S. tariffs led to a greater total FDI inflows into ASEAN+3 countries, which reflects tariff-jumping effects by the MNCs. Besides, the interaction term of U.S. tariffs and domestic tariffs is negative with a coefficient of –1.8283. This result shows that U.S. tariffs on country *i* amplify the deterrent effect of domestic tariffs, which indicates that higher U.S. tariffs on ASEAN+3 countries cause the negative impact of ASEAN+3 countries' own tariffs on total FDI inflows to become more pronounced.

In this case, all three variables are opposite to the expected sign and Hypothesis 1a. This strong negative interaction indicates that the overall attractiveness of the home country declines towards the investors or MNCs when both tariffs rise simultaneously. Investors may prefer alternative destinations with lower protectionist barriers as compared to the ASEAN+3 countries since they investors face double disadvantages, which are restricted access to the U.S. market and an unfavourable domestic trade regime in ASEAN+3 countries. As a result, the total FDI inflows from foreign investors into ASEAN+3 countries will decline, especially during the escalation of the US-China Tariff War. The compounding effect of higher U.S. tariffs, together with elevated domestic tariffs, further weakens the region's ability to attract foreign investment.

However, the results are insignificant at all significance levels, which indicates that the effects of tariffs on total FDI inflows cannot be statistically confirmed. This suggests that tariffs alone are not a decisive factor in shaping total FDI inflows into ASEAN+3, or there were possibly hidden effects of tariffs in sectoral FDI inflows.

4.4.1.2 Sectoral FDI Inflows Model

The sectoral FDI inflows models were also progressively expanded to Model 5 to assess their impact on sectoral FDI inflows into ASEAN+3 countries with the selected model specification, respectively. The results are presented in Table 4.5 for manufacturing FDI and in Table 4.6 for services FDI.

Table 4.5

Research Findings of Manufacturing FDI using Total Trade

Variables	Model				
	1	**2**	**3**	**4**	**5**
$lnGDP_{it}$	-0.0267 (0.0628)*	-0.0312 (0.1505)	-0.0391 (0.0188)**	-0.0871 (0.2822)	-0.0212 (0.3995)
$lnGDP_{jt}$	-1.8583 (0.5992)	-1.8890 (0.5935)	-1.1719 (0.7437)	-0.4918 (0.8032)	0.5595 (0.6413)
$lnWGHTAVRDIST_{ij}$	-4.0375 (0.1635)	-4.0652 (0.1612)	-3.7012 (0.1992)	-3.6677 (0.2795)	-2.7484 (0.3923)
$lnTRADE_{iRoWt}$	0.1660 (0.0057)***	0.1591 (0.0148)**	0.1181 (0.0002)***	-0.2072 (0.5833)	0.1751 (0.0002)***
$lnCLRATIO_{it}$	0.0137 (0.1026)	0.0132 (0.1086)	0.0121 (0.2055)	0.0072 (0.6022)	0.0118 (0.2299)
$lnFTA_{it}$		0.0153 (0.8153)	0.0787 (0.1235)	0.2103 (0.1452)	0.1258 (0.1669)
$TARIFF_{it}$			-0.0255 (0.0055)***	-0.0144 (0.3752)	-0.0079 (0.3705)
$USTARIFF_{it}$			0.0017 (0.0481)**	0.0023 (0.3269)	-0.0048 (0.0227)**
$USTARIFF_{it}$ * $TARIFF_{it}$				0.0216 (0.3090)	0.0661 (0.0030)***
$HIGH\_INC_{it}$* $TARIFF_{it}$					0.0047 (0.5722)
Adjusted R^2	0.1522	0.1377	0.1274	0.1539	0.1478
F-test	3.2973 (0.0108)**	2.7027 (0.0221)**	2.1683 (0.0440)**	2.2930 (0.0289)**	2.1102 (0.0393)**

Note. The p-values are shown in parentheses. * indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 4.6

Research Findings of Services FDI using Total Trade

Variables	Model				
	1	2	3	4	5
$\ln GDP_{it}$	0.1354 (0.0187)**	0.1727 (0.0124)**	0.2132 (0.0125)**	0.2209 (0.0113)**	0.1895 (0.0239)**
$\ln GDP_{jt}$	-0.0771 (0.9695)	0.3232 (0.8798)	0.7784 (0.7269)	1.0690 (0.6710)	0.5478 (0.8169)
$\ln WGHTAVRDIST_{ij}$	0.7223 (0.5153)	0.9949 (0.4244)	1.3194 (0.3184)	1.4997 (0.3062)	1.1397 (0.4035)
$\ln TRADE_{iRoWt}$	0.9087 (0.0002)***	0.9640 (0.0003)***	1.0419 (0.0001)***	1.0598 (0.0001)***	0.9988 (0.0004)***
$\ln CLRATIO_{it}$	0.0350 (0.0000)***	0.0401 (0.0000)***	0.0472 (0.0001)***	0.0480 (0.0001)***	0.0444 (0.0002)***
$\ln FTA_{it}$		-0.2084 (0.4057)	-0.3119 (0.1633)	-0.3154 (0.1725)	-0.2648 (0.2926)
$TARIFF_{it}$			-0.0063 (0.7475)	-0.0067 (0.7322)	-0.0279 (0.5340)
$USTARIFF_{it}$			0.0034 (0.3232)	0.0032 (0.4086)	0.0031 (0.4800)
$USTARIFF_{it}$ * $TARIFF_{it}$				0.0077 (0.7358)	0.0016 (0.9417)
$HIGH\_INC_{it}$* $TARIFF_{it}$					0.0313 (0.3879)
Adjusted R^2	0.2712	0.2607	0.2981	0.3005	0.2403
F-test	5.7625 (0.0002)***	4.7622 (0.0005)***	4.3974 (0.0004)***	4.0554 (0.0005)***	3.0247 (0.0041)***

Note. The p-values are shown in parentheses. * indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

As we further investigated the manufacturing FDI, both U.S. tariffs and the combined effect of U.S. and domestic tariffs are statistically significant, revealing that hidden effects in total FDI inflows appear in the manufacturing FDI model. This effect proves that tariff effects are only evident when examining sectoral FDI. The U.S. tariffs alone reduce inflows into ASEAN+3 because exports from the region become more expensive in the U.S. market and lower its competitiveness. However, when combined with lower domestic tariffs, the effect turns positive, which aligns with the expected sign and Hypothesis 1a. This finding suggests manufacturing FDI is particularly sensitive to tariff policies and companies prefer to relocate production to ASEAN+3 to reduce costs and circumvent U.S. tariffs. By contrast, tariffs are not a key driver of services FDI, which is expected with the theoretical expectations. Tariffs mainly target goods, hence their direct effects on service activities are limited. Service FDI inflows are more reliant on demand conditions, institutional quality, and digital readiness rather than tariff considerations.

4.4.2 GVC Trade Model

The results under the GVC trade model are examined to capture the influence of GVC integration on FDI inflows into ASEAN+3. In line with the total trade framework, the analysis considers both total FDI inflows and sectoral FDI inflows, namely manufacturing FDI and services FDI. This approach provides deeper insights into whether participation in GVC-oriented trade alters the FDI inflows into the ASEAN+3 region.

4.4.2.1 Total FDI Inflows Model

The model is re-estimated with the same set of variables, with total trade replaced with GVC trade. It evaluates whether their effects remain consistent within the GVC framework. New interaction terms with GVC trade are added to observe the effects brought by GVC trade.

Table 4.7

Research Findings of Total FDI using GVC Trade

Variables	TOTAL_FDI
$lnGDP_{it}$	-0.0023 (0.2051)
$lnGDP_{jt}$	0.0084 (0.0068)***
$lnDISTCONNECT_i$	0.8600 (0.0001)***
$lnGVC_{it}$	0.0142 (0.0144)**
$lnCLRATIO_{it}$	3.08E-05 (0.8902)
$lnFTA_{it}$	0.0125 (0.0638)*
$TARIFF_{it}$	0.1653 (0.6704)
$USTARIFF_{it}$	0.0884 (0.7832)
$lnGVC*TARIFF_{it}$	-0.0714 (0.5331)
$lnGVC*USTARIFF_{it}$	-0.0308 (0.7186)
$HIGH\_INC_{it}*TARIFF_{it}$	0.1215 (0.1548)
DUM_WAR*USTARIFF_I	-0.0148 (0.4727)
Adjusted R^2	0.7149
F-test	24.0429 (0.0000)***

Note. The p-values are shown in parentheses. * indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

When taking GVC trade into account, the adjusted R^2 is 0.7155, indicating that approximately 71.55% of the variation in total FDI inflows is explained by the model after adjusting the number of predictors. The F-statistic is highly significant at 1% significance level, confirming the joint explanatory power of the regressors.

The regression result in Table 4.7 indicates that the GVC trade has a positive coefficient of 0.0142 with a p-value of 0.0144, which is statistically significant at

5% significance level, while the domestic tariff showed a positive coefficient of 0.1653 with a p-value of 0.6704, which is statistically insignificant. Besides, the interaction term between GVC trade and domestic tariffs has a negative coefficient of –0.0714 with a statistically insignificant p-value of **0.5331**. However, the negative sign aligned with Hypothesis 1b, suggesting that lower domestic tariffs attract more total FDI inflows when ASEAN+3 countries participate in the GVC trade.

In other words, deeper integration into GVCs enhances the attractiveness of ASEAN+3 economies for foreign investors only when accompanied by relatively lower tariff barriers. This is because higher tariffs will increase the cost along the GVC chains, as the production costs accumulate and ripple through various production stages (European Central Bank, 2019). Therefore, it reduced the overall competitiveness of the host economy and discouraged FDI inflows, leading to the relocation of factories to alternative countries with a relatively lower tariff. During the intensified US-China Tariff War, ASEAN+3 countries benefited from their comparatively lower tariffs, which positioned them as attractive destinations for FDI through GVC participations.

The insignificant results for domestic tariffs and bilateral U.S. tariffs with ASEAN+3 countries also raised the question about the possibility that other structural determinants likely playing a stronger role in the total FDI inflows. Therefore**,** according to Model 6 in Table 4.7, the coefficient on the number of free trade agreements signed by country *i* is 0.0125 with a p-value of 0.0638, significant at the 10% level. This positive relationship supports Hypothesis 2, which indicates that greater trade liberalization with higher participation in FTAs facilitates increasing FDI inflows into ASEAN+3 economies under the framework of GVC trade (Hofmann et al., 2017; Rocha et al., 2021).

The result suggests that FTAs reduce tariff and non-tariff barriers, harmonize regulations, and improve market access, thereby lowering transaction costs for multinational corporations operating within GVC trade. These agreements not only encourage cross-border flows of intermediate goods but also provide policy stability and predictability, which are the critical factors for MNCs. As a result, countries with broader FTA participation become more attractive investment destinations, as

MNCs can exploit regional production sharing with fewer trade frictions and greater efficiency. Especially during the US-China Trade War, countries that actively participate in FTAs can mitigate the negative spillovers of the tariff war, but also enhance ASEAN+3's attractiveness as an investment hub for relocated or diversified production. Under the total trade framework, the variable for FTA also shows significant results starting from Model 3 until Model 5 in Table 4.4. Hence, it further supports that FTA emerges as the most robust and consistent determinant of FDI inflows into ASEAN+3 across both the total trade and GVC trade frameworks.

4.4.2.2 Sectoral FDI Inflows Model

For the GVC trade specification, Model 5 follows a similar structure but replaces trade flows with GVC trade to better capture the role of production networks in driving FDI inflows. In this setting, the interaction term between host-country tariffs and U.S. tariffs is replaced with the interaction term between GVC trade and U.S. tariffs. This specification is to assess whether participation in GVCs mitigates or amplifies the adverse effects of tariff measures on FDI inflows into ASEAN+3 countries.

