

THE ROLE OF ENVIRONMENTAL, SOCIAL, AND
GOVERNANCE (ESG) IN ATTRACTING FOREIGN
DIRECT INVESTMENT: A COMPARATIVE STUDY
OF MALAYSIA AND SINGAPORE

BY

TAN KAI YING

A research project submitted in partial fulfilment of
the
requirement for the degree of

BACHELOR OF FINANCE (FINANCIAL
TECHNOLOGY) WITH HONOURS

UNIVERSITI TUNKU ABDUL RAHMAN

FACULTY OF ACCOUNTANCY AND
MANAGEMENT
DEPARTMENT OF FINANCE

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AGFI	Adjusted Goodness-of-Fit Index
ARDL	Autoregressive Distributed Lag
ASEAN	Association of Southeast Asian Nations
BNM	Bank Negara Malaysia
BoP	Balance of Payments
DOLS	Dynamic Ordinary Least Squares
ESG	Environmental, Social, and Governance
EXR	Exchange Rate
FDI	Foreign Direct Investment
FM-OLS	Fully Modified Ordinary Least Squares
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HDI	Human Development Index
IMF	International Monetary Fund
INF	Inflation Rate
MNCs	Multinational Corporations
NETR	National Energy Transition Roadmap
NIA	National Investment Aspirations
NIMP	New Industrial Master Plan
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PP	Phillips-Perron
PRI	Principles for Responsible Investment
SDGs	Sustainable Development Goals
SEM	Structural Equation Modelling

SPSS	Statistical Package for Social Science
TOP	Trade Openness
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
VECM	Vector Error Correction Model
WGI	Worldwide Governance Indicators

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ABSTRACT

The research investigates how the Environmental, Social, and Governance (ESG) performance and major macroeconomic factors impact Foreign Direct Investment (FDI) inflows to Malaysia and Singapore. The general objective of the study is to examine the role of Environmental, Social, and Governance (ESG) factors and other key macroeconomic determinants in attracting Foreign Direct Investment (FDI) for a comparative analysis of Malaysia and Singapore. Against an increasing FDI differential between the two economies, this study explores the role of sustainability governance, institutional credibility, and macroeconomic stability in instilling investor confidence in a more sustainability-oriented overall global investment environment. Based upon Stakeholder Theory and Legitimacy Theory, ESG is positioned as a proxy for the quality of national governance and legitimacy, serving to complement the existing economic drivers of FDI. The study utilizes Panel Data model and Vector Error Correction Models (VECM) with co-integration to analyze the long and short-run relationships among FDI inflows with, ESG performance, GDP growth, exchange rate, inflation rate, as well as trade openness, with secondary data collected over the 10-year period from 2014 to 2023. The comparative framework emphasizes Malaysia's developing sustainability efforts in comparison to Singapore's established governance and regulatory systems. The results should suggest governance-related ESG dimensions are significant in supporting FDI inflows, and macroeconomic variables are the reinforcing driving factors. Through assessing model performance and producing ex-post predictions, the study offers evidence-driven guidelines to policymakers towards improving national investment competitiveness. This research extends the general FDI literature by incorporating ESG into traditional FDI models and providing a detailed comparative analysis of Malaysia and Singapore.

Keywords: Foreign Direct Investment (FDI), Environmental Social and Governance (ESG), Macroeconomic Determinants, Comparative Analysis, Sustainability ✓

JEL: F21, Q56, O16, C23, C32

CHAPTER 1: INTRODUCTION

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1.0 Introduction

During the last 10 years the global investment landscape moved from focusing solely on financial returns. The shift focuses on sustainability-driven performance. Foreign Direct Investment (FDI) is considered extremely important for the upgrading of industries, fostering job opportunities, and the transfer of technologies. However, FDI is also greatly influenced these now days by non-financial factors focusing mainly on Environmental, Social, and Governance (ESG) components (ASEAN, 2024). The ESG focus shift is accompanied by the UN Sustainable Development Goals (SDGs) and by the UN Principles for Responsible Investment (PRI) which call for responsible investment by MNCs only after assessing the SDG of the host country (*Principles of Responsible Investment, n.d.-b*). The UNCTAD world investment reports elaborates that the nowadays investors respect and value regulatory transparency, climate and responsible governance (*World Investment Report 2023 | Investing in Sustainable Energy for All, 2023*). The reports also suggest that the previously dominant strategies of attracting FDI with cheap labour and low production costs are now obsolete.

In this context region, there is an important comparative case of Malaysia and Singapore: Investment in Singapore and Malaysia. Even though they have proximity and strong economic relations, their investments economies differ: Singapore has green finance and the head offices of corporations in Singapore, while Singapore possesses strong governance structures, climate change legislation, and stable economic growth. On the other hand, Malaysia is trying to change how it is viewed as an investor through the National Investment Aspirations (NIA), the New Industrial Master Plan (NIMP) 2030, and the National Energy Transition Roadmap (NETR) that include ESG principles. However, how ESG performance influences the volume of FDI, and how that relationship differs to that of Malaysia's

other competitor Singapore, is an understudied area of the ASEAN region (*Ministry of Investment, Trade and Industry, 2025*).

This research attempts to fill the gap by trying to understand the rationale of FDI in Malaysia and Singapore with a focus on ESG performance and the other standard macroeconomic variables. By looking at the last 10 years and comparing the economies and models to understand which of the fundamentals or sustainable variables impacted the country more, the research attempts to focus on the variables that impact the attractiveness of the country in the light of FDI.

1.1 Research Background

During the last ten years (2014–2023), the flow of Foreign Direct Investment in Malaysia and Singapore took different paths. FDI, defined as net cross-border investment that provides enduring managerial control to the company and measured in USD million (World Bank, 2024; UNCTAD, 2022), has varied dramatically in Malaysia after political turmoil, changes made to industrial policy and pandemic-related disruption. By comparison, Singapore with relatively stable and high quality regulation and a solid institutional base continued to receive much higher FDI inflows during the same time (UNCTAD, 2022). This divide had widened, and in particular since 2018 with Malaysia's FDI which oscillated for more than a year and Singapore enjoying prosperity due to its role as a regional headquarters and global financial hub. These trends imply the structural differences, not the cyclical shocks per se, influence investor confidence between these economies.

The sustainability aspect also supports these structural differences. ESG performance rated as 0 to 100, calculated by a 0–100 index comprising UNDP social indicators, Transparency International governance scores, WGI regulation following from Ling et al.'s (2020) approach gives better results for Singapore. Its rapid development of mandatory sustainability reporting at the Singapore Exchange (SGX, 2022) and decent rule of law performance is leading to a consistent ESG improvements over the

time span of the decade (SGX, 2023). At the same time, Malaysia seems to have shown progress step by step, including post 2020 when Bursa Malaysia reinforced sustainability disclosure laws; however, governance-related measures remain out of sync with regional best practices (World Bank, 2023).

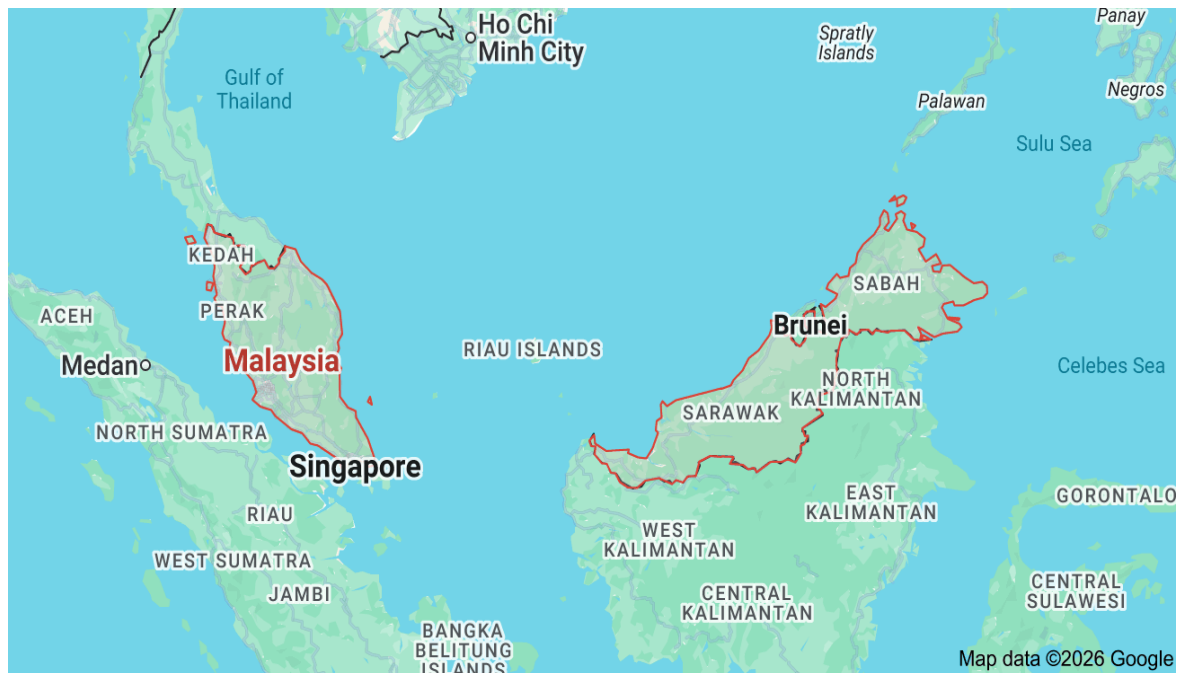
In the same span, annual GDP growth (as expressed in percentage GDP) suggested robust cyclicalities for both countries, with a pronounced contraction in 2020 before a subsequent recovery in 2021–2022, although Malaysia is likely to have a bigger recovery, as it is one of the world’s most manufacturing-driven low-base economies (World Bank, 2024). Because of the diversified economic structure and resilience to external-demand, the recovery trajectory was more stable in Singapore. For example, macroeconomic stability variables reveal prominent contrasts. Exchange rate movements reported on the basis of local currency per USD show that the Malaysian Ringgit steadily fell within the decade, raising concerns about repatriation risk, while the Singapore Dollar was constant under MAS’s managed float (CEICdata.com, 2019; MOI, 2025).

Inflation rate (the annual percentage change in consumer prices) as from World Bank (2024), remains relatively stable until 2022–2023, before it experienced price spikes due to global supply chain breakdowns in 2022–2023, inflation in Singapore became particularly pronounced with the dependency on imported commodities, while its price controls at home (from a subsidy base on prices) kept inflation in Malaysia lower than inflation globally, with long-term fiscal repercussion. Lastly, trade openness, expressed by (the percentage of total trade represented in terms of GDP) was consistently in the high-range in Singapore with more than 300% of GDP (over the last decade), and Malaysia was in the high-rate, which was above 100%, driven by its engagement with the electrical and electronics supply chain (World Bank, 2024).

Taken together, these ten-year trends indicate that both economies are highly integrated within the region, but show distinct divergence, regarding governance,

macroeconomy, and sustainability performance, and it would therefore be important to analyse how these variables jointly affect the FDI inflows into Malaysia and Singapore.

Figure 1.1 Map of Malaysia and Singapore



Google Maps (n.d)

1.1.1 Definition of the Study

1.1.1.1 Foreign Direct Investment (FDI)

The term Foreign Direct Investment (FDI) is used to describe an investment that includes a long-term relationship and reflects a permanent interest and control by an entity located in one economy in an enterprise located in another economy (Organisation for Economic Co-operation and Development [OECD], 2023). This is equally described by the United Nations Conference on Trade and Development (UNCTAD) which describes FDI as an investment undertaken to have a permanent interest and a practical control of an enterprise in an outside economy of the investor

(UNCTAD, 2022). In this study, the net inflows (BoP, current USD) are used to measure FDI inflows because it captures the investment inflows that attracted Malaysia and Singapore (World Bank, 2024).

1.1.1.2 Social, Environmental and Governance (ESG)

ESG means a list of particular, quantifiable values that describe the performance of an organization or a country in three pillars: Environmental (emissions, resource use), Social (e.g., labor practices, human rights), and Governance (transparency, corruption control) (Sundoro, Rahayu, Thine, Aini, and Sulistyowati, 2025). They are used to monitor the progression, define goals, and report to the stakeholders (World Bank, 2024). On the national scale, ESG performance can be used as a measure of the quality of governance, institutional credibility, and compliance with international standards of sustainability (Anh and Trang, 2025). It is possible to build a composite index of ESG using sources that include the Worldwide Governance Indicators and the Human Development Index (Ling, Abdul Rahim, and Said, 2020).

1.1.1.3 GDP Growth Rate

GDP growth rate refers to the percentage of change in the Gross Domestic Product of a given country within a certain period of time (World Bank, 2024). The GDP, in its turn, is the sum of all final goods and services manufactured on the territory of a specific country during a certain period (UNCTAD, 2022). The growth rate is one of the main sources of economic health and market prospects, which inform investors of the growing opportunities that a host country offers (Bui and Doan, 2024).

1.1.1.4 Exchange Rate

Exchange rate refers to the cost of the currency of a country in relation to the currency of another country and commonly measured in units of the local currency in relation to a single United States dollar (International Monetary Fund [IMF], 2024). Stability of the exchange rate lowers the uncertainty of the worth of future profit repatriation and cost of operations incurred by foreign investors (Alnaa & Ahiakpor, 2020). The exchange rate in this analysis will be calculated as an average of the yearly rates of local currency (Malaysian Ringgit or Singapore Dollar) of one US dollar (CEICdata, 2024).

1.1.1.5 Inflation Rate

The inflation rate is used to quantify how the overall level of prices of goods and services in an economy change by the percentage over a period (usually calculated with the help of the Consumer Price Index) (World Bank, 2024). Uncertainty in operations and purchasing power are also reduced due to high or volatile inflation, which may be an indicator of bad management of the macroeconomic system and thus, discourage long-term investment commitments (Hossain, Voumik, Ahmed, Alam, and Tasmim, 2024). In this research, the inflation has been taken as the rate of change of the consumer prices on an annual basis.

1.1.1.6 Trade Openness

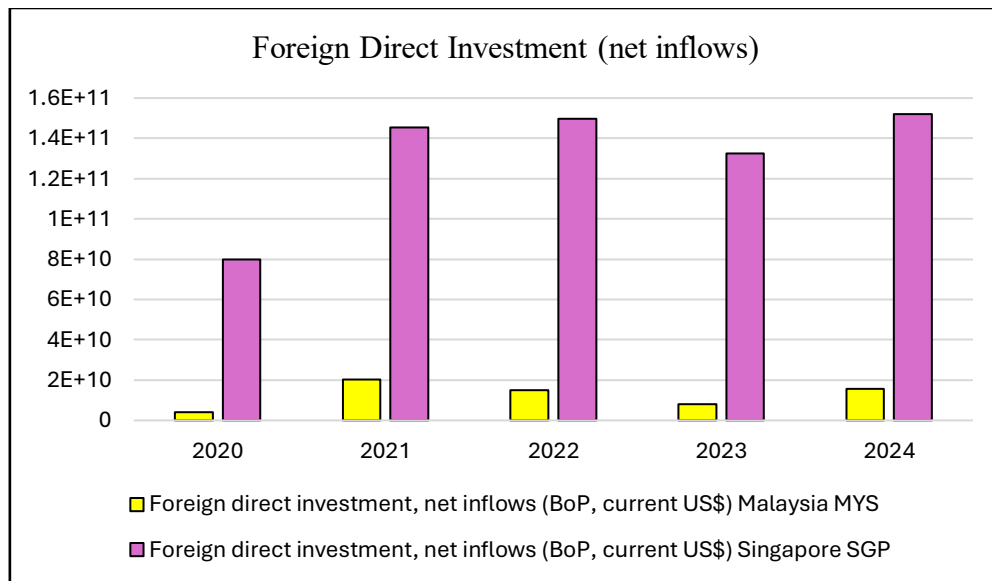
The openness to trade is defined as the extent to which a given economy is engaged in international trade, which is usually expressed as the ratio of the total trade (export and imports) in a given country to the Gross Domestic Product (World Bank, 2024). The high ratio signifies more involvement in the global economy, which lowers the costs related to transactions and provides easier access to the market to export-oriented multinational corporations (Tahir, 2024). Openness to trade is an

indicator of policy transparency and adherence to international standards of the economy (Albahouth and Tahir, 2024).

1.2 Current Situation of Study

In the last five years, the environment of Foreign Direct Investment (FDI) in southeast Asia has been influenced a lot by the introduction of Environmental, Social, and Governance (ESG) standards into the international investment strategies. Since multinational corporations and sovereign wealth funds are shifting to the sustainable and resilient economies, the capacity of a country to exhibit good governance, regulatory clarity and commitment to climatic conditions has become as important as the conventional economic fundamentals. Singapore has used its institutional infrastructure, which is rated as the best in the world and the mandatory ESG disclosure system to sustain itself as a leading investment destination in the region. Caught up, on Malaysia, policy measures like the National Investment Aspirations (NIA) and the National Energy Transition Roadmap (NETR) have given the country a jump start on its sustainability agenda in its quest to capture ESG-driven capital. Regardless of such attempts, the difference between the amount of FDI inflows of the two neighbors is still acute, which is shown in Figure 1.1, which compares the net FDI inflows of the two countries in 2020-2024.

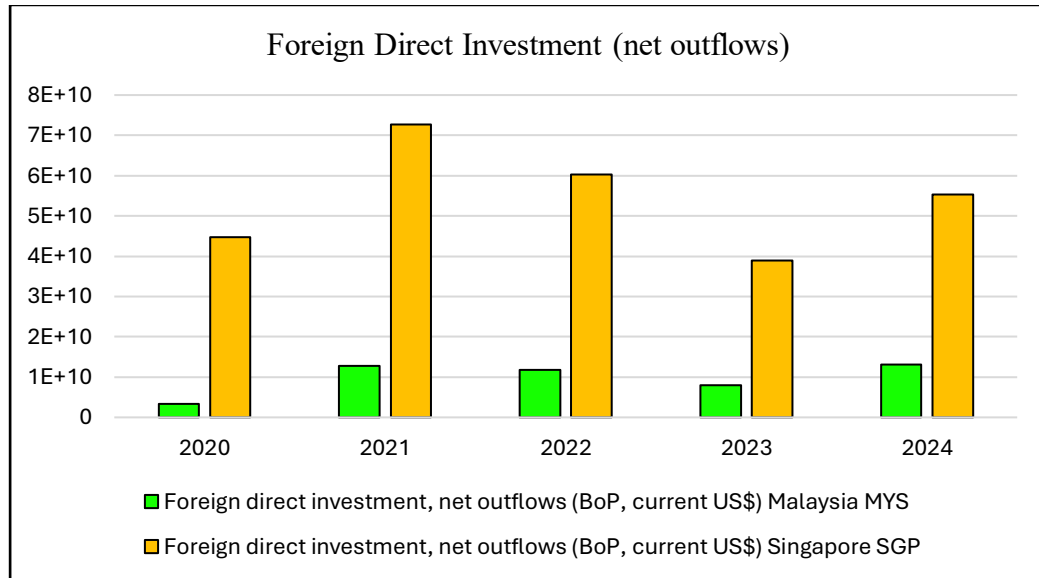
Figure 1.2 Foreign Direct Investment (net inflow) from year 2020 to 2024



Source: World Bank (2024)

Figure 1.2 shows the net FDI inflows for Malaysia and Singapore for 2020-2024, where there is a wide and consistent gap between the two countries. Malaysia's inflows (yellow bars) are quite volatile, starting from a low in 2020 when pandemic disruptions affected the investment environment, surging in 2021, moderating in 2022, and falling again in 2023 before recovering in 2024. This represents a more sensitive investment environment driven by economic uncertainty and policy changes. Singapore's inflows (purple bars) on the other hand, remain robust over the period, ranging between USD 80 billion and USD 150 billion, underscoring its position as a stable global financial centre with strong institutional quality and investor confidence. Both countries had a dip in 2023 due to global inflation and financial tightening, but both should rebound in 2024, with Singapore maintaining a dominant lead.

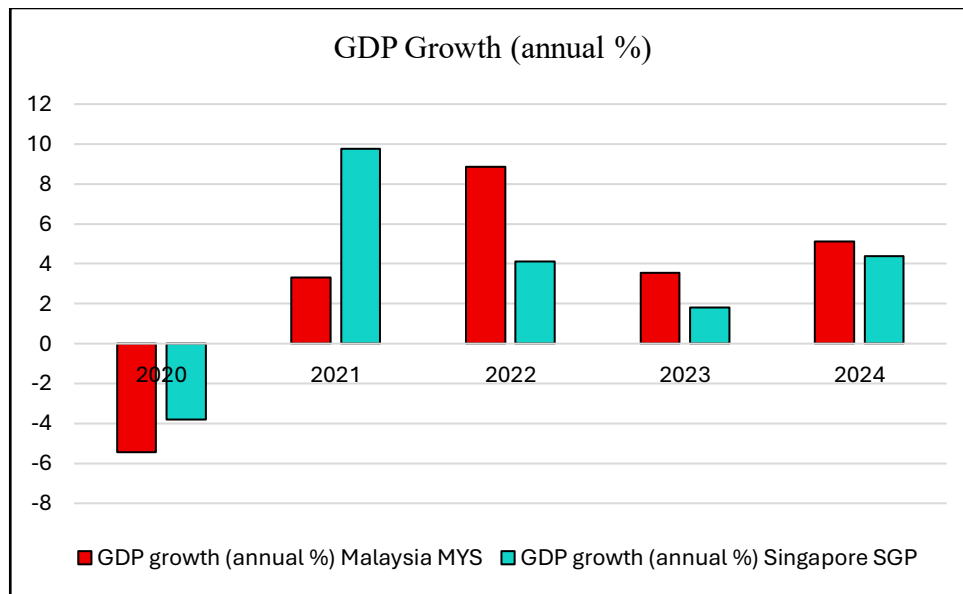
Figure 1.3 Foreign Direct Investment (net outflow) from year 2020 to 2024



Source: World Bank (2024)

Figure 1.3: FDI Net Outflows of Malaysia and Singapore, 2020-2024 (amount of capital invested overseas by the domestic investors of each nation) Malaysia's outflows (green bars) are low and consistent at around USD 5–12 billion, with spikes in 2021 and 2024, reflecting modest foreign expansion by Malaysian enterprises. Outflows (yellow bars) are substantially bigger at USD 40-70 billion, highlighting Singapore's status as a key global investment hub. Singapore had the highest outflow in 2021, then a little decrease in 2022 and a bigger dip in 2023, before rebounding in 2024. The overall picture is that Singapore's outflows are consistently far higher than Malaysia's and the growth of Malaysia's outward investment activities is slower and more dependent on global factors, especially during economic shocks, such as in 2020 and 2023.