Table 4.8

Research Findings of Sectoral FDI using GVC Trade

Variables	MANU_FDI	SERV_FDI
$lnGDP_{it}$	-0.0969 (0.0459)**	0.1036 (0.2520)
$lnGDP_{jt}$	0.7214 (0.6257)	-0.1793 (0.9553)
$lnWGHTAVRDIST_{i}$	-2.6921 (0.4206)	-0.1465 (0.9563)
$lnGVC_{it}$	-0.0243 (0.7950)	0.7357 (0.9563)
$lnCLRATIO_{it}$	0.0056 (0.5531)	0.0293 (0.0159)**
$lnFTA_{it}$	0.2237 (0.0646)*	0.1028 (0.6717)
$TARIFF_{it}$	-0.0982 (0.0380)**	0.0414 (0.3198)
$USTARIFF_{it}$	0.0005 (0.8133)	0.0499 (0.0461)**

lnGVC*USTARIFF$_{it}$	0.1573 (0.0913)*	-0.1789 (0.0050)***
HIGH_INC$_{it}$* TARIFF$_{it}$	0.0274 (0.1486)	0.0037 (0.9232)
Adjusted R^2	0.1654	0.2300
F-test	2.2688 (0.0267)***	2.9121 (0.0055)***

Note. The p-values are shown in parentheses. * indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Based on Model 5 in Table 4.6, a negative coefficient of –0.0048 is observed in the total trade regression. This implies that when the U.S. tariff on ASEAN+3 increases by 1 percentage, manufacturing FDI decreases by 0.0048 percentage. The reason is that ASEAN+3 manufactured goods become more expensive in the U.S. market, reducing their competitiveness and causing total trade to fall. This reflects the penalize effect of U.S. tariff on the downstream-focused manufacturing FDI. However, when the analysis is focused only on GVC trade, the U.S. tariff coefficient turns positive (0.0005). This suggests that higher U.S. tariffs are associated with an increase in manufacturing FDI into ASEAN+3. The logic is that ASEAN+3 economies are closely tied to global value chains, particularly in intermediate goods production like upstream and midstream stages. As a result, U.S. tariffs incentivize MNEs to relocate production away from heavily targeted economies, such as China, toward ASEAN+3 countries, which provide well-established GVC networks that allow firms to bypass higher U.S. tariffs.

Conversely, the domestic tariff of ASEAN+3 initially shows a negative coefficient (–0.0279) in total trade based on Model 5 in Table 4.7, implying that higher domestic tariffs discourage services FDI. This is because higher domestic tariffs increase input costs for domestic producers and businesses, thereby reducing trade openness and lowering overall trade activity. However, when we turn to focus only on the GVC trade regression, the domestic tariff coefficient becomes positive (0.0414). The logic is that ASEAN+3, as a major GVC assembly hub, generates increased demand for local services that support production and supply chain activities. Although services are less directly exposed to tariffs, they become unavoidable as firms adjust their GVC strategies, which raises the strategic importance of services in strengthening GVC participation and, consequently, attracts more services FDI (Prazeres, 2019).

These results illustrate the first-layer story, showing how tariffs alone affect sectoral FDI. However, in reality, tariff shocks do not impact all economies uniformly; their effects depend on how deeply countries are embedded in global value chains. Therefore, it is necessary to examine the interaction term between U.S. tariffs and GVC participation in order to capture the indirect and conditional effects on sectoral FDI.

The regression results show that the interaction term between GVC participation and U.S. tariffs on ASEAN+3 countries is statistically significant for both manufacturing and services FDI, with a p-value of 0.0913 (< 0.10) for manufacturing and 0.005 (< 0.01) for services. The manufacturing coefficient of 0.1573 indicates that when GVC participation is strong, higher U.S. tariffs are associated with greater manufacturing FDI inflows into ASEAN+3. By contrast, the services coefficient of -1.789 suggests that the same interaction discourages services FDI inflows. This confirms that the effect of U.S. tariffs is heterogeneous across sectors once GVC integration is considered, providing strong support for Hypothesis 3.

The positive effect on manufacturing FDI reflects ASEAN+3 countries' established role in the global production network as they are closely tied (Hummels et al., 2001; Choi et al., 2021; Cigna et al., 2022; Klimek, 2024). When the U.S. imposes tariffs on manufactured goods from ASEAN+3, it makes their exports more expensive and less competitive in the U.S. market (Fajgelbaum et al., 2019; Flaaen & Pierce, 2019; York, 2018). However, ASEAN+3, which is deeply integrated into GVCs, is attractive to MNEs because most of the countries are not only producing finished goods, but are also heavily involved in the manufacturing of intermediate goods like electronics and machinery components. While U.S. tariff have also targeted the intermediate goods in ASEAN+3, the impact has been less severe than final goods in overall. Thus, many MNEs choose to deepen and relocate their manufacturing investments in ASEAN+3 to mitigate the tariff impact, ensuring a more stable and flexible supply chain. In short, once GVC integration is considered, ASEAN+3 attractiveness as an upstream or midstream production base has outweighs the loss in direct competitiveness in the U.S. Therefore, a positive coefficient is shown for manufacturing FDI. Since ASEAN+3 does not rely solely on the U.S. market, firms can redirect downstream production to other markets that are less affected by the U.S. tariff (Aslam, 2019). With RCEP and strong intra-Asian trade, firms can also easily restructure production and supply chains within the region itself, serving the local markets while reducing reliance on the U.S. market. While U.S. tariffs discourage ASEAN+3's exports, they also indirectly push MNEs to redirect their investment in ASEAN+3 to bypass the tariff barriers.

Services FDI moves in the opposite direction compared to manufacturing FDI is mainly due to different role of the sectors in GVCs. Manufacturing FDI is more upstream and midstream that tied directly to suppliers and production networks. In recent decades, firms split their production lines across different countries depending on the skills and resources available. This fragmentation allows ASEAN+3 to be benefited from U.S.-China Trade War since firms can relocate their upstream or midstream production to the countries in the region. Yet, service FDI often act as a downstream player in the GVCs. While not all services are downstream globally, in ASEAN+3 the manufacturing sector tends to occupy midstream positions rather than being fully upstream, making services relatively more downstream in the regional value chains (Asian Development Bank, 2023). Hence, services generate revenues mostly from the end-users, which can be spread over the world. This makes services less reliant on where the factories are located as some services can also be delivered remotely without physically crossing borders, which reduces the need to relocate to other countries (Nano & Stolzenburg, 2021). Therefore, services investors are usually more cautious and wait for stable demand before bumping capital. When U.S. raises tariffs, it creates uncertainty and disrupts global trade flows, causing service investors to hold their capital or delay expansion plans until the economic condition becomes clearer.

Moreover, service sectors are tied to long term relationship and skilled labour. Unlike manufacturing that can expand production quickly by responding to lower costs and better quality, services require investment in human capital and technology. Sectors like finance, logistics, and IT need employees skilled in technology and capable of building lasting client trust. This explains why our results show that the capital–labour ratio has a positive and significant effect on services FDI. Thus, building these networks require long-term commitment, causing service investors are reluctant to expand under uncertain conditions.

Although the interaction term exerts opposite effects on manufacturing and service FDI, the magnitude differs, with service FDI exhibiting a stronger impact. This suggests that service FDI are more sensitive and more deeply embedded in GVC participation. Services such as logistics, finance, and IT are essential to support production networks in ASEAN+3 countries. Once manufacturing FDI relocates to the region and stabilizes, service FDI tends to follow, as investors perceive these sectors as irreplaceable. For example, without well-established logistics and transportation services, the cross-border movement of intermediate goods would likely be impossible, or at least severely delayed. This underscores the crucial role of service industries in sustaining the manufacturing base and global production networks.

CHAPTER 5 CONCLUSIONS AND IMPLICATIONS

5.1 Summary

This study investigates the determinants of FDI inflows into ASEAN+3, with a focus on Total FDI, Manufacturing FDI, and Services FDI, in the context of the US–China Trade War. The findings suggest that tariffs are not the primary drivers of total FDI inflows into the region. However, their hidden impact becomes evident in the manufacturing sector. Specifically, spikes in U.S. tariffs reduce manufacturing FDI inflows to ASEAN+3, although this negative effect can be partially mitigated when host countries lower their domestic tariffs.

Trade agreements have played a significant role in attracting total FDI, as they reduce uncertainty, lower trade barriers, and enhance market access. For ASEAN+3, regional initiatives such as the AFTA and the RCEP create a more favorable investment climate that encourages cross-border production and deeper integration into global value chains. In the context of the U.S.–China Trade War, these agreements significantly strengthen ASEAN+3's position as an alternative investment hub, enabling the region to capture redirected FDI seeking stability, cost-efficiency, and secure market access.

Table 5.1

Divergent Effects of U.S. Tariffs on Sectoral FDI with GVC Integration

Sectoral FDI	*US tariff*	*US tariff x GVC*	*Net effect under GVC*
Manufacturing	0.0005	0.1573	Positive (+)
Service	0.0499	-0.1789	Negative (-)

Note: Coefficients are adapted from Table 4.6 to highlight the net effect of U.S. tariffs under GVC participation for the sectoral FDI in ASEAN+3 economies.

Sectoral analysis in Table 5.1 reveals a divergent pattern once GVC participation is taken into account. For manufacturing, higher U.S. tariffs can redirect investment opportunities towards ASEAN+3 economies with strong GVC integration, as firms seek cost-efficient alternatives to reposition their supply chains. In contrast, service FDI reacts differently. When the services sector is more deeply embedded in GVCs, rising U.S. tariffs reduce FDI inflows. This is because services such as finance, IT, and logistics are downstream and depend heavily on end-user demand, which is dispersed globally rather than tied to a single production hub.

5.2 Implications of the Study

Our study shows that while tariffs do not have a significant impact on total FDI inflows to ASEAN+3, they play an important role in the manufacturing sector. Specifically in GVC trade, reducing domestic tariffs can help improve manufacturing FDI, as it makes the region more attractive for firms that are considering relocating their plants. Manufacturing firms that want to bypass U.S. tariff costs will prefer countries that offer a more cost-effective strategy. Therefore, policymakers should design better incentives for foreign firms, such as lowering tariffs, simplifying business procedures, and creating a faster approval process. These measures can increase ASEAN+3's competitiveness and encourage more manufacturing FDI to enter the region.

Besides, our study proves that trade agreements have generated significant positive investment flows into ASEAN+3. This finding implies that policymakers should not only maintain but also expand the scope of regional trade agreement (RTA) to strengthen the region's attractiveness to foreign investors. ASEAN+3 countries should explore more partnering opportunities that create tariff-free zones, reduce non-tariff barriers, and enhance cost-efficiency for firms operating across borders. From a policy view, governments should focus on harmonizing regulations, improving infrastructure, and building stronger institutions to get the most benefits from trade liberalization, helping ASEAN+3 become a reliable and competitive hub in global production networks. During external shocks like the U.S.–China Trade War, closer economic integration through trade agreements can also protect against instability, helping the region stay resilient and continue to attract stable FDI inflows.

Moreover, the difference in sectoral FDI under high GVC integration shows that manufacturing FDI receives a positive inflow when U.S. tariffs increase. This means that ASEAN+3 countries should implement policies that support deeper GVC participation. Since each country has its own strength in different stages of the value chain, governments should encourage strategies that move industries further upstream, such as developing higher-skilled production, improving technology transfer, and building stronger supply chain linkages. By doing so, ASEAN+3 can capture more manufacturing FDI and strengthen its role in global production networks. Conversely, our study finds that service FDI reacts differently under high GVC integration. When U.S. tariffs increase, service FDI shows a negative inflow because services like finance, IT, and logistics are downstream and depend more on end-user demand, which is spread globally. This means that ASEAN+3 countries cannot only rely on GVC participation to attract service FDI. Instead, governments should improve the domestic business environment by strengthening institutions, protecting intellectual property, and building digital infrastructure. These policies can give more confidence to foreign service investors, even when global trade tensions create instability.

5.3 Limitations of the Study

This study has several limitations that should be acknowledged. First, Vietnam and Laos were excluded from the analysis of total FDI and sectoral FDI due to the unavailability of bilateral FDI and GVC-related FDI data. Vietnam is gaining importance as the country has become one of the fastest-growing destinations for manufacturing FDI in ASEAN. Vietnam's strategic position within GVC, especially in electronics, and textiles, making it an important player in the production network. The omission of Vietnam may lead to an underestimation of the broader ASEAN+3 dynamics, particularly regarding the redistribution of FDI inflows in response to trade tensions and tariff shocks. Similarly, although Laos accounts for a smaller share of FDI in the region, its exclusion still reduces the comprehensiveness of the dataset, as smaller economies can provide important insights into how less developed markets integrate into global and regional production networks.