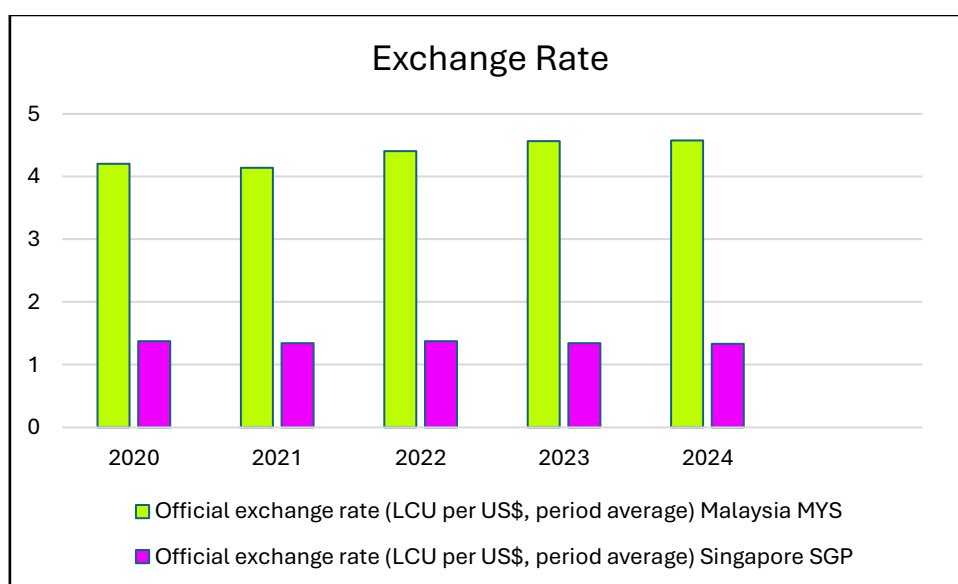
Figure 1.4 GDP Growth Rate (annual %) from year 2020 to 2024



Source: World Bank (2024)

Figure 1.4 Annual GDP growth rates of Malaysia and Singapore 2020-2024: their economic performance during and after the COVID-19 pandemic. Both countries suffered steep economic contractions in 2020, with Malaysia contracting by about -5.6% and Singapore by about -3.9% due to widespread lockdowns and disruptions to the global economy. Singapore's GDP jumped to nearly 9.6% in 2021 with a rapid opening up and recovery of global trade while Malaysia's grew at an annual rate of about 3.1%. Malaysia posted the highest growth rate of 8.7% for the period in 2022, boosted by domestic reopening and strong consumption. Singapore moderated to approx. 3.8% as global demand stabilized. Both economies slowed to around 3.6% and 1.5% respectively in 2023 as global inflation, tighter financial conditions and weaker exports weighed on the outlook. Both economies saw a further improvement in 2024 with Malaysia expanding by 4.5% and Singapore by 4.1%, indicating a more stable economic environment post-pandemic.

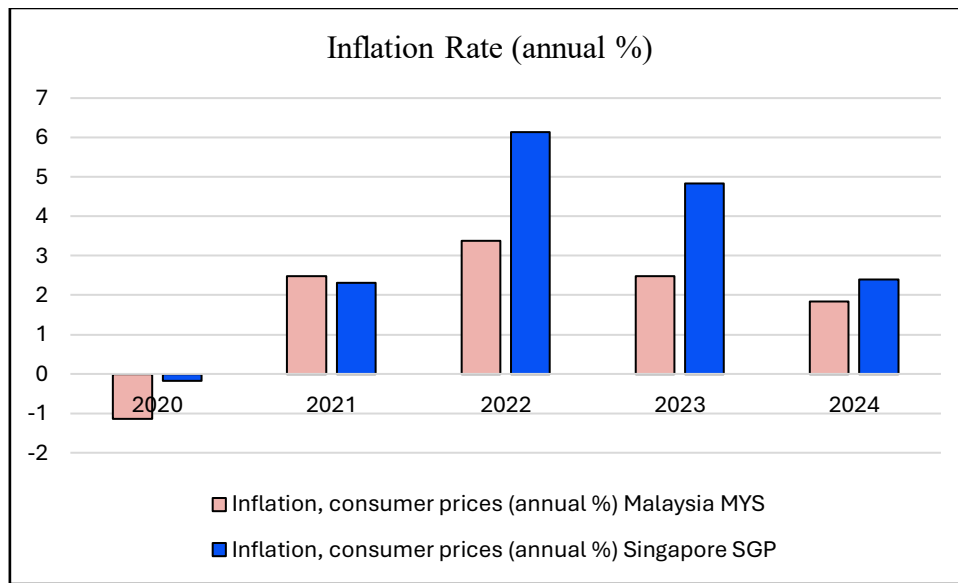
Figure 1.5 Exchange Rate from year 2020 to 2024



Source: World Bank (2024)

Figure 1.5 Official exchange rates of Malaysia and Singapore (LCU per US dollar), 2020–24 The exchange rate of Malaysia (light green bars) is much higher than Singapore's throughout the period and has been gradually increasing from about 4.15 MYR/USD in 2020 to about 4.55-4.60 MYR/USD in 2024, indicating a slow depreciation of the Malaysian Ringgit to the US dollar. On the other hand, the Singapore currency rate (purple bars) is modest and stable with little changes between 1.33 and 1.36 SGD/USD. It is a symbol of strength and stability of the Singapore Dollar. In conclusion, the graph demonstrates that Malaysia had a larger depreciation of its currency over these five years whilst Singapore had a stable exchange rate environment which might affect trade competitiveness, investor confidence and foreign investment trends in both nations.

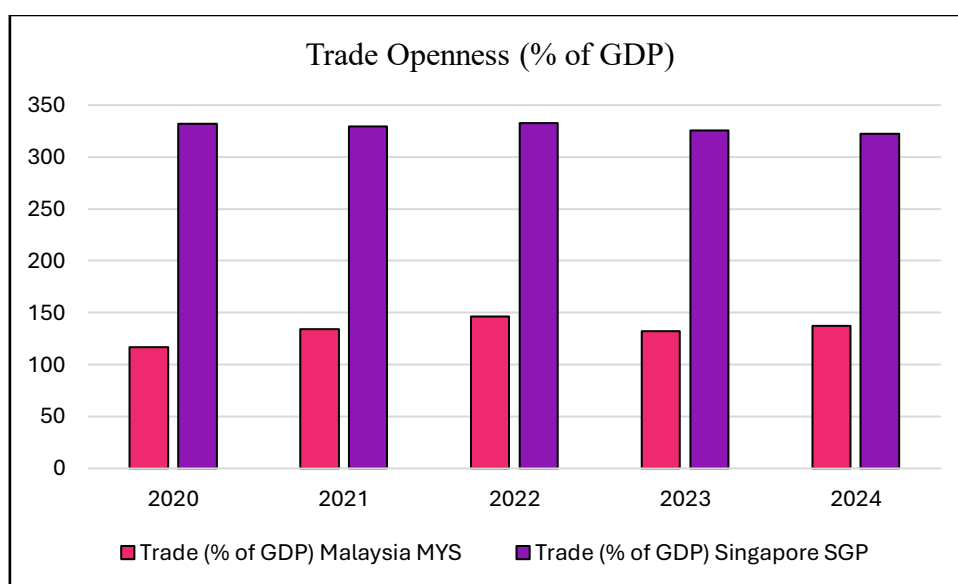
Figure 1.6 Inflation Rate (annual %) from year 2020 to 2024



Source: World Bank (2024)

Figure 1.6 illustrates the evolution of consumer prices during and post-pandemic for Malaysia and Singapore. Weak demand and the epidemic-induced economic slowdowns resulted in low inflation in both countries in 2020, with Malaysia seeing moderate deflation (-1.2%) and Singapore mild negative inflation. Both countries had an inflation pick-up as economic activity increased up in 2021. Inflation in Malaysia was about 2.5% and in Singapore 2.3 per cent. Both economies saw inflation skyrocket, culminating in 2022 as the world was beset by supply chain disruptions and soaring energy prices. Malaysia's was more modest at 3.4 per cent, while Singapore's was sharper at 6.1 per cent. Inflation slowed in 2023 but remained elevated, notably in Singapore (4.7%). Malaysia fell to about 2.5% due to government subsidies and price controls. Inflation in both countries continued to stabilise in 2024 at around 1.8% in Malaysia and 2.3% in Singapore, a return to more normal price conditions after the inflationary spike in 2022.

Figure 1.7 Trade Openness (% of GDP) data from year 2020 to 2024



Source: World Bank (2024)

Figure 1.7 shows the levels of trade openness of Malaysia and Singapore for the period 2020 to 2024 in terms of total trade (export + import) as a percentage of GDP. Singapore's trade openness is very high throughout the period, at between about 325% and 335% of GDP. This is consistent with the country being a global commerce hub with a strongly export driven and import dependent economy. Trade openness in Malaysia is significantly lower than Singapore's but still significant, with mild swings, rising from approximately 115% in 2020 to a peak of roughly 145% in 2022 and falling slightly in 2023 and gaining again in 2024. Overall, the trend demonstrates that both nations are highly integrated into international commerce with Singapore being one of the most open economies in the world and Malaysia displaying a steady but less obvious level of trade openness commensurate with its diverse economic structure.

1.3 Problem Statements

Over the last decade, FDI (Foreign Direct Investment) inflows into Malaysia have stagnated compared to its regional competition, generating very serious worries for the country's long-run economic success. Malaysia's average net foreign direct investment (FDI) inflows were USD 10–13 billion between 2015 and 2019, while in 2020 it fell sharply, coming back only modestly, to USD 3.2 billion (according to World Bank data). In contrast, Singapore has attracted on average a total annual value of between USD 70–100 billion even during the COVID-19 outbreak (World Bank 2024). The widening gap matters because FDI is one of the key engines of Malaysia's growth in terms of capital formation, technological upgrading and high-income job creation. In a highly competitive ASEAN environment, conventional pull factors like cheap labour and resource availability no longer can deliver high-quality investment. Hence, the overall purpose of the research is to examine the role of Environmental, Social, and Governance (ESG) and other key factors in attracting foreign direct investment (FDI) for a comparative analysis of Malaysia and Singapore.