Second, the scope of the GVC sectoral FDI data is quite limited, which covers only 11 countries over the short period from 2017 to 2022. While this timeframe captures the beginning of the U.S.–China Trade War in 2018, its relatively short time period reduces the explanatory power of the analysis, as the trade war is still ongoing and its long-term effects may not yet be fully reflected in the data. Moreover, the short duration restricts the ability to observe lagged or cumulative impacts of tariff measures, policy shifts, and firm relocation strategies within GVCs. As a result, the standard errors may be slightly downward biased due to the limited time period, which could lead some variables to appear statistically insignificant. Furthermore, because our dataset only covers a short time period, we could not include the interaction term (GVC*Tariff_i) as the number of cross-sections was not enough compared to the number of coefficients needed for the REM estimation.

Third, this study did not account for the lagged effects of FDI determinants. In reality, the impact of trade policy changes, tariff adjustments, or improvements in infrastructure and connectivity may not be immediately reflected in FDI inflows. Investment decisions typically involve long-term planning, and firm-level strategic considerations, meaning that policy shocks or structural changes may influence FDI only after a certain time lag. By not incorporating lagged variables, the analysis may underestimate or overlook these delayed responses, particularly in the case of factors such as free trade agreements, global value chain integration, and tariff measures, whose effects are likely to materialise gradually. The omission of lagged effects therefore limits the ability of the study to fully capture the dynamic nature of FDI flows in the ASEAN+3 region.

5.4 Recommendations of Future Studies

First, future studies should incorporate Vietnam and Laos once reliable bilateral FDI and GVC-related data become available. Both countries are integral members of ASEAN and play important roles in the region's economic integration and connectivity. Their exclusion may limit the representativeness of the findings for the ASEAN+3 region, as the dynamics of FDI and global value chain participation cannot be fully understood without considering all key ASEAN economies. Including Vietnam and Laos in future analyses would provide a more complete picture of regional investment patterns and supply chain linkages.

Second, the time dimension of the data should be extended beyond the 2017–2022 period used in this study. While the timeframe captured the beginning of the U.S.–China Trade War, it remains too short to assess the long-term effects of tariff shocks, GVC restructuring, and policy shifts. Extending the data to cover a longer period would improve the robustness of the results and allow researchers to examine the persistence of FDI responses over time. This would also help in capturing lagged and cumulative effects, such as gradual relocation of firms, the delayed impact of free trade agreements, and changes in connectivity or infrastructure that take years to materialize.

Third, future studies should explicitly account for lagged effects of FDI determinants by employing dynamic models, such as the Generalized Method of Moments (GMM). Investment decisions are rarely immediate, as firms typically take into consideration long-term strategies, risks, and regulatory environments. By incorporating lagged variables, future research would better capture the delayed responses of FDI inflows to trade policies, tariff changes, or shifts in global production networks. This would enhance the ability to understand the true dynamics of FDI flows within ASEAN+3.

Finally, future research could also benefit from including institutional, regulatory, and sustainability-related factors, which were beyond the scope of this study. Elements such as governance quality, political stability, labor market regulations, and the adoption of green finance practices are increasingly important in influencing investment decisions. By integrating these dimensions, future studies can provide a more holistic understanding of the determinants of FDI and offer richer insights for both policymakers and investors.

References

Abraham, F., Deardorff, A. V., & Stern, R. M. (1988). The impact of tariffs on profits in the United States and other major trading countries. *Weltwirtschaftliches Archiv*, *124*(4), 623–634.

Adarov, A., & Stehrer, R. (2020). Capital dynamics, global value chains, competitiveness and barriers to FDI and capital accumulation in the EU. *Wiiw Research Report, No. 446*. https://www.econstor.eu/bitstream/10419/223096/1/wiiw-research-rep-446.pdf

Albahouth, A. A., & Tahir, M. (2024). The Relationship between Trade Openness and FDI Inflows: Evidence-Based Insights from ASEAN Region. *Economies*, *12*(8), 208.

Alfaro, L., Kalemli-Ozcan, S., & Volosovych, V. (2014). Sovereigns, upstream capital flows, and global imbalances. *Journal of the European Economic Association*, *12*(5), 1240–1284.

ASEAN Plus Three. (2017). *Chairman's statement of the 20th ASEAN Plus Three Commemorative summit*. https://aseanplusthree.asean.org/wp-content/uploads/2020/01/FINAL-CHAIRMANS-STATEMENT-OF-THE-20TH-ASEAN-PLUS-THREE-COMMEMORATIVE-SUMMIT.pdf

ASEAN. (2024). *Regional Comprehensive Economic Partnership (RCEP)*. ASEAN. https://asean.org/our-communities/economic-community/integration-with-global-economy/regional-comprehensive-economic-partnership-rcep/

ASEAN. (2024). *Regional Comprehensive Economic Partnership (RCEP)*. ASEAN. https://asean.org/our-communities/economic-community/integration-with-global-economy/regional-comprehensive-economic-partnership-rcep/

Asian Development Bank. (2023). ASEAN and global value chains: Locking in resilience and sustainability. In *Asian Development Bank*. https://www.adb.org/sites/default/files/publication/871976/asean-global-value-chains-resilience-sustainability.pdf#page=66

Aslam, M. (2019). US-China trade disputes and its impact on ASEAN. *Transnational Corporation Review*, *11*(4), 332–345. https://doi.org/10.1080/19186444.2019.1691410

Australian Aid. (2018, October). *ASEAN Community Progress Monitoring System 2017: Tariff liberalization*. Aseanstat. https://www.aseanstats.org/wp-content/uploads/2018/10/Tariff-Liberalisation.pdf

Azizov, M., Bilan, Y., Jabiyev, F., Alirzayev, E., & Heyderova, A. (2023). The impact of foreign direct investment on GDP growth: the case of Turkey. *Investment Management and Financial Innovations*, *20*(4), 50–59.

Baldwin, R. (2012, May 30). *Unilateral tariff liberalisation*. CEPR. https://cepr.org/voxeu/columns/unilateral-tariff-liberalisation

Baldwin, R. (2014). *Multilateralising 21st-century regionalism*. CEPR. https://cepr.org/voxeu/columns/multilateralising-21st-century-regionalism

Baltagi, B. H., Bresson, G., & Pirotte, A. (2008). To Pool or Not to Pool? *Advanced Studies in Theoretical and Applied Econometrics*, *46*, 517–546. https://doi.org/10.1007/978-3-540-75892-1_16

Barrell, R., Nahhas, A., & Hunter, J. (2017). Exchange rates and bilateral FDI: Gravity models of bilateral FDI in high income economies. *Economics and Finance Working Paper Series No17-07*. https://www.brunel.ac.uk/economics-and-finance/research/pdf/Ray-Barrell-Abdulkader-Nahhas-and-John-Hunter-Exchange-Rates-and-Bilateral-FDI-Gravity-models-of-Bilateral-FDI-in-High-Income-Economies.pdf

Barfield, C. (2018, September 14). *An American (non-Trumpian) perspective on Asian integration*. CEPR. https://cepr.org/voxeu/blogs-and-reviews/american-non-trumpian-perspective-asian-integration

Barrell, R., Nahhas, A., & Hunter, J. (2017). Exchange Rates and Bilateral FDI: Gravity models of Bilateral FDI in High Income Economies. *Brunel University London*. https://www.brunel.ac.uk/economics-and-finance/research/pdf/Ray-Barrell-Abdulkader-Nahhas-and-John-Hunter-Exchange-Rates-and-Bilateral-FDI-Gravity-models-of-Bilateral-FDI-in-High-Income-Economies.pdf

Baum, C. F. (2006). Stata Tip 38: Testing for groupwise heteroskedasticity. *The Stata Journal Promoting Communications on Statistics and Stata*, *6*(4), 590–592. https://doi.org/10.1177/1536867x0600600412

Bi, Y., Ren, Z., & Bao, K. (2020). Does distance matter in foreign direct investment sub-national location choice? Evidence from China. *Frontiers of Business Research in China*, *14*(1).

Blackhurst, R., & Otten, A. (1996, October 9). Trade and foreign direct investment [Press release]. WTO. https://www.wto.org/english/news_e/pres96_e/pr057_e.htm

Blanchard, E. (2019, June 20). *Trade wars in the global value chain era*. CEPR. https://cepr.org/voxeu/columns/trade-wars-global-value-chain-era

Blonigen, B. A. (2002). Tariff-jumping antidumping duties. *Journal of International Economics*, *57*(1), 31–49.

Bouras, H., & Raggad, B. (2015, October 16). *Foreign Direct Investment and Exports: Complementarity or substitutability An Empirical investigation*. https://www.econjournals.com/index.php/ijefi/article/view/1372

Bown, C. P. (2020a, January 21). *Unappreciated hazards of the US-China phase one deal*. PIIE. https://www.piie.com/blogs/trade-and-investment-policy-watch/unappreciated-hazards-us-china-phase-one-deal

Bown, C. P. (2020b, May 18). *US-China phase one tracker: China's purchases of US goods*. PIIE. https://www.piie.com/research/piie-charts/us-china-phase-one-tracker-chinas-purchases-us-goods

Bown, C. P. (2021, February). *21-2 The US-China Trade War and Phase One Agreement*. Peterson Institute for International Economics. https://www.piie.com/sites/default/files/documents/wp21-2.pdf

Bown, C. P. (2025, February 25). *Trump's trade war timeline 2.0: An up-to-date guide*. Peterson Institute for International Economics. https://www.piie.com/blogs/realtime-economics/2025/trumps-trade-war-timeline-20-date-guide

Bown, C. P., & Joseph, J. (2017, October 31). *Solar and Washing Machine Safeguards in Context: The History of US Section 201 Use*. Peterson Institute for International Economics (PIIE). https://www.piie.com/blogs/trade-and-investment-policy-watch/solar-and-washing-machine-safeguards-context-history-us

Bown, C. P., & Kolb, M. (2018, April 16). *Trump's Trade War Timeline: An Up-to-Date Guide*. Peterson Institute for International Economics. https://www.piie.com/blogs/trade-and-investment-policy-watch/2018/trumps-trade-war-timeline-date-guide

Buelens, C., & Tirpák, M. (2017). Reading the Footprints: How foreign investors shape countries' participation in global value chains. *Comparative Economic Studies*, *59*(4), 561–584.

Büthe, T., & Milner, H. V. (2008). The Politics of Foreign Direct Investment into Developing Countries: Increasing FDI through International Trade Agreements? *American Journal of Political Science*, *52*(4), 741–762.

Cadestin, C., Backer, K. D., James, I. D., Miroudot, S., Ye, M., & Rigo, D. (2018). Multinational Enterprises and global Value chains: New insights on the trade- investment Nexus. *OECD Science, Technology and Industry Working Papers 2018/05*. https://doi.org/10.1787/194ddb63-en

Calì, M. (2018, October 16). *The impact of the US-China trade war on East Asia*. CEPR. https://cepr.org/voxeu/columns/impact-us-china-trade-war-east-asia

Celebi, K., & Roeger, W. (2025). US tariffs in a model with trade and FDI. *German Institute for Economic Research*. https://www.diw.de/documents/publikationen/73/diw_01.c.942342.de/dp2111.pdf

Cerutti, E., Gopinath, G., & Mohommad, A. (2019, May 23). *The Impact of US-China Trade Tensions*. International Monetary Fund. https://www.imf.org/en/Blogs/Articles/2019/05/23/blog-the-impact-of-us-china-trade-tensions

Chen, M. X., & Moore, M. O. (2010). Location decision of heterogeneous multinational firms. *Journal of International Economics*, *80*(2), 188–199.

Chiang, S. (2024, April 4). Malaysia emerges as a hotspot for semiconductor firms amid U.S.-China chip tensions. *CNBC*. https://www.cnbc.com/2024/04/04/malaysia-emerges-as-a-hotspot-for-chip-firms-amid-us-china-tech-war.html

Choi, J., Hinojales, M. M., Hong, S. H., & Vichyanond, J. (2021). The role of Vietnam's FDI inflows in global value chains participation and economic growth. *ASEAN+3 Macroeconomic Research Office*. https://www.amro-asia.org/wp-content/uploads/2021/05/The-Role-of-Vietnams-FDI-Inflows-in-Global-Value-Chains-Participation-and-Economic-Growth.pdf

Cigna, S., Gunnella, V., & Quaglietti, L. (2022). Global Value Chains: measurement, trends and drivers. *ECB Occasional Paper*, *2022/289*. https://doi.org/10.2139/ssrn.4007756

Cruz, C. B. B., Floriani, D. E., & Amal, M. (2020). The OLI paradigm as a comprehensive model of FDI determinants: a sub-national approach. *International Journal of Emerging Markets*, *17*(1), 145–176.

Dellis, K., Sondermann, D., & Vansteenkiste, I. (2017). Determinants of FDI inflows in advanced economies: Does the quality of economic structures matter? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2990996

DFAT. (2021). *Guide to obtaining preferential tariff treatment when exporting and importing goods using CPTPP*. Australian Government Department of Foreign Affairs and Trade. https://www.dfat.gov.au/trade/agreements/in-force/cptpp/outcomes-documents/guide-to-obtaining-preferential-tariff-treatment-when-exporting-and-importing-goods-using-cptpp

DFAT. (2025). *Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)*. Australian Government Department of Foreign Affairs and Trade (DFAT); Australian Government. https://www.dfat.gov.au/trade/agreements/in-force/cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership

Duan, J., Zhuang, Q., Wang, E., & Li, X. (2023). The Impact of Tariff Reduction of Manufacturing Industry on the Participation of Global Value Chains in China. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4516034

Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, *11*(1), 9–31.

Dunning, J. H. (1988a). The eclectic paradigm of international production: a restatement and some possible extensions. *Palgrave Macmillan Journals on Behalf of Academy of International Business*, *19*(1), 1–31.

Dunning, J. H. (1988b). The theory of international production. *The International Trade Journal*, *3*(1), 21–66.

Elfaki, K. E., & Ahmed, E. M. (2024). Digital technology adoption and globalization innovation implications on Asian Pacific green sustainable economic growth. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(1), 100221.

Ellerbeck, S. (2023, February 17). *What is "friendshoring"? This and other global trade buzzwords explained*. World Economic Forum. https://www.weforum.org/stories/2023/02/friendshoring-global-trade-buzzwords/

Encinas-Ferrer, C., & Villegas-Zermeño, E. (2015). Foreign direct investment and gross domestic product growth. *International Conference on Applied Economics*, 198–207. https://doi.org/10.1016/S2212-5671(15)00647-4

Eugster, J., Jaumotte, F., MacDonald, M., & Piazza, R. (2022). The Effect of Tariffs in Global Value Chains. *IMF Working Papers*, *2022*(040).

European Central Bank. (2019, December 27). *The effects of tariff hikes in a world of global value chains*. https://www.ecb.europa.eu/press/economic-bulletin/focus/2019/html/ecb.ebbox201908_01~da0137b70b.en.html

Fajgelbaum, P. D., Goldberg, P. K., Kennedy, P. J., & Khandelwal, A. K. (2019). The return to protectionism. *The Quarterly Journal of Economics*, *135*(1), 1–55.

Farge, E. (2025, March 27). Exclusive: US suspends financial contributions to WTO, trade sources say. *Reuters*. https://www.reuters.com/world/us-suspends-financial-contributions-wto-trade-sources-say-2025-03-27/

Flaaen, A., & Pierce, J. (2019a). Disentangling the effects of the 2018-2019 tariffs on a globally connected U.S. manufacturing sector. *Finance and Economics Discussion Series*, *2019.0*(86).

Fontagné, L. (1999). Foreign Direct Investment and international trade. In *OECD Science, Technology and Industry Working Papers*. https://doi.org/10.1787/788565713012

Freund, C., Mattoo, A., Mulabdic, A., & Ruta, M. (2023, August 31). *US-China decoupling: Rhetoric and reality*. CEPR. https://cepr.org/voxeu/columns/us-china-decoupling-rhetoric-and-reality

Freund, C., Mattoo, A., Mulabdic, A., & Ruta, M. (2024). Is US trade policy reshaping global supply chains? *Journal of International Economics*, *152*, 104011. https://doi.org/10.1016/j.jinteco.2024.104011

Gao, Y., Tresa, E., Zhang, T., Zhang , M., & Coffman, D. (2023). Global Value Chain Development Report 2023: Resilient and sustainable GVCs in turbulent times. In *World Trade Organization*. https://www.wto.org/english/res_e/booksp_e/05_gvc23_ch2_dev_report_e.pdf

George, A., Gopalan, S., & Lim, J. Z. (2021). Do global value chains pull greenfield FDI inflows into emerging markets? Theory and evidence. *ACI Research Paper #01-2021*. https://lkyspp.nus.edu.sg/docs/defaultsource/aci/acirp202101.pdf?sfvrsn=4bc2260a_4

Ghazalian, P. L., & Amponsem, F. (2018). The effects of economic freedom on FDI inflows: an empirical analysis. *Applied Economics*, *51*(11), 1111–1132.

Ghosh, A. R., & Ramakrishnan, U. (2023). *Current Account Deficits*. International Monetary Fund. https://www.imf.org/en/Publications/fandd/issues/Series/Back-to-Basics/Current-Account-Deficits

Gratton, P. (2024, June 7). *Multinational Corporation (MNC)*. Investopedia. https://www.investopedia.com/terms/m/multinationalcorporation.asp

Graziano, A., Martincus, C. V., & Blyde, J. (2014, May 13). *Economic integration agreements and the location of vertical FDI*. CEPR. https://cepr.org/voxeu/columns/economic-integration-agreements-and-location-vertical-fdi

Hadden, R. (2025, March 19). *Tariffs 101: What are they and how do they work?* Oxford Economics. https://www.oxfordeconomics.com/resource/tariffs-101-what-are-they-and-how-do-they-work/

Harithas, B., Meng, K., Brown, E., & Mouradian, C. (2025). *"Liberation Day" Tariffs Explained*. Center for Strategic & International Studies. https://www.csis.org/analysis/liberation-day-tariffs-explained

Hayakawa, K., Lee, H.-H., & Park, C.-Y. (2022). The Effect of COVID-19 on Foreign Direct Investment. *SSRN Electronic Journal*, *653*(653).

Hill, T. D., Davis, A. P., Roos, J. M., & French, M. T. (2019). Limitations of Fixed-Effects Models for Panel Data. *Sociological Perspectives*, *63*(3), 073112141986378.

Hoang, H. H., & Bui, D. H. (2015). Determinants of foreign direct investment in ASEAN: A panel approach. *Management Science Letters*, *5*(2), 213–222.

Hofmann, C., Osnago, A., & Ruta, M. (2017). Horizontal Depth: a new database on the content of preferential trade agreements. *Policy Research Working Paper 7981*. https://openknowledge.worldbank.org/server/api/core/bitstreams/daf3725e-216f-51f1-8a39-b80385a6e2a3/content

Hummels, D., Ishii, J., & Yi, K. (2001). The nature and growth of vertical specialization in world trade. *Journal of International Economics*, *54*(1), 75–96.

IMF. (2003). *Foreign Direct Investment in Emerging Market Countries*. International Monetary Fund (IMF). https://www.imf.org/external/np/cmcg/2003/eng/091803.pdf

IMF. (2019). World Economic Outlook, April 2019: Growth Slowdown, Precarious Recovery. In *World Economic Outlook*. International Monetary Fund. https://doi.org/10.5089/9781484397480.081

International Trade Council. (2025, March 6). *Impact of U.S. March 2025 tariffs on global Foreign Direct Investment (FDI)*. Trade Council. https://tradecouncil.org/wp-content/uploads/2025/03/Impact-of-U.S.-March-2025-Tariffs-on-Global-Foreign-Direct-Investment.pdf

Jang, Y. J. (2011). The Impact of Bilateral Free Trade Agreements on Bilateral Foreign Direct Investment among Developed Countries. *World Economy*, *34*(9), 1628–1651.

Kassim, Q. (2023, May 25). *Balance game for middle powers caught in US-China rivalry*. ISIS. https://www.isis.org.my/2023/05/24/balance-game-for-middle-powers-caught-in-us-china-rivalry/

Kim, J. D. (2019). Servicification: Its meaning and policy implications. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3887257

Klimek, A. (2024). Economic upgrading of Central and Eastern European economies through global value chain participation and foreign direct investment. *Baltic Journal of Economics*, *24*(2), 180–202.

Kolb, M. (2024, August 16). *What Is Globalization?* Peterson Institute for International Economics. https://www.piie.com/microsites/globalization/what-is-globalization

Koopman, R., Wang, Z., & Wei, S.-J. (2012). Tracing Value-added and Double Counting in Gross Exports. *American Economic Review*, *104*(2), 459–494.

Korsah, E., Amanamah, R. B., & Gyimah, P. (2022). Drivers of foreign direct investment: new evidence from West African regions. *Journal of Business and Socio-economic Development*. https://doi.org/10.1108/jbsed-12-2021-0173

Kowalkowski, C., Gebauer, H., Kamp, B., & Parry, G. (2017). Servitization and deservitization: Overview, concepts, and definitions. *Industrial Marketing Management*, *60*, 4–10. https://doi.org/10.1016/j.indmarman.2016.12.007

Kowalski, P., Gonzalez, J. L., Ragoussis, A., & Ugarte, C. (2015). Participation of developing countries in global value chains. *OECD Trade Policy Working Papers*. https://doi.org/10.1787/5js33lfw0xxn-en

Krieger-Boden, C., & Görg, H. (2011, June 9). *Trade protection backfires on FDI*. CEPR. https://cepr.org/voxeu/columns/trade-protection-backfires-fdi

Kwan, Y. K., & Qiu, L. D. (2010). The ASEAN+3 trading bloc. *Journal of Economic Integration*, *25*(1), 1–31.

Lai, L. G., Quynh, N. T., & Bayhaqi, A. (2022). The FDI network, global value chain participation and economic upgrading. *APEC Policy Support Unit POLICY BRIEF No. 46*. https://www.apec.org/docs/default-source/publications/2022/5/the-fdi-network-global-value-chain-participation-and-economic-upgrading/222_psu_fdi-and-gvc transformation.pdf?sfvrsn=cda431fb_2#:~:text=Foreign%20direct%20investment%20(FDI)%20represents%20an%20important%20internationalisation%20pathway%20to,value%20chain%20(GVC)%20participation.&text=

The%20APEC%20economies%20as%20a,percent%20between%201990%20and%202020

Lee, S. J., Kang, S. J., & Lee, S. (2024). Economic, Social and Institutional Determinants of FDI Inflows: A Comparative Analysis of Developed and Developing Economies. *Transnational Corporations Review*, *16*(3), 200074–200074.

Lesher, M., & Miroudot, S. (2008). FDI Spillovers and their Interrelationships with Trade. *OECD Trade Policy Working Papers*. https://doi.org/10.1787/235843308250

Liu, X., Lovely, M. E., & Ondrich, J. (2010). The location decisions of foreign investors in China: Untangling the effect of wages using a control function approach. *The Review of Economics and Statistics*, *92*(1), 160–166.

Ly, A., Esperança, J., & Davcik, N. S. (2017). What drives foreign direct investment: the role of language, geographical distance, information flows and technological similarity. *Journal of Business Research*, *88*, 111–122. https://doi.org/10.1016/j.jbusres.2018.03.007

Manak, I., & Miller, M. C. (2023, October 25). *Friendshoring's Devil Is in the Details*. Council on Foreign Relations. https://www.cfr.org/blog/friendshorings-devil-details

Martínez-Galán, E., & Fontoura, M. P. (2018). Global value chains and inward foreign direct investment in the 2000s. *World Economy*, *42*(1), 175–196.

Matsuura, T. (2022). Investment Liberalisation in East and Southeast Asia. *ERIA Discussion Paper Series*, *457*. https://www.eria.org/uploads/media/discussion-papers/FY22/Investment-Liberalisation-in-East-and-Southeast-Asia.pdf

Mayer, T., Thoenig, M., & Martin, P. (2010, April 9). *The economics and politics of free trade agreements*. CEPR. https://cepr.org/voxeu/columns/economics-and-politics-free-trade-agreements

Medina, A. F. (2021, August 20). *ASEAN's free trade agreements: an Overview*. ASEAN Business News. https://www.aseanbriefing.com/news/aseans-free-trade-agreements-an-overview/

Mena, B. (2025, April 2). *Key takeaways from Trump's "Liberation Day" tariffs*. CNN. https://edition.cnn.com/2025/04/02/economy/key-takeaways-from-trumps-liberation-day-tariffs/index.html

Mensah, I., & Mensah, E. K. (2021). The impact of inward FDI on output growth volatility: A country-sector analysis. *Research in Globalization*, *3*, 100063. https://doi.org/10.1016/j.resglo.2021.100063

Miroudot, S. (2019). Services and manufacturing in global value chains: Is the distinction obsolete? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3374789

Miura, Y. (2019). The Impact of US-China Trade Friction on Asian Supply Chains Summary. *Pacific Business and Industries*, *19*(74).