The second problem relates to the vague effect of five important determinants which include ESG performance, GDP growth, exchange rate, inflation, and trade openness on FDI inflows in both developing and advanced economies. The empirical results have justified the personal impact of these variables: Ling et al. (2020) suggested that a high level of ESG performance should result in a higher level of the institutional credibility of a country and lower regulatory risk, which will provide foreign investors with a more reliable environment. Alharthi et al. (2024) have shown that the growth in GDP is a major indicator of market potential, and market-seeking FDI is attracted. Albahouth and Tahir (2024) found exchange rate stability to be one of the key determinants because fluctuating currencies generate ambiguity about the transfer of profits and their operations. Asbullah et al. (2022) confirmed that inflation is a source of cost, which limits investments and reduces the purchasing power of individuals, making long-term planning difficult. Lastly, Sobirov et al. (2025) validated the trade openness as an important facilitator

of export-oriented FDI by minimizing the transaction costs and incorporating host economies into the global value chains. However, even with this evidence, there is little agreement as to the factors that dominate in the Malaysian situation, especially due to the recent Ringgit volatility, fluctuating inflation regime, and effect on ESG scores that have been slowly improving. Thus, it is imperative to combine these five variables into a single analysis structure in order to understand the overall effect of their combination on the FDI inflows. The paper will hence be undertaken based on the following specific objectives: (1) To identify the key factors and the role of ESG in attracting foreign direct investment (FDI) of Malaysia and Singapore and (2) To analyse the relationship among the ESG, GDP growth rate (GDP), exchange rate (EXR), inflation rate (INF), and trade openness (TOP) and FDI of Malaysia and Singapore.

The research gap of the study concerns a lack of research as to why Malaysia and Singapore should be compared specifically, and not any other ASEAN members. While some studies have examined ASEAN as a whole, very few studies directly compare Malaysia (a developing, resource-based, middle-income economy) with Singapore (a high-income, governance-strong financial hub). These two neighbours have well-integrated supply chains and strong bilateral investment flows, yet distinct ESG characteristics, exchange-rate regimes, governance structures, and levels of economic stability. This comparison presents a unique opportunity to examine how sustainability performance and macroeconomic stability generate empirical differences in attracting FDI. Prior studies either concentrate on single-country time-series analyses or on large-scale panel-based analyses of ASEAN, but don't usually analyze Malaysia and Singapore together using both Panel Data Model and Vector Error Correction Models (VECM). Thus, this paper fills an important void in the literature by offering a strong two-country comparative analysis which is directly consistent with the research aims such as specific objective (3) To evaluate the FDI models of Malaysia and Singapore individually in terms of their comparative estimating accuracy and (4) To predict the ex-post forecast of the the FDI models of Malaysia and Singapore.

1.4 Research Objectives

1.4.1 General Objective

To examine the role of Environmental, Social, and Governance (ESG) factors and other key macroeconomic determinants in attracting Foreign Direct Investment (FDI) for a comparative analysis of Malaysia and Singapore.

1.4.2 Specific Objectives

1. To identify the key factors and the role of ESG in attracting foreign direct investment (FDI) of Malaysia and Singapore.
2. To analyse the relationship among the ESG, GDP growth rate (GDP), exchange rate (EXR), inflation rate (INF), and trade openness (TOP) and FDI of Malaysia and Singapore.
3. To evaluate the FDI models of Malaysia and Singapore individually in terms of their comparative estimating accuracy.
4. To predict the ex-post forecast of the the FDI models of Malaysia and Singapore.

1.5 Research Question

Based on the issues discussed in the problem statement, this study is guided by the following research questions:

1. What are the key factors influencing Foreign Direct Investment (FDI) inflows in Malaysia and Singapore, and how does ESG performance contribute to attracting FDI in both countries?
2. How are ESG, GDP growth rate (GDP), exchange rate (EXR), inflation rate (INF), and trade openness (TOP) related to FDI in Malaysia and Singapore?
3. How do the estimated FDI models of Malaysia and Singapore differ in terms of their individual accuracy and comparative performance?
4. To what extent can the FDI models of Malaysia and Singapore accurately generate ex-post forecasts of FDI inflows?

1.6 Significant of Study

1.6.1 Theoretical Significant of Study

This research has broadened the theoretical perspective by exploring how Environmental, Social and Governance (ESG) determinants impact Foreign Direct Investment (FDI) flows especially in developing and advanced countries in Southeast Asia (Anh & Trang, 2025). Although earlier theoretical constructs that underpinned international investment motives through OLI Paradigm, Institutional Theory and Stakeholder Theory, to an extent had provided explanations to why firms invest internationally, few studies built ESG as a core component within these theories (Dunning, 2001; Freeman, 1984). The results of this study supported the hypothesis that sustainability performance acts as a signal of legitimacy for foreign investors, thus extending Legitimacy Theory to the context of national-level investment decisions (Suchman, 1995; Csordás & Al-Dalahmeh, 2024). The research also presented novel theoretical insights about how ESG functioned as a signalling tool, influencing investor perceptions about governance quality, regulatory stability and long-term economic integrity by studying Malaysia and Singapore in tandem (Nasir, Ridzuan, Nasir, Syeddin, Salim, & Ithnin, 2025).

It also advanced theoretical dialogue around macroeconomic determinants of FDI. Previous studies established the significance of GDP growth, exchange rate stability, trade openness, and inflation, but relatively few studies had examined how these economic parameters interacted with ESG in a comparative setting involving economies with different institutional qualities (Sundoro, Rahayu, Thine, Aini, & Sulistyowati, 2025). Integrating ESG into the traditional FDI model, the study broadened the conceptual framework that underpins cross-border investment intentions. This proved that economic performance alone no longer adequately explained investor behaviour, and that sustainability governance had become an integral theoretical factor influencing FDI inflows (Bui & Doan, 2024).

In addition, this study provided a fresh theoretical basis and an updated assessment of how global sustainability norms, for examples, UN SDGs, PRI Principles, and mandatory ESG disclosures have changed the drivers of FDI (United Nations, 2015; UNPRI, 2023). It provided theoretical backing that countries must now align with global sustainability expectations to maintain legitimacy in the international investment system (Jiang, Chang, Yao, Huang, & Zhou, 2025). This underscored the relevance of Legitimacy Theory and indicated that ESG had moved from being a voluntary activity in corporate affairs to a national-level competitive advantage. Therefore, the study established some conceptual clarity in light of changing global investment dynamics and as a theoretical basis for future studies focusing on sustainability-driven investment behaviour.

1.6.2 Empirical Significance of Study

Empirically, the comparison of Malaysia with Singapore through Panel Data coupled with Vector Error Correction Models (VECM) was important empirical evidence rarely adopted in previous studies (Trung, 2025). Earlier studies tended to rely on focusing on just one country or an overall ASEAN panel without clarifying differences in structure and institutions between Malaysia and Singapore (Kayani, Nasim, & Abu Saleem, 2024). This study addresses this problem by presenting country and comparative empirical findings that illuminated the extent of how ESG and macroeconomic variables impact FDI differently in a developing middle-income economy compared with a high-income financial capital (Akhter, 2023).

The study also provided up-to-date empirical data drawn from 10 years of the most recent data, capturing key events including the COVID-19 pandemic, global supply chain disruptions, sustainability reporting reforms and exchange rate regime shifts (World Bank, 2024). Because global investment preferences have evolved rapidly towards sustainable assets, these recent lessons gave a greater empirical relevance for policymakers and investors (Phan, 2024). Incorporating ESG performance as a quantitative measure, the study provided empirical evidence on the direct impact of

sustainability reporting, governance quality, and social indicators on real FDI inflows, thus filling an empirical gap in the literature on how to assess ESG when ESG had previously been presented in a qualitative way (Ling, Abdul Rahim, & Said, 2020).

Moreover, the empirical findings of this study proved useful for better forecasting and the evaluation of models applied to both Malaysia and Singapore (Ali, 2025). By comparing model accuracy with one another and creating ex-post forecasts, the study provided pragmatic methods that may assist policymakers in predicting future investment trends and in assessing the reliability of the determinants of FDI (Hossain, Voumik, Ahmed, Alam, & Tasmim, 2024). This enhanced empirical evidence of the interplay between ESG, macroeconomic stability, and investment attractiveness.

From a policy viewpoint, empirical results yielded practical implications for governments (Pratama, Kusbandiyah, Innayah, Kuswara, & Bagis, 2025). These results revealed which of the variables are the strongest contributors to FDI inflows and how investment competitiveness can be improved by improving ESG governance, stabilising macroeconomic indicators and institutional credibility for Malaysia. On a national level, the results supported Singapore's sustainability-oriented approach and confirmed the country's position as the premier regional investment destination (Nasir et al., 2025). Investors also gained empirical clarity: they gained a better understanding of how sustainability and economic fundamentals influenced risk, return and long-term investment feasibility in each country.

Overall, the empirical significance of this study lay in its ability to provide robust comparative evidence, updated quantitative results, and practical insights that supported better policymaking, investment planning, and future academic research.

1.7 Chapter Layout

The study is composed of five chapters. Chapter 1 starts the research with the context of FDI and ESG in Malaysia and Singapore, important concerns and research questions, objectives and significance. Chapter 2 analysed key theories and empirical studies of previous empirical research on FDI and its causes, identified gaps and built the conceptual framework of the study. Beside that, Chapter 3 describes the study methods covering the source of data, the definition of variables and the quantitative models such as Panel Data and VECM and so on. Moreover, the empirical findings were discussed in Chapter 4, where the influence of ESG and macroeconomic factors on FDI were interpreted, and the comparison of model performance for Malaysia and Singapore were shown. Finally, the fifth chapter finalized the study with a summary of findings, discussion of consequences, and recommendations for future research areas.

1.8 Conclusion

Having discussed the background, issues and motivations regarding the investigation of the involvement of ESG on the attraction of Foreign Direct Investment (FDI) in Malaysia and Singapore, chapter 1 had set out the fundamental framework of the study as a whole. It introduced the world of global investment as a sustainability-driven business context, where MNCs evaluated host countries based not only on economic fundamentals but also on Environmental, Social and Governance (ESG) performance.

The chapter also examined the ten-year temporal trends of FDI, ESG, GDP growth, exchange rate stability, inflation, and trade openness for each country. These patterns, in turn, revealed that Malaysian and Singaporean governance quality, macroeconomic stability, and sustainability performance exhibited large contrasts, so they lend themselves to an in-depth comparative study. The problem statements also further explained the critical problems: Malaysia's stagnating FDI relative to Singapore, the uncertainty that the determinants they chose bring, and lack of proper comparative analysis between Malaysia and Singapore.

Moreover, Chapter 1 had detailed the significance of the research. Theoretically, this research contributed to strengthening the application of sustainability and legitimacy-based perspectives in FDI literature. At a more direct level, the paper filled evident gaps in contemporary understanding by providing updated comparative evidence using advanced econometric techniques. The structure of this thesis was set out at the end of the chapter in which each chapter is developed in order to form the basis for one comprehensive comprehension of the impact that ESG and macroeconomic variables had on FDI inflows into Malaysia and Singapore.

In general, the framework for research had been set up in Chapter 1 which provided the motivation, background, problems, goals, and relevance. This initiated Chapter 2, which offered the theoretical model and literature review on the conceptual ground for the study.