Nair, S. (2022, August 30). *MADE IN CHINA 2025*. Organisation for Research on China and Asia. https://orcasia.org/made-in-china-2025

Nano, E., & Stolzenburg, V. (2021). The role of Global Services Value Chains for Services-Led Development. In *WTO*. WTO. https://www.wto.org/english/res_e/booksp_e/07_gvc_ch4_dev_report_2021_e.pdf

Nguyen, H. T., Le, A. N. N., Le, H. V., & Duong, K. D. (2024). Foreign direct investment and employments in Asia Pacific nations: The moderating role of labor quality. *Heliyon*, *10*(9), e30133.

Nguyen, Q. (2020). The impact of the US-China trade war on foreign direct investment inflows of Vietnam. *CEU eTD Collection*. https://www.etd.ceu.edu/2020/nguyen_quynh02.pdf

Obashi, A. (2022). Overview of foreign direct investment, trade, and global value chains in East Asia. ERIA Discussion Paper Series. https://www.eria.org/uploads/media/discussion-papers/FY21/Overview-of-Foreign-Direct-Investment%2C-Trade%2C-and-Global-Value-Chains-in-East-Asia.pdf

OECD. (2013). *Interconnected economies: Benefiting from global value chains*. http://dx.doi.org/10.1787/9789264189560-en

OECD. (2024). *FDI flows*. OECD. https://www.oecd.org/en/data/indicators/fdi-flows.html

Pattnayak, S. S., & Chadha, A. (2022). Servicification and manufacturing exports: Evidence from India. *Economic Modelling*, *108*, 105756. https://doi.org/10.1016/j.econmod.2022.105756

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. *IZA Discussion Paper No. 1240*. https://docs.iza.org/dp1240.pdf

Petri, P. A., & Plummer, M. G. (2019, February 3). *Why the CPTPP Could Be the Answer to the US-China Trade War*. PIIE. https://www.piie.com/commentary/op-eds/why-cptpp-could-be-answer-us-china-trade-war

Prazeres, T. L. (2019, September 20). *Services are the hidden side of the US-China trade war*. World Economic Forum. https://www.weforum.org/stories/2019/09/us-china-trade-war-disrupting-services/

Presbitero, A., Amendolagine, V., Rabellotti, R., Sanfilippo, M., & Seric, A. (2017). FDI, global value chains, and local sourcing in developing countries. *IMF Working Paper*, *2017*(284), 1.

Pyun, J. H. (2025). Third-country FDI relocation in response to the US-China tariff war. *IDE DISCUSSION PAPER No. 954*. https://journals.sagepub.com/doi/pdf/10.1177/1536867X0600600412

Raudenbush, S. W. (1994). Random Effects Model. *The Handbook of Research Synthesis*, *421*(3.6), 301–321.

Ravikumar, R., Ezhilarasan, G., & Munusamy, A. (2024). The Impact of GDP on Foreign Direct Investment inflows of BRICS Country: An Empirical analysis. *Journal of Emerging Technologies and Innovative Research (Jetir)*, *11*(10).

Rocha, N., Ruta, M., & Fernandes, A. M. (2021, June 23). *The Economics of Deep Trade Agreements: a new eBook*. CEPR. https://cepr.org/voxeu/columns/economics-deep-trade-agreements-new-ebook

Ruta, M., Osnago, A., Rocha, N., & Laget, E. (2018, July 14). *Trade agreements and global production*. CEPR. https://cepr.org/voxeu/columns/trade-agreements-and-global-production

Sağlam, B. B., & Böke, S. S. (2017). Labor Costs and Foreign Direct Investment: A panel VAR approach. *Economies*, *5*(4), 36.

Sahoo, P., & Dash, R. K. (2022). Does FDI have differential impacts on exports? Evidence from developing countries. *International Economics*, *172*, 227–237. https://doi.org/10.1016/j.inteco.2022.10.002

Saleh, E. A. (2023). The effects of economic and financial crises on FDI: A literature review. *Journal of Business Research*, *161*, 113830. https://doi.org/10.1016/j.jbusres.2023.113830

Salvatici, L. (2020). Assessing the impact of trade and other policies on GVC participation, positioning and vertical specialization in agriculture and food. *Background Paper for the State of Agricultural Commodity Markets (SOCO) 2020*. https://openknowledge.fao.org/server/api/core/bitstreams/f6caca0c-9428-4011-b75c-269a1f5b8568/content

Sanfilippo, M., Presbitero, A., Rabellotti, R., & Amendolagine, V. (2018, January 24). *Foreign direct investment, integration in global value chains, and local development*. CEPR. https://cepr.org/voxeu/columns/foreign-direct-investment-integration-global-value-chains-and-local-development

Sauvé, P. (2018). Malaysia's trade governance at a crossroads. *Khazanah Research Institute*. https://www.krinstitute.org/assets/contentMS/img/template/editor/Malaysia%20Trade%20Governance%20at%20a%20Crossroads_Full%20Book%20(1).pdf#page=97

Scaperlanda, A., & Balough, R. S. (1983). Determinants of U.S. direct investment in the E.E.C. *European Economic Review*, *21*(3), 381–390.

Shah, M. H., & Khan, Y. (2016). Trade liberalization and FDI inflows in emerging economies. *Business & Economic Review*, *8*(1), 35–52.

Shine, I. (2024, October 9). *The Building Chips in America Act: what's in the new bill?* World Economic Forum. https://www.weforum.org/stories/2024/10/building-chips-in-america-act-semiconductor-industry/

Sun, J., Luo, Y., & Zhou, Y. (2022). The impact of regional trade agreements on the quality of export products in China's manufacturing industry. *Journal of Asian Economics*, *80*, 101456. https://doi.org/10.1016/j.asieco.2022.101456

Tang, L. (2012). The direction of cultural distance on FDI: attractiveness or incongruity? *Cross Cultural Management an International Journal*, *19*(2), 233–256.

Thangavelu, S. M., & Findlay, C. (2011). The impact of free trade agreements on foreign direct investment in the Asia-Pacific region. *ERIA Research Project Report 2010-29*, 112–131. https://www.eria.org/uploads/media/Research-Project-Report/RPR_FY2010_29_Chapter_4.pdf

The White House. (2025a, January 21). *America First Trade Policy*. The White House. https://www.whitehouse.gov/presidential-actions/2025/01/america-first-trade-policy/

The White House. (2025b, February 1). *Fact Sheet: President Donald J. Trump Imposes Tariffs on Imports from Canada, Mexico and China*. The White House. https://www.whitehouse.gov/fact-sheets/2025/02/fact-sheet-president-donald-j-trump-imposes-tariffs-on-imports-from-canada-mexico-and-china/

Thipphaphone, E. (2022). Asia-Pacific economic growth & the region's major trade agreements. *Bulletin of the Saint Petersburg State Institute of Technology*, *4*(49).

Torrisi, C. R. (1985). The determinants of direct foreign investment in a small LDC. Journal of Economic Development, 10(1), 29–45.

UNCTAD. (2007). *Definitions and sources*. United Nations Conference On Trade And Development. https://unctad.org/system/files/official-document/wir2007p4_en.pdf

UNCTAD. (2013). *World Investment Report 2013: Global Value Chains: Investment and Trade for Development*. https://unctad.org/system/files/official-document/wir2013_en.pdf

UNCTAD. (2017). *World Investment Report 2017: Investment and the digital economy*. https://unctad.org/system/files/official-document/wir2017_en.pdf

UNESCAP. (2017). *Foreign Direct Investment: Liberalization continues*. https://www.unescap.org/sites/default/d8files/Ch3%20-%20Foreign%20direct%20investment_liberalization%20continues.pdf

UNESCAP. (2020). *Asia-Pacific Trade and Investment Trends 2019/2020: Preferential trade agreements in Asia and the Pacific*. https://repository.unescap.org/bitstream/handle/20.500.12870/384/ESCAP-2019-RP-Preferential-trade-agreements-Asia-Pacific-2019-2020.pdf?sequence=1&isAllowed=y

United Nations. (2024). *Global economic fracturing and shifting investment patterns: A diagnostic of 10 FDI trends and their development implications*. https://doi.org/10.18356/9789213589687

United States Census Bureau. (2025a). *Foreign Trade - U.S. Trade with China*. United States Census Bureau. https://www.census.gov/foreign-trade/balance/c5700.html

United States Census Bureau. (2025b). *Foreign Trade - U.S. Trade with World, Seasonally Adjusted*. United States Census Bureau. https://www.census.gov/foreign-trade/balance/c0004.html

Vo, T. Q., & Ho, H. T. (2021). The relationship between foreign direct investment inflows and trade openness: evidence from ASEAN and related countries. *Journal of Asian Finance Economics and Business*, *8*(6), 587–595.

Wahyuningsih, D. (2021). Trade flow of manufacturing sector and foreign Direct investment in ASEAN Economic Integration: the Gravity Model of Trade. *620Jurnal Perspektif Pembiayaan Dan Pembangunan Daerah*, *8*(6), 619–630.

Wang, D., & Lahiri, S. (2022). Bilateral foreign direct investments: differential effects of tariffs in source and destination countries. *The Journal of International Trade & Economic Development*, 1–18. https://doi.org/10.1080/09638199.2022.2080246

Wen, H., You, Y., & Zhang, Y. (2021). Effects of tariff reduction by regional comprehensive economic partnership (RCEP) on global value chains based on simulation. *Applied Economics Letters*, *29*(20), 1906–1920.

Wijesinghe, A., & Yogarajah, C. (2022). Trade policy impact on global value chain participation of the South Asian countries. *Journal of Asian Economic Integration*, *4*(1), 24–48.

World Bank. (2020). *Chapter 1: Foreign Direct Investment and Global Value Chains*. Worldbank. https://thedocs.worldbank.org/en/doc/c9af0143184de77cb58ddd5adf024508-0350012021/original/Chapter-1-An-Investment-Perspective-on-Global-Value-Chains.pdf

World Bank. *World Development Indicator*. Databank. https://databank.worldbank.org/reports.aspx?source=2&series=BX.KLT.DINV.CD.WD&country=

World Population Review. (2025). *Us Trade Deficit By Country 2020*. World Population Review. https://worldpopulationreview.com/country-rankings/us-trade-deficit-by-country

WTO. (2014). World Trade Report 2014: Trade and Development: recent trends and the role of the WTO. In *World Trade Report*. World Trade Organization. https://doi.org/10.30875/9f925144-en

Xue, S. (2024). *Trade Wars with FDI Diversion*. Princeton University. https://www.sifanxue.com/SifanXueJMP_latest.pdf

Yang, H., Ou, J., & Chen, X. (2021). Impact of tariffs and production cost on a multinational firm's incentive for backshoring under competition. *Omega*, *105*, 102500. https://doi.org/10.1016/j.omega.2021.102500

Yanikkaya, H., Tat, P., & Altun, A. (2023). Do lower tariff rates promote global value chain participation? *World Trade Review*, *23*(1), 1–19.

Yeyati, E. L., Stein, E., & Daude, C. (2002). Regional integration and the location of FDI. *Documento De Trabajo 05/2003*.

https://repositorio.utdt.edu/server/api/core/bitstreams/c71c7733-81af-46d5-a299-761fccb2ed12/content

Yin, X. (2011). *China's Intermediate Goods Trade with ASEAN: A Profile of Four Countries*. BRC Research. https://www.ide.go.jp/library/English/Publish/Reports/Brc/pdf/05_chapter3.pdf

York, E. (2018). The Impact of Trade and Tariffs on the United States. In *Tax Foundation* (No. 595). Tax Foundation. https://files.taxfoundation.org/20180627113002/Tax-Foundation-FF595-1.pdf

Yotov, Y., & Anderson, J. E. (2011, May 19). *Good news on free trade agreements*. CEPR. https://cepr.org/voxeu/columns/good-news-free-trade-agreements

Zeng, K., & Kim, S. Y. (2024). Chinese Firms in the US–China Trade War: Decoupling through Reshoring? *International Studies Quarterly*, *69*(1).