CHAPTER 2: LITERATURE REVIEW

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2.0 Introduction

Chapter 2 presents a comprehensive review of the existing literature regarding the impact of Environmental, Social, and Governance (ESG) factors and key macroeconomic variables on Foreign Direct Investment (FDI) inflows, particularly in the comparative context of Malaysia and Singapore. A literature review is done to show that the researcher has critically reviewed previous investigations, outlined theoretical premises, and reviewed the strengths, weaknesses, and gaps in the extant academia. As Haywood and Wragg (1982) point out, this approach of reviewing past research “with insight” is important in order to ensure that a study is based in accepted academic knowledge and yet provides new insights into the field.

Review of literature related to ESG, FDI and macroeconomic determinants is needed in the context of this research for the following reasons. 1) Global investment practices have changed dramatically among multinational corporations, with corporations increasingly emphasizing sustainability performance, governance quality as well as institutional credibility when selecting host destinations. This calls for how ESG aligns with foreign investors’ perceptions and what role it plays alongside economic fundamentals like GDP growth, exchange rate stability, inflation and trade openness. Second, Malaysia and Singapore differ considerably in their sustainability governance, institutional structures, and macroeconomic conditions. Hence, an understanding of the theoretical and empirical basis is important to elaborate on why these differences may affect FDI inflows.

The Chapter starts with 2.0 Introduction which describes the purpose of the chapter, the changing role of sustainability in FDI decisions, and the structure of the chapter. In Section 2.1 Reviews of Relevant Theoretical Models, the Stakeholder Theory (Freeman, 1984) and Legitimacy Theory (Suchman, 1995) are analysed and the

reasons why ESG sends signals of ethical governance and protection of stakeholders to minimize investment risk and to attract FDI, with diagrams provided to exemplify the interdependent stakeholder model and ESG channels to FDI and economic performance. Section 2.2 Empirical Reviews of the Study summarizes the recent findings on FDI and its determinants (ESG, GDP growth, exchange rate, inflation, trade openness) and identifies trends, weaknesses and gaps in comparative study of Malaysia and Singapore. Section 2.3 has Summary of Empirical Review presented as a tabular introduction of the most important studies (authors, theories, methods, findings) to summarize the evidence. Section 2.4 Conclusion summarizes the theoretical and empirical results, reiterates the complementary nature of ESG with macroeconomic variables, mentions the gaps in the comparative dynamic study, and moves on to the methodology in Chapter 3. Through a rigorous, methodological approach of analysing and synthesising the literature, Chapter 2 lays the groundwork for the dynamic links between sustainability, macroeconomic stability and foreign investment conduct.

2.1 Reviews of Relevant Theoretical Models

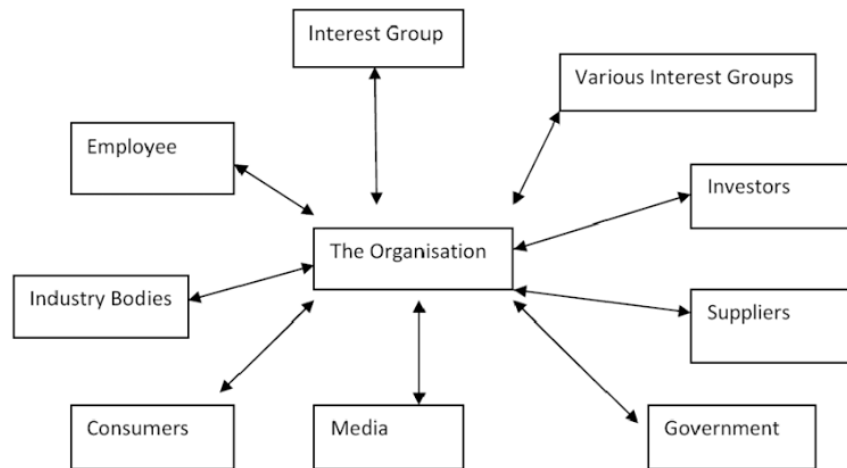
2.2.1 Stakeholder Theory

According to Freeman (1984), Stakeholder Theory suggested that the value creation of organisations should not only be in the interests of shareholders but also equally for the other populations and groups whose lives may be affected by the actions of the organisation. The use of Stakeholder Theory in this study is based on the premise that it offers a holistic method of why countries need to consider the interests of various stakeholder groups such as foreign investors, local communities, domestic workers in addition to regulatory bodies in order to make the country attractive and sustainable to investment (Freeman, 1984). The theory assumes that in the long term, the success is not only due to the profit maximization but also to the ethical governance, transparency, and sustainable management of the relationship between the stakeholders. The Stakeholder Theory, in the context of the research, is directly related to the objectives of the research as it describes the reasons why the performance of ESG has become the critical factor in the inflows of FDI. Companies with good levels of environmental protection, social responsibility, and quality of governance are also indicative of countries that protect the interests of their stakeholders, which lowers perceived investment risk and increases legitimacy (Talan, Sharma, Pereira, and Muschert, 2024). In the case of Malaysia and Singapore, the theoretical lens can be used to interpret divergent FDI results: Singapore with its well-developed stakeholder-based governance arrangements triggers regular, high-value investment, whereas Malaysia with its gradual ESG advancement is the result of an active attempt to keep up with the expectations of stakeholders and eliminate the legitimacy gap. Therefore, Stakeholder Theory offers the theoretical basis of the combination of ESG and the standard macroeconomic determinants in the explanation of modern FDI behaviour.

The involved parties are the staff, clientele, suppliers, investors, governments, communities, and the environment. The theory developed as a corrective to profit-

maximisation paradigms, emphasising that long-term success depends on ethical behaviour, transparency, and responsible management of stakeholder relationships. Framing organizations as interdependent systems, the theory emphasizes trust, accountability and social responsibility for sustainable operations

Figure 2.1 Stakeholder Theory



Source: Al Mamun et al. (2013)

Figure 2.1 is a stakeholder map with the organisation in the middle and several external and internal groups that are interested in or are influenced by the activities of the organisation such as the employees, investors, suppliers, consumers, government, and media. The diagram notes that organizations cannot exist on their own, they have to take into account and weigh the needs and expectations of this network of interconnected stakeholders to ensure long-term success and legitimacy.

Stakeholder theory is highly applicable to national-level economic variables as all the identified determinants (foreign direct investment (FDI); environmental, social and governance (ESG); GDP growth; exchange rate; inflation; and trade openness) in this study directly affect overall stakeholder welfare (Freeman, 1984). Today foreign investors, being important drivers, consider the legitimacy and environmental and social stability of host countries in addition to their economic prospects (Alregab, 2022). Countries that protect labour rights, uphold environmental standards, and maintain political stability are marked lower on the

investment risks ladder and attract greater sustainable, long-term FDI (Tang, Nedopil, & Springer, 2024). ESG performance, in particular, mirrors stakeholder expectations, whilst being the evidence of ethical governance and responsible development (Ji & Mou, 2023). By adopting stakeholder theory, it is assumed that a country could build trustworthiness and legitimacy with its stakeholders by enhancing its ESG performance (Talan, Sharma, Pereira, & Muschert, 2024).

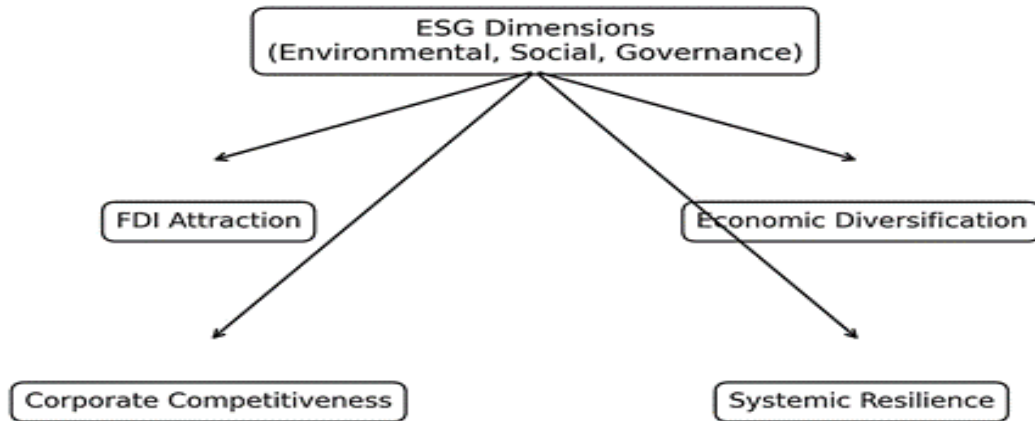
Figure 2.2 ESG and Stakeholders



Source: Yaz Palanichamy & Bales (2023)

Figure 2.2 is an infographics-like stakeholder wheel incorporated into an ESG reporting model where the ESG impact on different stakeholders (employees, regulators, customers) is highlighted to achieve sustainability in its operations. This is a graphic illustration of the argument that high ESG performance safeguards the interests of stakeholders, mitigate risks in investments and increases the legitimacy of FDI inflows in such countries as Malaysia and Singapore.

Figure 2.3 ESG Dimensions Branching into FDI Attraction



Source: Al-Sawai et al. (2026)

Figure 2.3 is a conceptual arrow diagram with ESG dimensions branching out into FDI attraction, economic diversification (which leads to GDP growth through increased economic resilience), corporate competitiveness and systemic resilience. This illustration brings out the role of ESG as a critical catalyst in the Stakeholder Theory that positively supports long-term value creation, instead of profit maximization, by helping to address the environmental, social, and governance concerns of the stakeholders, thereby increasing FDI and GDP in the interdependent economies.

Stakeholder theory also accounts for how macroeconomic conditions influence outcomes for stakeholders (Freeman, 1984). That's because stable GDP growth improves employability and income security, and exchange rate stability diminishes uncertainty for businesses and consumers (Akhter, 2023). Inflation limits purchasing power, living costs, and business operations, so effective and open economic governance is vital to ensure and earn trust. Trade openness impacts the employment of relevant stakeholders, consumer prices, and industrial competitiveness (Alregab, 2022). Stakeholder theory therefore encourages policymakers to optimise between economic growth and the protection of interest among multiple stakeholders. Its application to all variables arises because every

risk, negative or positive outcome, and benefit are linked to certain aspects of the determinants for groups of stakeholders. ESG develops as a response from stakeholders to the demand for transparency and moral behaviour (Talan, Sharma, Pereira, & Muschert, 2024). FDI decisions are also linked with governance, social stability, and environmental protection. Welfare, corporate confidence, economic resilience, and consumer confidence are also directly affected by GDP growth, inflation, exchange rates, and trade openness. This is why Stakeholder theory gives a holistic way of understanding the role economic and sustainable aspects together playing in national development and investor perceptions.

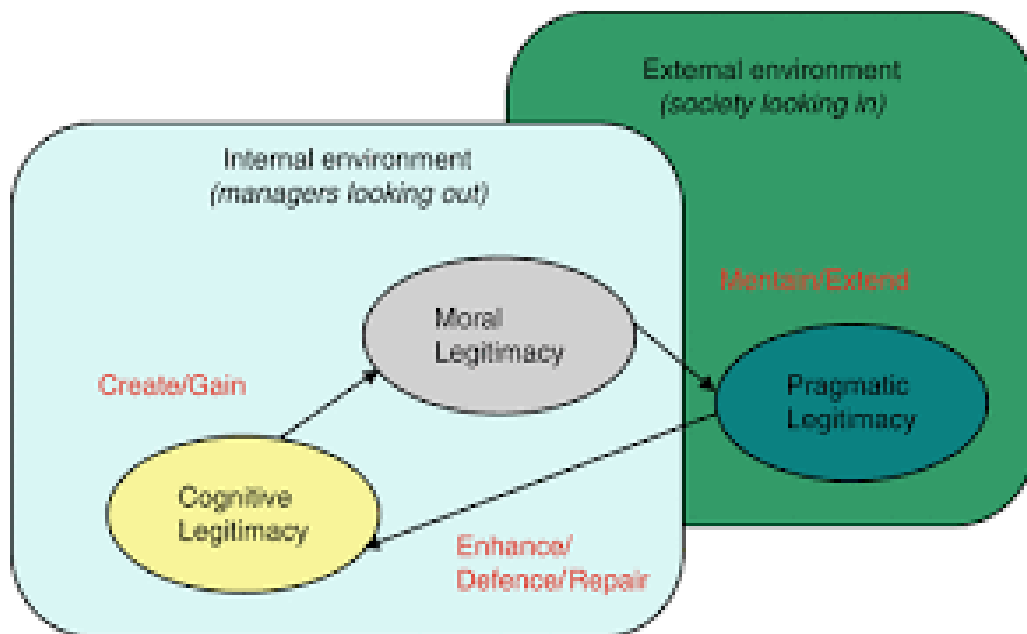
With regards to what the research, “The Role of ESG in Attracting FDI: A Comparative Study of Malaysia and Singapore” says, Stakeholder Theory does articulate the reason why ESG is so effective in influencing investment choices. Singapore’s well-defined governance systems, mandatory sustainability reporting, and environmental measures not only instil trust among investors but also demonstrate high stakeholder protection. The National Investment Aspirations (NIA), ESG disclosure reforms, and renewable energy policies of Malaysia all indicate alignment with stakeholder expectations. As the theory suggests, this implies that when countries safeguard the interests of their environmental, social, and governance stakeholders, they also enhance legitimacy, stability, and attractiveness for global investment.

2.1.2 Legitimacy Theory

Legitimacy theory states that organizations and governments work on a “social contract” basis, meaning that everything that organizations and governments undertake should be regarded appropriate by society, based on society’s norms, values, and expectations (Widhiastuti, Rohman, & Harto, 2025). Legitimacy is defined by Suchman (1995) as the perception by stakeholders that institutions are operating in accordance with commonly accepted social norms. On a global level, governments prove their legitimacy by transparency, governance excellence,

economic stability, and adherence to global norms such as ESG-related duties (Akhter, 2023). Governments that do not achieve these expectations will lose the trust of the public, credibility and international support (Pratama, Kusbandiyah, Innayah, Kuswara, & Bagis, 2025). Thus legitimacy is critical for political stability, economic resilience and international competitiveness.

Figure 2.4 A Representation of Legitimacy Theory



Source: Schiopoiu Burlea (2013)

Figure 2.2 shows that organizations aim to gain legitimacy by making the practices within their organization consistent with the expectations of the external society, which can be divided into three types: pragmatic (self-interest based), moral (ethically right), and cognitive (taken-for-granted). Attempts to build new legitimacy, or to build, defend and repair existing legitimacy is done through the strategies used by managers in reaction to stakeholder scrutiny.

For Foreign Direct Investment (FDI), Legitimacy Theory highlights that a country's attractiveness does not simply rely on its economic fundamentals, but rather on how legitimate and trustworthy it appears to foreign investors (Le, 2025). Host countries

with strong governance, rule of law, transparent rules and regulations, and environmental and social responsibilities are likely to retain their investors (Akhter, 2023). Countries adopting ESG frameworks, enhancing disclosure requirements, and aligning policies with global sustainability norms can be viewed as signalling less risk as well as a high level of institutional credibility in the long run (Jiang, Chang, Yao, Huang, & Zhou, 2025). So in that sense Malaysia and Singapore are using ESG to augment their legitimacy. Malaysia has improved sustainability reporting to drive green FDI, whilst Singapore's long-established governance strength and mandatory ESG disclosures strengthen its place as a reliable and credible investment destination.

The rationale also discusses how ESG practices work in direct combination with these processes of sustaining legitimacy. ESG disclosure is an important strategic instrument for governments and enterprises to provide signals of accountability, ethical conduct and conformity to society expectations (Agyemang, Yusheng, Twum, Ayamba, Kongkuah, & Musah, 2021). They serve as a signal to be accountable and transparent in voluntary reporting of environmental, social and governance performance (Jiang et al., 2025). Malaysia's shift towards compulsory sustainability reporting demonstrates this model for developing legitimacy of global markets through ESG; and Singapore's use of ESG in financial regulation and corporate governance, in particular, further supports its legitimacy as a global financial hub. In that sense, ESG acts like a tool for compliance and validation and a means of legitimacy building that plays an important role for investor confidence influencing their behaviour.

Legitimacy Theory additionally applies to macroeconomic variables such as GDP growth, exchange rate stability, inflation, and trade openness. These indicators reflect the effectiveness and credibility of national governance (Akhter, 2023). Stable GDP growth signals prosperity and fulfils societal expectations, while weak or volatile growth can threaten legitimacy. Stable exchange rates indicate sound monetary management, whereas high inflation reduces public trust in economic institutions. Trade openness further demonstrates alignment with global standards

of economic integration (Pratama et al., 2025). Countries reinforce legitimacy by adopting transparent fiscal policies, pursuing price stability, and harmonising regulations with international norms.

ESG is a strong signal, and the Legitimacy Theory helps explain this in the context of “The Role of ESG in Attracting FDI: A Comparative Study of Malaysia and Singapore”. They are exhibiting their compliance with the global standards of sustainability and enhancing their credibility in the international arena which will attract investment by adopting strong ESG models (Csordás & Al-Dalahmeh, 2024). Singapore's superior governance infrastructure secures its place as a trusted investor gateway, and Malaysia's ESG strategy aids in bridging legitimacy gaps and ensuring competitiveness. Hence, the use of Legitimacy Theory lays the conceptual groundwork explaining why ESG affects FDI flows and why both countries utilize ESG to strengthen their national legitimacy and attract investment.

2.2 Empirical Reviews of the Study

2.2.1 Foreign Direct Investment (FDI)

This analysis investigates the impact of Environmental, Social and Governance (ESG) dimensions on the Foreign Direct Investment (FDI) inflows in Malaysia and Singapore using three recent peer-reviewed research. Collectively, the articles present several theoretical and regional views on the ESG–FDI nexus, which support their empirical findings and theoretical extensions on the influence of sustainability standards on investment choices in Southeast Asia.

Environmental, Social, and Governance (ESG) is a collection of non-financial measures of performance that determine how committed a country or company is to the sustainability, ethical actions, and quality of the institutions. The environmental criteria focus on environmental impact and resource management, the social criteria focus on human rights and labor practices, and the governance criteria focus on the quality of regulation, corruption, and institutional transparency (Anh and Trang, 2025). Within the international investment institutional sector, ESG performance has become a pivotal indicator of national credibility and future stability to the foreign investor.

The study done by Csordas and Al-Dalahmeh (2024), has based its evidence on the legitimacy theory to determine whether ESG reporting enhances national credibility and attracts more inward FDI. The study was conducted on 28 countries with nonparametric statistical tests of the Kruskal-Wallis statistic test and Bonferonni post hoc test of the World Bank data. This was aimed at exploring the universality of the legitimacy theory by evaluating the connection between ESG reporting and FDI inflows. They found out that the high scores in ESG are not enough to increase FDI inflows. Instead, the most attractive countries to foreign investors are those whose ESG standards are rapidly increasing and meet the global standard. Nevertheless, the absence of international norms of ESG disclosure prevents the

creation of credible economic relationships. The article supports the current research with theoretical foundations by applying the legitimacy theory on the corporate level to the national level, proving that nations are able to implement ESG activities so as to be in line with international requirements and appeal to sustainable investments.

Anh and Trang (2025b) examined that 31 Asian countries during 2010–2020 to find out the impact of environmental, social, and governance factors on FDI inflows. Using panel econometric models like OLS, Random Effects, and Fixed Effects estimations, the authors state that environmental performance, specifically lower CO₂ emissions per capita, has a positive correlation with FDI inflows. On the other hand, the Human Development Index, which is a proxy for social performance, lacks a significant relationship with FDI. Indeed, their analysis reveals why environmental sustainability is a key driver of investment flows in Asia and underlines the urgency of incorporating environmental policy within wider investment strategies within a country.

Li et al. (2025b) develop a conceptual framework that explains how FDI can be an effective enabler of national ESG change. via a structured literature review, the authors identify four mechanisms via which FDI advances ESG agendas: knowledge spillovers, regulatory convergence, green finance signaling, and policy diffusion. They argue that the maturity of institutions and absorptive capacity determine the extent of the benefits of ESG. This study introduces a multi-level governance model that governments can deploy to align FDI strategies with sustainable development goals.

These studies, taken together, point to the influence of environmental quality, governance strength, and policy coherence on the attraction of FDI, offering direction for Malaysia and Singapore as they aim to become ESG-driven investment hubs in the region (Trung, 2025; Ali, 2025). The existing literature has provided insights into FDI determinants, however, most of the empirical research undertaken

has been in the form of either single country time series regressions or huge multi-country panels, thus limiting the amount of country-level comparison. Furthermore, most works use OLS or DOLS based static estimation techniques, which do not consider the dynamic responses to shocks. Structural differences between developing economies like Malaysia and advanced financial hubs such as Singapore, despite their highly interconnected investment environments, are barely touched on in the literature. These limitations point to the necessity of a focused comparative study using more robust dynamic models (e.g., panel estimators, VECM frameworks).

2.2.2 Environmental, Social, and Governance (ESG)

In recent years, certain studies have examined the relation between Environmental, Social, and Governance (ESG) impacts on Foreign Direct Investment (FDI), including in the context of GDP growth and governance quality in both Malaysia and Singapore. In the article by Anh and Trang (2025c), the ESG is broken down into three distinct measures, with environmental performance proxied by CO₂ emission per capita, social performance proxied by the Human Development Index (HDI), and the quality of the governance proxied by governance indicators. Their findings indicate that no statistically significant value with FDI is found in terms of good quality governance and high environmental performance (reduced emissions) can be a deterrent factor and social performance does not have any statistically significant value in connection with FDI inflows.

Anh and Trang (2025c) conducted a quantitative analysis of 31 Asian countries, including Malaysia and Singapore, to analyze the influence of ESG factors on FDI inflows. Their results suggested a positive impact of governance quality on FDI but strong environmental performance might discourage it. Moreover, the fact that macroeconomic indicators (e.g. GDP growth) are positively associated with FDI inflows reinforced the notion that a favourable economic environment invites investors.

Conversely, Tabash et al. (2024) focused on Malaysia and used time series data from 1970 to 2022. The study finds positive and substantial association between governance quality and energy security with the FDI inflows of Malaysia using the dynamic econometric techniques of Dynamic Ordinary Least Squares (DOLS) and Fully Modified OLS (FM-OLS). The control was GDP growth, although the main focus was on the E and G components of ESG.