Zheng, H. (2021). Liberalizing Investment to Cope with Trade Wars: Evidence from China's Strategic Reform of FDI Policy. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3985226

Appendices

Appendix 1: Descriptive Statistics

Appendix 1.1: Descriptive Statistics of Total FDI

FDI_ij		GDP_i		GDP_j			DistConnect_ij	Trade_i		Clratio_i	
Mean	0.99	Mean	2297929.26	Mean	7767425.99	Mean	2459570.53	Mean	106.82	Mean	41713275.10
Standard Error	0.14	Standard	169383.01	Standard	262157.36	Standard	98096.06	Standard	3.29	Standard	4402829.32
Median	0.03	Median	661406.86	Median	4376627.83	Median	1754664.50	Median	86.25	Median	223249.05
Mode	-0.03	Mode	38029.53	Mode	3149837.98	Mode	#N/A	Mode	122.11	Mode	10931.81
Standard Deviation	3.37	Standard	4403958.14	Standard	6816091.47	Standard	2550497.47	Standard	85.57	Standard	114049427.52
Sample Variance	11.39	Sample Va	19394847336016.20	Sample Va	46459102934573.50	Sample Va	6505037325437.81	Sample Va	7321.75	Sample Va	13007271916825000.00
Kurtosis	20.55	Kurtosis	7.17	Kurtosis	-1.05	Kurtosis	1.40	Kurtosis	2.97	Kurtosis	11.00
Skewness	4.21	Skewness	2.86	Skewness	0.72	Skewness	1.34	Skewness	1.88	Skewness	3.33
Range	33.37	Range	19999262.21	Range	20701357.02	Range	13028358.48	Range	367.24	Range	586020430.34
Minimum	-8.08	Minimum	13000.44	Minimum	742031.41	Minimum	64694.52	Minimum	11.86	Minimum	10510.78
Maximum	25.29	Maximum	20012262.65	Maximum	21443388.43	Maximum	13093053.00	Maximum	379.10	Maximum	586030941.12
Sum	579.08	Sum	1553400178.93	Sum	5250779967.88	Sum	1662669677.10	Sum	72210.53	Sum	27989607594.03
Count	587	Count	676	Count	676	Count	676	Count	676	Count	671

Appendix 1.2: Descriptive Statistics of Manufacturing FDI

MANU_FDI_i		GDP_i		GDP_j		WghtAvrDist		Trade_i		Clratio_i	
Mean	1.01	Mean	2612074.68	Mean	3630891.97	Mean	113883.31	Mean	103.87	Mean	90453493.60
Standard Error	0.20	Standard Error	613406.37	Standard Error	7193.14	Standard Error	394.62	Standard Error	9.82	Standard Error	19194407.67
Median	0.36	Median	601100.33	Median	3644807.48	Median	112972.02	Median	78.06	Median	848181.98
Mode	#N/A	Mode	#N/A	Mode	3597248.14	Mode	113958.22	Mode	37.63	Mode	#N/A
Standard Deviati	1.65	Standard Deviati	4983336.93	Standard Deviati	58437.38	Standard Deviati	3205.90	Standard Deviati	79.82	Standard Deviati	154750261.94
Sample Variance	2.73	Sample Variance	24833646956074.20	Sample Variance	3414926825.72	Sample Variance	10277785.14	Sample Variance	6370.87	Sample Variance	23947643569539000.00
Kurtosis	4.72	Kurtosis	5.94	Kurtosis	-0.49	Kurtosis	0.75	Kurtosis	3.21	Kurtosis	3.14
Skewness	2.04	Skewness	2.64	Skewness	-0.74	Skewness	1.48	Skewness	1.91	Skewness	1.97
Range	9.20	Range	19999262.21	Range	179316.36	Range	9324.23	Range	301.65	Range	586011419.53
Minimum	-2.20	Minimum	13000.44	Minimum	3522914.64	Minimum	111353.40	Minimum	31.33	Minimum	19521.60
Maximum	7.01	Maximum	20012262.65	Maximum	3702231.00	Maximum	120677.63	Maximum	332.98	Maximum	586030941.12
Sum	66.98	Sum	172396928.79	Sum	239638870.14	Sum	7516298.44	Sum	6855.43	Sum	5879477084.16
Count	66	Count	66	Count	66	Count	66	Count	66	Count	65

Appendix 1.3: Descriptive Statistics of Service FDI

SERV_FDI_i		GDP_i		GDP_j		WghtAvrDist		Trade_i		Clratio_i	
Mean	2.67	Mean	2612074.68	Mean	3630891.97	Mean	113883.31	Mean	103.87	Mean	90453493.60
Standard Error	0.78	Standard Error	613406.37	Standard Error	7193.14	Standard	394.62	Standard Error	9.82	Standard Error	19194407.67
Median	0.51	Median	601100.33	Median	3644807.48	Median	112972.02	Median	78.06	Median	848181.98
Mode	#N/A	Mode	#N/A	Mode	3597248.14	Mode	113958.22	Mode	37.63	Mode	#N/A
Standard Deviati	6.36	Standard Deviati	4983336.93	Standard Deviati	58437.38	Standard	3205.90	Standard Deviati	79.82	Standard Deviati	154750261.94
Sample Variance	40.46	Sample Variance	24833646956074.20	Sample Variance	3414926825.72	Sample Va	10277785.14	Sample Variance	6370.87	Sample Variance	23947643569539000.00
Kurtosis	10.68	Kurtosis	5.94	Kurtosis	-0.49	Kurtosis	0.75	Kurtosis	3.21	Kurtosis	3.14
Skewness	3.32	Skewness	2.64	Skewness	-0.74	Skewness	1.48	Skewness	1.91	Skewness	1.97
Range	31.01	Range	19999262.21	Range	179316.36	Range	9324.23	Range	301.65	Range	586011419.53
Minimum	-1.10	Minimum	13000.44	Minimum	3522914.64	Minimum	111353.40	Minimum	31.33	Minimum	19521.60
Maximum	29.91	Maximum	20012262.65	Maximum	3702231.00	Maximum	120677.63	Maximum	332.98	Maximum	586030941.12
Sum	175.92	Sum	172396928.79	Sum	239638870.14	Sum	7516298.44	Sum	6855.43	Sum	5879477084.16
Count	66	Count	66	Count	66	Count	66	Count	66	Count	65

Appendix 2: Correlation

Appendix 2.1: Correlation of Total FDI

	FDI_ij	GDP_i	GDP_j	'stConnect_	Trade_i	Clratio_i
FDI_ij	1.0000					
GDP_i	-0.0652	1.0000				
GDP_j	0.2260	-0.0262	1.0000			
DistConnect_ij	0.0210	0.0529	0.1776	1.0000		
Trade_i	0.0699	-0.3165	-0.0003	-0.1685	1.0000	
Clratio_i	0.1335	-0.0099	0.0732	0.0583	0.2003	1.0000

Appendix 2.2: Correlation of Manufacturing FDI

	MANU_FDI_	GDP_i	GDP_j	WghtAvrDis	Trade_i	Clratio_i
MANU_FDI_i	1.0000					
GDP_i	-0.2230	1.0000				
GDP_j	0.1571	0.0212	1.0000			
WghtAvrDist	-0.1567	-0.0265	-0.9262	1.0000		
Trade_i	0.6342	-0.3648	0.0595	-0.0545	1.0000	
Clratio_i	0.1906	-0.0221	-0.0578	0.1145	0.3240	1.0000

Appendix 2.3: Correlation of Service FDI

	SERV_FDI_i	GDP_i	GDP_j	WghtAvrDis	Trade_i	Clratio_i
SERV_FDI_i	1.0000					
GDP_i	-0.1553	1.0000				
GDP_j	0.0195	0.0212	1.0000			
WghtAvrDist	-0.0043	-0.0265	-0.9262	1.0000		
Trade_i	0.8439	-0.3648	0.0595	-0.0545	1.0000	
Clratio_i	0.5627	-0.0221	-0.0578	0.1145	0.3240	1.0000

Appendix 3: Poolability F test

Appendix 3.1: Poolability F test of Total FDI

Redundant Fixed Effects Tests
Equation: MODEL5 FEM
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.355420	(51,517)	0.0000
Cross-section Chi-square	379.216484	51	0.0000

Appendix 3.2: Poolability F test of Manufacturing FDI

Redundant Fixed Effects Tests
Equation: MODEL 5
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.622789	(10,44)	0.7862
Cross-section Chi-square	8.604755	10	0.5700

Appendix 3.3: Poolability F test of Service FDI

Redundant Fixed Effects Tests
Equation: MODEL 5
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.185838	(10,44)	0.0000
Cross-section Chi-square	68.312896	10	0.0000

Appendix 4: BPLM Test

Appendix 4.1: BPLM Test of Total FDI

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	563.2657 (0.0000)	0.015402 (0.9012)	563.2811 (0.0000)
Honda	23.73322 (0.0000)	-0.124105 (0.5494)	16.69417 (0.0000)
King-Wu	23.73322 (0.0000)	-0.124105 (0.5494)	9.906313 (0.0000)
Standardized Honda	26.66871 (0.0000)	0.401541 (0.3440)	13.69286 (0.0000)
Standardized King-Wu	26.66871 (0.0000)	0.401541 (0.3440)	7.098497 (0.0000)
Gourieroux, et al.	--	--	563.2657 (0.0000)

Appendix 4.2: BPLM Test of Manufacturing FDI

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	4.144209 (0.0418)	2.444664 (0.1179)	6.588873 (0.0103)
Honda	-2.035733 (0.9791)	-1.563542 (0.9410)	-2.545072 (0.9945)
King-Wu	-2.035733 (0.9791)	-1.563542 (0.9410)	-2.451958 (0.9929)
Standardized Honda	-0.907043 (0.8178)	-0.725696 (0.7660)	-5.768976 (1.0000)
Standardized King-Wu	-0.907043 (0.8178)	-0.725696 (0.7660)	-5.528494 (1.0000)
Gourieroux, et al.	--	--	0.000000 (1.0000)

Appendix 4.3: BPLM Test of Service FDI

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	11.26335	1.330777	12.59412
	(0.0008)	(0.2487)	(0.0004)
Honda	3.356091	-1.153593	1.557401
	(0.0004)	(0.8757)	(0.0597)
King-Wu	3.356091	-1.153593	0.995735
	(0.0004)	(0.8757)	(0.1597)
Standardized Honda	6.829127	-0.133247	0.293954
	(0.0000)	(0.5530)	(0.3844)
Standardized King-Wu	6.829127	-0.133247	-0.434570
	(0.0000)	(0.5530)	(0.6681)
Gourieroux, et al.	--	--	11.26335
			(0.0013)

Appendix 5: Hausman Test

Appendix 5.1: Hausman Test of Total FDI

Correlated Random Effects - Hausman Test
Equation: MODEL5 FEM
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.709005	11	0.0072

Appendix 5.2: Hausman Test of Manufacturing FDI

Correlated Random Effects - Hausman Test
Equation: MODEL 5
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.157783	10	0.8018

Appendix 5.3: Hausman Test of Service FDI

Correlated Random Effects - Hausman Test
Equation: MODEL 5
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	8.394891	10	0.5903

Appendix 6: Groupwise Heteroskedasticity Test

Appendix 6.1: Groupwise Heteroskedasticity Test of Total FDI

Panel Cross-section Heteroskedasticity LR Test
Equation: MODEL5_FEM
Specification: LNFDI_IJ LNGDP_I LNGDP_J LNDISTCONNECT_IJ
LNTRADE_I LNCLRATIO_I LNFTA_I TARIFF_I_DEC
USTARIFF_I_DEC TARIFF_I_DEC*USTARIFF_I_DEC
DUM_WAR*USTARIFF_I_DEC HIGH_INC*TARIFF_I_DEC C
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	3175.794	52	0.0000

LR test summary:

	Value	df
Restricted LogL	72.20159	568
Unrestricted LogL	1660.099	568

Appendix 6.2: Groupwise Heteroskedasticity Test of Manufacturing FDI

Panel Cross-section Heteroskedasticity LR Test
Equation: MODEL 1
Specification: LNMANU FDI I LNGDP I LNGDP J LNWGHTAVRDIST
LNGVC I LNCLRATIO I LNFTA I TARIFF I USTARIFF I
LNGVC I USTARIFF I DUM INC TARIFF I C
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	154.2591	11	0.0000

LR test summary:

	Value	df
Restricted LogL	-15.71058	54
Unrestricted LogL	61.41897	54

Appendix 6.3: Groupwise Heteroskedasticity Test of Service FDI

Panel Cross-section Heteroskedasticity LR Test
Equation: MODEL 5
Specification: LNSERV FDI I LNGDP I LNGDP J LNWGHTAVRDIST
LNTRADE I LNCLRATIO I LNFTA I TARIFF I USTARIFF I
USTARIFF_I_TARIFF_I DUM_INC___TARIFF_I C
Null hypothesis: Residuals are homoskedastic