A more conceptual contribution was made by Nasir, Ridzuan, Nasir, Syeddin, Salim, and Ithnin (2025) which gave a theoretical comparison of Malaysia and Singapore through their analysis in *International Journal of Research and Innovation in Social Science*. They explain that the different trajectories of their growth were mostly related to differences in governance quality. They contended that FDI and trade openness could be vital economic variables, but their effects are contingent upon the resilience of governance institutions. In Singapore, strong governance created the foundation for prolonged high GDP growth and FDI performance, while considerably slower progress in Malaysia was connected with governance flaws. This is in line with the findings of Kayani, Nasim and Abu Saleem (2024) who researched Cambodia, Thailand and Vietnam and concluded that governance has a positive impact on FDI as a lower control of corruption, higher regulatory quality and stronger rule of law led to increased FDI inflows. Overall, this research in conjunction with existing literature indicates that ESG (and in particular governance quality) performance is a key determinant in FDI but rise in GDP and other economic variables are complimentary to attract the firms.

While there is increasing recognition of ESG as an influential driver of investment flows, the empirical evidence is uneven because researchers use different ESG indices, scoring methodologies and disclosure standards (Sundoro, Rahayu, Thine, Aini, & Sulistyowati, 2025). ASEAN-based studies are limited by a tendency of predominantly qualitative analyses and/or narrow indicators at the corporate-level, that make inconsistent evaluations of the relationship between ESG and FDI (Phan, 2024). Furthermore, there are scant studies integrating ESG performance with

macroeconomic fundamentals to explain the interplay between sustainability and economic conditions (Bui & Doan, 2024). These methodological inconsistencies exemplify the need for more standardised measurement and strong cross-country comparisons (Huang, Loganathan, Subramaniam, & Kogid, 2025).

2.2.3 GDP Growth Rate

GDP has been one of the pillars in defining the economic strength and a key factor in foreign direct investment (FDI) inflows, especially when it is taken in conjunction with Environmental, Social, and Governance (ESG) (Sundoro, Rahayu, Thine, Aini, and Sulistyowati, 2025). In Malaysia, Singapore, and ASEAN region, the GDP and the quality of governance, as well as the maturity of the financial system, interrelate to determine how international investors perceive risk and sustainability in the long term (Bui and Doan, 2024). The present review summarizes the results of three recent articles released between 2024 and 2025 that deliver empirical and theoretical evidence on how GDP and other factors related to ESG influence the inflow of FDI into Southeast Asia (Huang, Loganathan, Subramaniam, and Kogid, 2025).

Bui and Doan (2024), explained the impact of FDI on green GDP in six ASEAN countries, including Malaysia and Singapore. Situated in the post-pandemic sustainability era, this study explores whether financial development enhances the positive effects of FDI on environmentally adjusted GDP. Utilizing dynamic panel techniques such as the Generalized Method of Moments and Bayesian regression, along with threshold analysis, the authors find that FDI significantly increases green GDP only when financial development surpasses specific institutional and market thresholds. The results show that financial institutions, more than financial markets, play a pivotal moderating role. The study extends the literature by demonstrating that FDI's benefits to sustainable GDP growth are conditional rather than automatic, underscoring the need for stronger institutional frameworks in ASEAN economies.

Ameer et al. (2025) examine about Malaysia how governance quality and energy infrastructure affect FDI inflows from 1970 to 2022. As a macroeconomic factor and influential in FDI modelling, GDP is still regarded as a significant factor. However, the authors conclude that ESG-related factors in general: specifically governance performance and energy capacity have been insufficiently explored. Employing Dynamic OLS as well as Fully Modified OLS estimators, they find that both governance improvements and improved energy infrastructure cause a strong increase in FDI inflows, and that financial development has an outside negative impact. GDP is still a powerful positive factor. This study adds empirical support for the theory that institutional strength and energy reliability are determinants of foreign investor engagement beyond the purely economic dimension.

Thao et al. (2025), presents a broader regional view through a PESTLE framework for identifying FDI drivers in ASEAN that align with Sustainable Development Goals (SDGs). Their mixed-methods (panel estimation along with policy assessment) analysis showed that political stability, legal reforms, and environmental regulation are the major drivers of FDI. A joint research article by the authors also finds that a 10% rise in FDI corresponds to a 0.3% increase in GDP within three years, and demonstrates how investment is positively correlated with economic growth. Their conceptualisation emphasizes the fact that integrating ASEAN through the ASEAN Economic Community brings with it the establishment of a more balanced macroeconomic model and policies making possible a strengthened investment environment in the region.

Overall, these studies demonstrate that GDP is indeed integral to these decisions of FDI, however, it is also strengthened with good governance, a strong financial system, sustainable energy infrastructure and regional consistency in policy. Drawing and maintaining FDI for Malaysia and Singapore in the next decade can no longer be achieved without rapid economic growth but also requires deeper ESG-aligned reforms that favour long-range sustainable development.

While many of these studies find GDP growth to be an important driving force of market-seeking FDI, their methods mostly depend on aggregated annual data, masking cyclical effects and short-term shocks. Some studies also investigate GDP growth in isolation, without accounting for the interaction of GDP growth with governance quality or sustainability performance Thao et al. (2025). Results observed in large cross-country panels may not be easily applicable to structurally different economies like Malaysia and Singapore. Such limitations limit the accuracy of these conclusions and underscore the requirement for a comparative and model-based assessment based on the latest data.

2.2.4 Exchange Rate Variable

Exchange rate mechanisms (alternatively known as exchange rate regimes) are the institutional mechanisms or policy arrangements chosen by the monetary authorities of a given country to stabilize and regulate the value of its national currency against other currencies in the foreign exchange market between ends of a fixed policy and other end of a fully floating policy and adaptive in the middle, where controlled variability is acceptable to achieve price stability, trade facilitation, and external adjustment objectives (International Monetary Fund, 2022). Exchange rate mechanisms have a significant impact on foreign direct investment (FDI) determinant effects by affecting investor risk perceptions, expected returns, and the stability of cross-border capital flows. Although some of the studies have quantitatively derived the relationship of exchange rate and foreign direct investment (FDI); macro-financial evidence for the importance of exchange rate stability to provide information on why exchange rate stability is important for long-term foreign investment is also found in the recent literature. Yeboah et al. (2025) investigate the linkage of geopolitical risk to exchange rate dynamics in the emerging economies in Sub-Saharan Africa: Quantile-on-Quantile Regression (QQR) and Wavelet Coherence methods. While the study does not directly estimate FDI inflows, these results show that exchange rate volatility inherently responds asymmetrically not only to external geopolitical shocks but also to market conditions and country idiosyncrasies. Such evidence is applicable to FDI analysis

as volatile exchange rate conditions increase uncertainty for multinationals, which discourages long-term investment commitments.

In a similar work, Yang, Wan, and Shen (2023) assessed the effect of exchange rate and interest rate on the carbon price changes in China's Hubei carbon trading market using various time-varying econometric models (TVP-VAR and DCC-GARCH) and machine learning approaches. Although the study targets environmental markets as opposed to FDI, it shows the effects of exchange-rate movements on sustainability policies and financial markets. These interactions affect investment decisions indirectly as the result of perceptions of policy credibility, macroeconomic stability, and regulatory risk.

In a more direct macroeconomic context, Ullah and Nobanee (2025) using nonlinear ARDL techniques investigated the determinants of exchange rate movement in an emerging economy. FDI flows, energy pricing, and inflation have all been effective drivers of the currency behaviour and the robust interaction of exchange rate stability and the effect of capital flows on currency outcomes. The current analysis does not relate to either Malaysia or Singapore per se but does provide some evidence that stable exchange rates decrease the uncertainty and increase the confidence of investors.

Collectively, although the studies by Yeboah et al. (2025) Yang, Wan, and Shen (2023) Ullah and Nobanee (2025) do not provide a direct estimate on FDI inflows, this provides a macro-financial account of why exchange rate stability is essential for investor optimism and capital allocation choices. When compared between Malaysia and Singapore, differences in exchange rate regimes Malaysia's relatively volatile managed float, and Singapore's tightly managed exchange rate system which may generate divergent FDI outcomes, which is especially relevant here. Thus, the absence of comparative exchange rate–FDI studies between Malaysia and Singapore would lead us here to one of the significant gaps in research.

2.2.5 Inflation Rate Variable

The rate of inflation is the most dominant macroeconomic indicator that has shown the price stability and the effectiveness of the policies, which is significant to foreign investors. A moderate inflation may be a sign of growth, whereas a high and/or fluctuating inflation will tend to reduce the true returns and increase the riskiness of an investment venture. The authors Hossain et al. (2024) studied the impact of inflation, Gross Domestic Product (GDP), interest rates, trade openness, and geopolitical risk on FDI inflows in countries of Southeast Asia based on the panel cointegration and system GMM techniques. Their findings indicate that inflation may lead to positive long-run correlation with FDI when inflation is a parameter of the increasing demand and macroeconomic momentum. Nevertheless, the authors emphasize that the correlation between inflation and FDI is highly situational, and it is based on institutional credibility and consistency of policies.

Zaharum et al. (2024) examined the factors that affect FDI inflows at the time-series levels of the years 1992 through 2021 using the Malaysian context alone. They used a multiple regression analysis on the data and discovered that inflation does not show any statistically significant effect on FDI when it is controlled with other macroeconomic variables. This implies that inflation is a secondary driver in investment environment in Malaysia as compared to trade openness, GDP growth, stable exchange rate etc.

Equally, Fuad et al. (2025) examined the long-run determinant of FDI in Malaysia since 1971-2022 and found that inflation has a positive and significant impact on FDI inflows. They indicate that the current and predictable inflation rate in Malaysia may indicate competent economic policies and attract foreign investment.

Other recent facts confirm this subtle opinion. Indicatively, a study conducted by Yee (2025) on determinants of FDI in Malaysia conducted a cointegration and causality analysis (including infrastructure, market size, exchange rate and inflation)

and found that inflation did not have any significant influence on FDIs, in both the short and long perspective, which strengthens its peripheral position in relation to other factors. Khan (2025) examined institutional quality, macroeconomic drivers on FDI inflows in nine ASEAN countries (2002Q1-2022Q4) based on a broader ASEAN study whereby inflation was an important macroeconomic variable, but not a dominant factor on the dynamics of FDI, though. Shaari et al. (2023) have also discovered, that inflation is an influential determinant of FDI in Malaysia (among market size, trade openness, and environmental conditions), although it tends to have an overall positive influence, which does not discourage inflows when the rates are moderate. The high FDI rebounds recorded in Malaysia, including the high value industries like data centers and semiconductors, have been accompanied by its consistently low rates of inflation, which have been ranging around 1.8% in 2024 and 1.4% in 2025, which is an indication that the policy credibility is in full control, rather than posing a hindrance to the country.

Overall, the results from the research show that inflation does not negatively affect FDI, but peripherally, indicating the importance of macroeconomic stability and policy credibility. The inflation-FDI relationship is aggravated by the disparity in subsidy regime, price controls and monetary frameworks among countries. It is worth noting that extremely minimal literature has examined the mutual interaction between inflation and ESG performance and quality of governance aspects as drivers of FDI in a specific country which is what the current study has endeavored to examine.