	Value	df	Probability
Likelihood ratio	119.3018	11	0.0000

LR test summary:

	Value	df
Restricted LogL	-17.36015	54
Unrestricted LogL	42.29076	54

Appendix 7: Cross-sectional Dependency Test

Appendix 7.1: Cross-sectional Dependency Test of Total FDI

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: MODEL5_FEM
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 580
Note: non-zero cross-section means detected in data
Test employs centered correlations computed from pairwise samples

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	2597.969	1326	0.0000
Pesaran scaled LM	24.69958		0.0000
Pesaran CD	19.65773		0.0000

Appendix 7.2: Cross-sectional Dependency Test of Manufacturing FDI

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: MODEL_5
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Note: non-zero cross-section means detected in data
Test employs centered correlations computed from pairwise samples

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	161.9276	55	0.0000
Pesaran scaled LM	10.19515		0.0000
Pesaran CD	2.370934		0.0177

Appendix 7.3: Cross-sectional Dependency Test of Service FDI

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: MODEL_5
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Note: non-zero cross-section means detected in data
Test employs centered correlations computed from pairwise samples

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	58.20996	55	0.3581
Pesaran scaled LM	0.306058		0.7596
Pesaran CD	-0.650210		0.5156

Appendix 8: Long Run Regression Model of Total FDI

Appendix 8.1: Total Trade Model 1 of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/22/25 Time: 00:28
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 582
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.002715	0.001605	-1.691195	0.0914
LNGDP_J	0.006018	0.002565	2.345924	0.0194
LNDISTCONNECT_IJ	0.706169	0.215018	3.284228	0.0011
LNTRADE_I	0.004161	0.002877	1.446345	0.1487
LNCLRATIO_I	9.13E-05	0.000141	0.648001	0.5173
C	2.091523	0.044484	47.01757	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.737977	Mean dependent var	25.77214
Adjusted R-squared	0.710028	S.D. dependent var	18.66042
S.E. of regression	0.127342	Sum squared resid	8.513384
F-statistic	26.40431	Durbin-Watson stat	1.612628
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618373	Mean dependent var	2.266179
Sum squared resid	13.92295	Durbin-Watson stat	1.337473

Appendix 8.2: Total Trade Model 2 of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/22/25 Time: 00:32
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 582
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.003100	0.001487	-2.085198	0.0375
LNGDP_J	0.005567	0.002790	1.995783	0.0465
LNDISTCONNECT_IJ	0.653713	0.226982	2.880022	0.0041
LNTRADE_I	0.003306	0.002982	1.108506	0.2682
LNCLRATIO_I	2.11E-06	0.000139	0.015199	0.9879
LNFTA_I	0.003343	0.002470	1.353258	0.1766
C	2.102949	0.051595	40.75884	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.741340	Mean dependent var	25.16723
Adjusted R-squared	0.713203	S.D. dependent var	17.90604
S.E. of regression	0.126194	Sum squared resid	8.344688
F-statistic	26.34783	Durbin-Watson stat	1.631181
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618341	Mean dependent var	2.266179
Sum squared resid	13.92411	Durbin-Watson stat	1.337306

Appendix 8.3: Total Trade Model 3 of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/22/25 Time: 00:59
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 580
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.004124	0.001566	-2.633828	0.0087
LNGDP_J	0.007609	0.003574	2.128938	0.0337
LNDISTCONNECT_IJ	1.317394	0.296744	4.439496	0.0000
LNTRADE_I	0.007088	0.003757	1.886537	0.0598
LNCLRATIO_I	-0.000178	0.000204	-0.871795	0.3837
LNFTA_I	0.006776	0.003750	1.806738	0.0714
TARIFF_I	-0.035837	0.041175	-0.870344	0.3845
USTARIFF_I	-0.009580	0.052709	-0.181755	0.8558
C	1.966962	0.066006	29.79989	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.761162	Mean dependent var	18.97517
Adjusted R-squared	0.734063	S.D. dependent var	13.82172
S.E. of regression	0.116870	Sum squared resid	7.102437
F-statistic	28.08831	Durbin-Watson stat	1.662866
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618544	Mean dependent var	2.266362
Sum squared resid	13.91441	Durbin-Watson stat	1.338426

Appendix 8.4: Total Trade Model 4 of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/22/25 Time: 01:04
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 580
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.004370	0.001525	-2.865376	0.0043
LNGDP_J	0.007552	0.003643	2.073169	0.0386
LNDISTCONNECT_IJ	1.502234	0.315631	4.759461	0.0000
LNTRADE_I	0.007643	0.003673	2.081015	0.0379
LNCLRATIO_I	-0.000243	0.000203	-1.196687	0.2320
LNFTA_I	0.006558	0.003820	1.717022	0.0866
TARIFF_I	0.043627	0.054924	0.794315	0.4274
USTARIFF_I	0.089246	0.072128	1.237332	0.2165
TARIFF_I*USTARIFF_I	-2.627082	1.202979	-2.183813	0.0294
C	1.942670	0.068636	28.30380	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.762223	Mean dependent var	19.01265
Adjusted R-squared	0.734734	S.D. dependent var	13.99279
S.E. of regression	0.117143	Sum squared resid	7.122017
F-statistic	27.72862	Durbin-Watson stat	1.673580
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618624	Mean dependent var	2.266362
Sum squared resid	13.91150	Durbin-Watson stat	1.339789

Appendix 8.5: Total Trade Model 5 of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/22/25 Time: 01:20
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 580
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.004860	0.001524	-3.189523	0.0015
LNGDP_J	0.007918	0.003408	2.323329	0.0205
LNDISTCONNECT_IJ	1.108245	0.252634	4.386759	0.0000
LNTRADE_I	0.008506	0.003801	2.238049	0.0256
LNCLRATIO_I	-0.000310	0.000203	-1.528193	0.1271
LNFTA_I	0.012177	0.005384	2.261743	0.0241
TARIFF_I	0.005400	0.075906	0.071137	0.9433
USTARIFF_I	0.044278	0.080055	0.553099	0.5804
USTARIFF_I*TARIFF_I	-1.828272	1.220011	-1.498571	0.1346
HIGH_INC*TARIFF_I	0.082294	0.089767	0.916758	0.3597
DUM_WAR*USTARIFF_I	-0.014110	0.018707	-0.754280	0.4510
C	1.975030	0.056930	34.69253	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.755806	Mean dependent var	21.86877
Adjusted R-squared	0.726522	S.D. dependent var	18.16860
S.E. of regression	0.121664	Sum squared resid	7.652669
F-statistic	25.80923	Durbin-Watson stat	1.671097
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618392	Mean dependent var	2.266362
Sum squared resid	13.91995	Durbin-Watson stat	1.338780

Appendix 8.6: GVC Model of Total FDI

Dependent Variable: LNFDI_IJ
Method: Panel EGLS (Cross-section weights)
Date: 08/24/25 Time: 22:41
Sample: 2010 2022
Periods included: 13
Cross-sections included: 52
Total panel (unbalanced) observations: 580
Linear estimation after one-step weighting matrix
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.002268	0.001787	-1.268851	0.2051
LNGDP_J	0.008432	0.003103	2.717045	0.0068
LNDISTCONNECT_IJ	0.860041	0.222289	3.869023	0.0001
LNGVC_I	0.014178	0.005775	2.454905	0.0144
LNCLRATIO_I	3.08E-05	0.000223	0.138161	0.8902
LNFTA_I	0.012516	0.006738	1.857615	0.0638
TARIFF_I	0.165268	0.388072	0.425869	0.6704
USTARIFF_I	0.088415	0.321122	0.275333	0.7832
LNGVC_I*TARIFF_I	-0.071353	0.114409	-0.623661	0.5331
LNGVC_I*USTARIFF_I	-0.030834	0.085527	-0.360519	0.7186
HIGH_INC*TARIFF_I	0.121514	0.085275	1.424964	0.1548
DUM_WAR*USTARIFF_I	-0.014808	0.020604	-0.718679	0.4727
C	1.946357	0.060300	32.27792	0.0000

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.745901	Mean dependent var	23.08076
Adjusted R-squared	0.714877	S.D. dependent var	22.27599
S.E. of regression	0.124535	Sum squared resid	8.002596
F-statistic	24.04290	Durbin-Watson stat	1.669904
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.618358	Mean dependent var	2.266362
Sum squared resid	13.92117	Durbin-Watson stat	1.337873

Appendix 9: Long Run Regression Model of Manufacturing FDI

Appendix 9.1: Total Trade Model 1 of Manufacturing FDI

Dependent Variable: LNMANU_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:07
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.026654	0.012736	-2.092809	0.0628
LNGDP_J	-1.858312	3.423516	-0.542808	0.5992
LNWGHTAVRDIST	-4.037486	2.684770	-1.503848	0.1635
LNTRADE_I	0.165976	0.047357	3.504773	0.0057
LNCLRATIO_I	0.013700	0.007626	1.796489	0.1026
C	75.81636	65.68942	1.154164	0.2753

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.347912	1.0000

Weighted Statistics

R-squared	0.218403	Mean dependent var	1.324372
Adjusted R-squared	0.152166	S.D. dependent var	0.370054
S.E. of regression	0.340738	Sum squared resid	6.850025
F-statistic	3.297299	Durbin-Watson stat	2.203176
Prob(F-statistic)	0.010811		

Unweighted Statistics

R-squared	0.218403	Mean dependent var	1.324372
Sum squared resid	6.850025	Durbin-Watson stat	2.203176

Appendix 9.2: Total Trade Model 2 of Manufacturing FDI

Dependent Variable: LNMANU FDI I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:08
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP I	-0.031192	0.020031	-1.557203	0.1505
LNGDP J	-1.889014	3.426405	-0.551311	0.5935
LNWGHTAVRDIST	-4.065236	2.686711	-1.513090	0.1612
LNTRADE I	0.159072	0.054148	2.937697	0.0148
LNCLRATIO I	0.013218	0.007502	1.761840	0.1086
LNFTA I	0.015263	0.063628	0.239883	0.8153
C	76.64129	65.83114	1.164210	0.2714

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.351332	1.0000

Weighted Statistics

R-squared	0.218497	Mean dependent var	1.324372
Adjusted R-squared	0.137651	S.D. dependent var	0.370054
S.E. of regression	0.343642	Sum squared resid	6.849206
F-statistic	2.702655	Durbin-Watson stat	2.200439
Prob(F-statistic)	0.022068		

Unweighted Statistics

R-squared	0.218497	Mean dependent var	1.324372
Sum squared resid	6.849206	Durbin-Watson stat	2.200439

Appendix 9.3: Total Trade Model 3 of Manufacturing FDI

Dependent Variable: LNMANU_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/21/25 Time: 21:56
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.039103	0.013965	-2.800138	0.0188
LNGDP_J	-1.171905	3.486437	-0.336133	0.7437
LNWGHTAVRDIST	-3.701224	2.692103	-1.374845	0.1992
LNTRADE_I	0.118122	0.021263	5.555198	0.0002
LNCLRATIO_I	0.012095	0.008932	1.354150	0.2055
LNFTA_I	0.078729	0.046814	1.681760	0.1235
TARIFF_I	-0.025482	0.007237	-3.521220	0.0055
USTARIFF_I	0.001748	0.000776	2.250975	0.0481
C	61.71064	66.25239	0.931448	0.3736

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.356656	1.0000

Weighted Statistics

R-squared	0.236501	Mean dependent var	1.324372
Adjusted R-squared	0.127430	S.D. dependent var	0.370054
S.E. of regression	0.345673	Sum squared resid	6.691413
F-statistic	2.168317	Durbin-Watson stat	2.275023
Prob(F-statistic)	0.043965		

Unweighted Statistics

R-squared	0.236501	Mean dependent var	1.324372
Sum squared resid	6.691413	Durbin-Watson stat	2.275023

Appendix 9.4: Total Trade Model 4 of Manufacturing FDI

Dependent Variable: LNMANU FDI I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:22
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP I	-0.087072	0.076601	-1.136693	0.2822
LNGDP J	-0.491785	1.921442	-0.255946	0.8032
LNWGHTAVRDIST	-3.667712	3.207466	-1.143492	0.2795
LNTRADE I	-0.207174	0.365462	-0.566884	0.5833
LNCLRATIO_I	0.007249	0.013469	0.538160	0.6022
LNFTA I	0.210270	0.133068	1.580164	0.1452
TARIFF I	-0.014393	0.015507	-0.928165	0.3752
TRADE I	0.002317	0.002248	1.030834	0.3269
USTARIFF I TARIFF I	0.021593	0.020149	1.071671	0.3090
C	52.33735	50.81636	1.029931	0.3273

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.356779	1.0000

Weighted Statistics

R-squared	0.272844	Mean dependent var	1.324372
Adjusted R-squared	0.153854	S.D. dependent var	0.370054
S.E. of regression	0.340398	Sum squared resid	6.372902
F-statistic	2.293010	Durbin-Watson stat	2.300067
Prob(F-statistic)	0.028896		

Unweighted Statistics

R-squared	0.272844	Mean dependent var	1.324372
Sum squared resid	6.372902	Durbin-Watson stat	2.300067

Appendix 9.5: Total Trade Model 5 of Manufacturing FDI

Dependent Variable: LNMANU FDI I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:20
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP I	-0.021156	0.024039	-0.880080	0.3995
LNGDP J	0.559539	1.164750	0.480394	0.6413
LNWGHTAVRDIST	-2.748357	3.073740	-0.894141	0.3923
LNTRADE I	0.175128	0.030911	5.665519	0.0002
LNCLRATIO I	0.011804	0.009232	1.278532	0.2299
LNFTA I	0.125772	0.084382	1.490519	0.1669
TARIFF I	-0.007879	0.008403	-0.937638	0.3705
USTARIFF I	-0.004805	0.001787	-2.689185	0.0227
USTARIFF I TARIFF I	0.066121	0.017014	3.886231	0.0030
DUM INC TARIFF I	0.004674	0.008004	0.583934	0.5722
C	23.58593	45.73699	0.515686	0.6173

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.354203	1.0000

Weighted Statistics

R-squared	0.280981	Mean dependent var	1.324372
Adjusted R-squared	0.147829	S.D. dependent var	0.370054
S.E. of regression	0.341608	Sum squared resid	6.301586
F-statistic	2.110231	Durbin-Watson stat	2.316954
Prob(F-statistic)	0.039341		

Unweighted Statistics

R-squared	0.280981	Mean dependent var	1.324372
Sum squared resid	6.301586	Durbin-Watson stat	2.316954

Appendix 9.6: GVC Model of Manufacturing FDI

Dependent Variable: LNMANU_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/24/25 Time: 22:45
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
White period (cross-section cluster) standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank
Standard error and t-statistic probabilities adjusted for clustering

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	-0.096946	0.042537	-2.279121	0.0459
LNGDP_J	0.721399	1.433422	0.503271	0.6257
LNWGHTAVRDIST	-2.692113	3.205222	-0.839915	0.4206
LNGVC_I	-0.024267	0.090927	-0.266888	0.7950
LNCLRATIO_I	0.005639	0.009188	0.613750	0.5531
LNFTA_I	0.223692	0.107718	2.076653	0.0646
TARIFF_I	-0.098185	0.041092	-2.389381	0.0380
USTARIFF_I	0.000459	0.001894	0.242537	0.8133
LNGVC_I_USTARIFF_I	0.157335	0.084221	1.868129	0.0913
DUM_INC_TARIFF_I	0.027422	0.017519	1.565258	0.1486
C	21.67483	52.41298	0.413539	0.6879

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	0.337334	1.0000

Weighted Statistics

R-squared	0.295844	Mean dependent var	1.324372
Adjusted R-squared	0.165445	S.D. dependent var	0.370054
S.E. of regression	0.338059	Sum squared resid	6.171320
F-statistic	2.268760	Durbin-Watson stat	2.125156
Prob(F-statistic)	0.026724		

Unweighted Statistics

R-squared	0.295844	Mean dependent var	1.324372
Sum squared resid	6.171320	Durbin-Watson stat	2.125156

Appendix 10: Long Run Regression Model of Service FDI

Appendix 10.1: Total Trade Model 1 of Service FDI

Dependent Variable: LNSERV_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 13:58
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	0.135353	0.055953	2.419062	0.0187
LNGDP_J	-0.077120	2.005540	-0.038454	0.9695
LNWGHTAVRDIST	0.722266	1.103515	0.654514	0.5153
LNTRADE_I	0.908734	0.230781	3.937638	0.0002
LNCLRATIO_I	0.034979	0.006297	5.555096	0.0000
C	-12.42808	40.90533	-0.303826	0.7623

Effects Specification

	S.D.	Rho
Cross-section random	0.580521	0.8750
Idiosyncratic random	0.219372	0.1250

Weighted Statistics

R-squared	0.328114	Mean dependent var	0.177582
Adjusted R-squared	0.271174	S.D. dependent var	0.249212
S.E. of regression	0.212885	Sum squared resid	2.673876
F-statistic	5.762497	Durbin-Watson stat	2.136534
Prob(F-statistic)	0.000214		

Unweighted Statistics

R-squared	0.520878	Mean dependent var	1.158037
Sum squared resid	15.36648	Durbin-Watson stat	0.371772

Appendix 10.2: Total Trade Model 2 of Service FDI

Dependent Variable: LNSERV_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:00
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	0.172683	0.066921	2.580425	0.0124
LNGDP_J	0.323216	2.127482	0.151924	0.8798
LNWGHTAVRDIST	0.994853	1.236638	0.804482	0.4244
LNTRADE_I	0.964033	0.250411	3.849805	0.0003
LNCLRATIO_I	0.040148	0.008520	4.712320	0.0000
LNFTA_I	-0.208402	0.248833	-0.837519	0.4057
C	-21.64917	44.40706	-0.487516	0.6277

Effects Specification

	S.D.	Rho
Cross-section random	0.590283	0.8784
Idiosyncratic random	0.219631	0.1216

Weighted Statistics

R-squared	0.330048	Mean dependent var	0.174914
Adjusted R-squared	0.260743	S.D. dependent var	0.248589
S.E. of regression	0.213864	Sum squared resid	2.652790
F-statistic	4.762235	Durbin-Watson stat	2.152576
Prob(F-statistic)	0.000523		

Unweighted Statistics

R-squared	0.552227	Mean dependent var	1.158037
Sum squared resid	14.36104	Durbin-Watson stat	0.397627

Appendix 10.3: Total Trade Model 3 of Service FDI

Dependent Variable: LNSERV FDI I
Method: Panel EGLS (Cross-section random effects)
Date: 08/18/25 Time: 21:13
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP I	0.213198	0.082588	2.581456	0.0125
LNGDP J	0.778354	2.217861	0.350948	0.7269
LNWGHTAVRDIST	1.319357	1.310631	1.006658	0.3184
LNTRADE I	1.041873	0.247603	4.207831	0.0001
LNCLRATIO I	0.047190	0.011387	4.144166	0.0001
LNFTA I	-0.311912	0.220778	-1.412782	0.1633
TARIFF I	-0.006300	0.019474	-0.323487	0.7475
USTARIFF I	0.003382	0.003393	0.996681	0.3232
C	-32.93127	47.11418	-0.698967	0.4875

Effects Specification

	S.D.	Rho
Cross-section random	0.389110	0.7516
Idiosyncratic random	0.223676	0.2484

Weighted Statistics

R-squared	0.385822	Mean dependent var	0.266050
Adjusted R-squared	0.298082	S.D. dependent var	0.273951
S.E. of regression	0.229769	Sum squared resid	2.956454
F-statistic	4.397350	Durbin-Watson stat	1.960853
Prob(F-statistic)	0.000361		

Unweighted Statistics

R-squared	0.627402	Mean dependent var	1.158037
Sum squared resid	11.95002	Durbin-Watson stat	0.485118

Appendix 10.4: Total Trade Model 4 of Service FDI

Dependent Variable: LNSERV_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/18/25 Time: 21:13
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	0.220943	0.084240	2.622785	0.0113
LNGDP_J	1.069003	2.502823	0.427119	0.6710
LNWGHTAVRDIST	1.499665	1.451976	1.032844	0.3062
LNTRADE_I	1.059847	0.242079	4.378106	0.0001
LNCLRATIO_I	0.048032	0.011715	4.099946	0.0001
LNFTA_I	-0.315379	0.228160	-1.382272	0.1725
TARIFF_I	-0.006731	0.019573	-0.343903	0.7322
USTARIFF_I	0.003221	0.003867	0.832802	0.4086
USTARIFF_I_TARIFF_I	0.007650	0.022556	0.339148	0.7358
C	-39.62715	53.43343	-0.741617	0.4615

Effects Specification

	S.D.	Rho
Cross-section random	0.366367	0.7244
Idiosyncratic random	0.226000	0.2756

Weighted Statistics

R-squared	0.398896	Mean dependent var	0.284365
Adjusted R-squared	0.300534	S.D. dependent var	0.279956
S.E. of regression	0.234418	Sum squared resid	3.022343
F-statistic	4.055369	Durbin-Watson stat	1.941505
Prob(F-statistic)	0.000499		

Unweighted Statistics

R-squared	0.641003	Mean dependent var	1.158037
Sum squared resid	11.51379	Durbin-Watson stat	0.509640

Appendix 10.5: Total Trade Model 5 of Service FDI

Dependent Variable: LNSERV FDI I
Method: Panel EGLS (Cross-section random effects)
Date: 08/31/25 Time: 14:01
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP I	0.189525	0.081543	2.324226	0.0239
LNGDP J	0.547835	2.355134	0.232613	0.8169
LNWGHTAVRDIST	1.139694	1.353427	0.842080	0.4035
LNTRADE I	0.998804	0.263501	3.790512	0.0004
LNCLRATIO I	0.044437	0.011131	3.992346	0.0002
LNFTA I	-0.264765	0.249104	-1.062871	0.2926
TARIFF I	-0.027916	0.044604	-0.625858	0.5340
USTARIFF I	0.003078	0.004328	0.711190	0.4800
USTARIFF I TARIFF I	0.001631	0.022189	0.073494	0.9417
DUM_INC___TARIFF_I	0.031338	0.036002	0.870455	0.3879
C	-26.92914	49.76330	-0.541145	0.5906

Effects Specification

	S.D.	Rho
Cross-section random	0.492198	0.8244
Idiosyncratic random	0.227127	0.1756

Weighted Statistics

R-squared	0.359026	Mean dependent var	0.215609
Adjusted R-squared	0.240327	S.D. dependent var	0.258912
S.E. of regression	0.225851	Sum squared resid	2.754474
F-statistic	3.024682	Durbin-Watson stat	2.090302
Prob(F-statistic)	0.004165		

Unweighted Statistics

R-squared	0.610306	Mean dependent var	1.158037
Sum squared resid	12.49832	Durbin-Watson stat	0.460677

Appendix 10.6: GVC Model of Service FDI

Dependent Variable: LNSERV_FDI_I
Method: Panel EGLS (Cross-section random effects)
Date: 08/24/25 Time: 22:44
Sample: 2017 2022
Periods included: 6
Cross-sections included: 11
Total panel (unbalanced) observations: 65
Swamy and Arora estimator of component variances
Cross-section SUR (PCSE) standard errors & covariance (no d.f. correction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP_I	0.186318	0.070780	2.632369	0.0110
LNGDP_J	-0.322862	2.006919	-0.160874	0.8728
LNWGHTAVRDIST	0.031941	1.074881	0.029715	0.9764
LNGVC_I	0.876916	0.187697	4.671981	0.0000
LNCLRATIO_I	0.046467	0.010130	4.587061	0.0000
LNFTA_I	-0.081074	0.161875	-0.500841	0.6185
TARIFF_I	-0.143710	0.491700	-0.292271	0.7712
USTARIFF_I	1.393132	0.477069	2.920191	0.0051
LNGVC_I_USTARIFF_I	-0.105725	0.073033	-1.447635	0.1535
DUM_INC___TARIFF_I	0.017334	0.035468	0.488729	0.6270
C	-0.273032	41.66270	-0.006553	0.9948

Effects Specification

	S.D.	Rho
Cross-section random	0.338647	0.7060
Idiosyncratic random	0.218512	0.2940

Weighted Statistics

R-squared	0.413160	Mean dependent var	0.296607
Adjusted R-squared	0.304486	S.D. dependent var	0.284118
S.E. of regression	0.237244	Sum squared resid	3.039371
F-statistic	3.801823	Durbin-Watson stat	1.918208
Prob(F-statistic)	0.000637		

Unweighted Statistics

R-squared	0.597715	Mean dependent var	1.158037
Sum squared resid	12.90216	Durbin-Watson stat	0.451874