2.2.6 Trade Openness Variable

Trade openness represents the extent of an economy's integration into the global economy and is associated with export-oriented FDI and participation in global value chains. Open trade regimes reduce transaction costs, facilitate market access, and enhance the attractiveness of host countries to multinational corporations. Albahouth and Tahir (2024) analyzed the ASEAN countries based on panel data and

concluded that trade openness significantly increased FDI inflows, particularly in countries with strong institutional quality. Their results suggest that openness alone is insufficient; its effectiveness depends on complementary governance structures that reduce regulatory and policy uncertainty.

Bannour and Abdelkawy (2024) examined the interaction between sovereign ESG performance and trade openness in GCC countries and found that trade openness amplifies the positive impact of ESG on FDI inflows. Even though their empirical focus is not on ASEAN countries, this study offers relevant theoretical insights for highly open economies like Malaysia and Singapore, where external trade integration and sustainability commitments jointly influence investor confidence.

Using Vector Autoregression (VAR), Nguyen (2022) investigated the long-run relationship between trade openness, FDI, economic growth, and unemployment. It shows that trade openness is part of a long-run equilibrium system linking FDI and growth, supporting the idea that open economies are better positioned to attract foreign capital. While trade openness has strong theoretical grounds, there are variations in empirical findings due to differences in measurement, sample selection, and estimation techniques.

In short summary, while Malaysia and Singapore are heavily integrated within the supply chain, there remains limited comparative research focusing specifically on these nations. As stated in this study, this reinforces the need for a focused comparative analysis.

2.3 Summary of Empirical Review of the Study

No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
<i>Foreign Direct Investment (FDI)</i>					
1.	Anh and Trang (2025)	Do environmental, social, and governance (ESG) factors affect foreign direct investment in Asian countries?	Dunning's Eclectic (OLI) Theory	Use panel data for 31 Asian countries (2010–2020) and uses Pooled OLS, REM, and FEM, with the Fixed Effects Model selected through F-tests and Hausman tests.	Its novelty lies in integrating ESG + macroeconomic + financial development factors in one framework for Asia. The findings show that lower CO ₂ emissions and better governance increase FDI, HDI has no effect, and GDP growth, trade openness, financial development, and price level ratio all positively influence FDI.
2.	Li et al. (2025b)	Strategic Role of Foreign Direct Investment in Driving National ESG Implementation: Innovative Pathways for Sustainable Economic Transformation.	Institutional theory, innovation systems theory, and global value chain (GVC) governance	Uses a conceptual, multi-scalar framework-building approach	The study is novel in reframing FDI as a dynamic sustainability ecosystem rather than capital inflow. The study identifies four transformation mechanisms knowledge spillovers, regulatory convergence, green finance signaling and policy diffusion and concludes that FDI's ESG impact depends on host-country absorptive capacity, regulatory alignment and institutional maturity.

3.	Csordás and Al-Dalahmeh (2024)	Developing Trust, Developing economies: The role of ESG disclosure in attracting Foreign investment.	Legitimacy Theory	It benchmarks ESG regulations across 28 countries, scores each nation's ESG maturity, and employs Kruskal–Wallis, Bonferroni post hoc tests, and Cohen's d	The study is novel in extending legitimacy theory from firms to entire countries, showing that more advanced ESG disclosure significantly boosts FDI, while early-stage nations suffer from low investor trust due to weak or non-standardized ESG practices.
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No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
ESG					
1.	Anh and Trang (2025)	Do environmental, social, and governance (ESG) factors affect foreign direct investment in Asian countries?	Dunning's Eclectic (OLI) Theory	Using panel data for 31 Asian countries (2010–2020), the study applies Pooled OLS, Random Effects, and Fixed Effects models, selecting the Fixed Effects Model through F-tests, Breusch–Pagan tests, and the Hausman test; the regression includes ESG indicators (CO ₂ emissions, governance, HDI) and macroeconomic controls.	The novelty of this study is the incorporation of ESG factors and macroeconomic variables in a single empirical FDI model for Asia. The study found that lower CO ₂ emissions and good governance significantly promote FDI, whereas HDI does not have a significant effect on FDI. The study also found that trade openness, GDP growth, financial development, and price level ratios have positive effects on FDI inflows.
2.	<i>Governance and Sustainable Economic Growth in Malaysia and Singapore: A Conceptual</i>	<i>A Conceptual analysis International Journal of Research and Innovation in Social Science.</i>	Neoclassical Growth Theory, Endogenous Growth Theory, and Governance Theory	It uses a conceptual analysis approach, reviewing past empirical studies and developing an integrated three-dimensional framework	The study is novel in placing governance at the center of the growth model, showing that governance amplifies the effectiveness of other growth drivers and explaining why Malaysia and Singapore experience different growth

	<i>Analysis International Journal of Research and Innovation in Social Science (2025)</i>				outcomes despite similar regional contexts.
No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
ESG					
3.	Tabash et al. (2024)	Role of governance in attracting foreign direct investment inflow: empirical evidence from South Asia region.	Dunning's Eclectic (OLI) Theory	Using panel data from 8 South Asian countries (2000–2019), the study conducts unit root and cointegration tests before applying FM OLS and DOLS models	The study is novel in that it provides comprehensive long-run evidence that governance significantly increases FDI inflows, where as inflation reduces FDI inflows and trade volume, population growth, labour force and financial development positively influence FDI. The study underscores governance improvement as a primary policy tool for attracting sustainable foreign investment.

No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
<i>GDP Growth Rate</i>					
1.	Ameer et al. (2025)	Does governance and energy spur FDI inflows in Malaysia?	Institutional Theory, Resource Dependence Theory, and Human Capital Theory	Using time-series data from 1970–2022, the authors employ FM-OLS and DOLS to estimate long-run relationships.	The study is novel in constructing a comprehensive governance index (QOG) and integrating energy services into Malaysia’s FDI model over a long historical period, finding that governance, energy security, human capital, and productivity significantly increase FDI, while financial development unexpectedly reduces FDI, suggesting a substitution effect between domestic and foreign financing.
2.	Thao et al. (2025)	Macroeconomic Environment for SDG – FDI drivers in ASEAN.	PESTLE framework (Political, Economic, Social, Technological, Legal, Environmental)	It uses secondary macroeconomic data (2000–2024) for all ASEAN countries, normalizes indicators using a 0–5 scoring scale, and evaluates each country’s FDI environment by constructing PESTLE radar charts	The study is novel by combining the analysis of FDI with regard to the SDGs and a thorough PESTLE analysis and finds that all six dimensions have a significant impact on FDI inflows and that the integration of the ASEAN Economic Community (AEC) and, in particular, the improvement of legal and economic conditions, increases the region’s ability to attract sustainable high-quality

					investment.
3.	Bui and Doan (2024)	Foreign direct investment and green GDP: the thresholds of financial development for economic policies.	Neoclassical growth theory, endogenous growth theory, and scale and technique effects	Using panel data for the ASEAN-6 from 2000–2021, the study applies GMM regression and Bayesian estimation to analyse FDI's impact on green GDP, and employs Hansen's threshold regression	The study is novel in identifying precise financial development thresholds which $FMI = 0.38$ and $FII = 0.68$ showing that FDI has a negative impact below these levels but becomes strongly positive above them, with financial institutions moderating the relationship more effectively than financial markets.

No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
<i>Exchange Rate</i>					
1.	Yeboah et al. (2025)	Geopolitical risk and exchange rate dynamics in Sub-Saharan Africa's emerging economies.	International finance theory and risk transmission theory	It uses Quantile-on-Quantile Regression (QQR) and Wavelet Coherence analysis	The novelty of this study lies in the application of time-frequency analysis and quantile based modelling to demonstrate that the sensitivity of exchange rates to GPR varies significantly across countries, with some currencies exhibiting notable reactions during positive market phases, while others are unaffected regardless of the geopolitical pressure.
2.	Ullah and Nobanee (2025)	Decoding exchange rate in emerging economy: Financial and energy dynamics.	Exchange rate theory and investment under uncertainty theory	It uses monthly data from 2010–2022 across several emerging markets and applies nonlinear ARDL (NARDL) and asymmetric causality tests	This paper contributes to the literature by providing sector-specific asymmetric evidence of the tendency of exchange rate depreciation to stimulate FDI in manufacturing and extractive sectors and appreciation to lower FDI more strongly. It shows that the FDI responses are nonlinear and differ substantially across industries.
3.	Yang et al. (2023)	Research on the impact of exchange rates and interest rates on carbon price changes in the context of sustainable	Stakeholder Theory and Institutional Theory	It uses panel data from 27 emerging economies (2005–2020) and employs system-GMM and panel threshold	This is the first study to recognize ESG performance as a significant threshold variable, in which green finance only promotes FDI in countries with strong ESG performance,

		development.		regression	but weak-ESG countries do not benefit from the promotion of green finance, emphasizing ESG as a catalyst that unleashes the positive effect of green financial development.
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No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
<i>Inflation Rate</i>					
1.	Fuad et al. (2025)	<i>A time series analysis on foreign direct investment determinants in Malaysia.</i>	Macroeconomic theory and the neoclassical growth view	It uses time-series data from 1971–2022 and applies correlation analysis, multicollinearity tests, ADF stationarity tests, and a Multiple Linear Regression (MLR) model	This study is novel in that it uses a long dataset of 51 years and incorporates population growth as a determinant. The results show that inflation and population growth significantly affect FDI (positively and negatively, respectively), while GDP per capita does not have a significant effect, implying a change in the dynamics of investment in Malaysia.
2.	Zaibedah Zaharum et al. (2024)	Determinants Of Foreign Direct Investment In Malaysia.	Macroeconomic theory	Using 30 years of annual data (1992–2021), the researchers employ descriptive statistics, correlation analysis, multicollinearity tests, and Multiple Linear Regression (MLR)	The novelty of this study is its simultaneous analysis of six major macroeconomic determinants over a long period, where it finds that real interest rates and trade openness significantly and negatively impact FDI, while GDP, inflation, unemployment and exchange rate do not have a significant impact, highlighting unexpected dynamics in Malaysia's investment landscape.

3.	Hossain et al. (2024)	Impact of geopolitical risk, GDP, inflation, interest rate, and trade openness on foreign direct investment: Evidence from five Southeast Asian countries.	Institutional Theory and Legitimacy Theory	It uses panel data from 22 emerging economies (2002–2022) and employs quantile regression with non-additive fixed effects	The novelty of this study is the application of quantile-based nonlinear modelling to the ESG-FDI relationships. It finds that countries with higher ESG scores and a higher number of female legislators attract significantly more FDI, especially in middle and high-quantile economies, emphasizing the importance of sustainable governance in investment decisions.
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No.	Author (s) & Year	Title	Theory Used	Methodology	Novelty & Findings
Trade Openness					
1.	Bannour and Abdelkawy (2024)	Sovereign ESG and Foreign Direct Investment in the GCC: The amplifying role of trade openness in economic diversification.	Institutional Theory and Legitimacy Theory	It analyses panel data from ASEAN-6 countries (2004–2020) and employs Pooled OLS, Fixed Effects, Random Effects models, and using Driscoll–Kraay standard errors.	The report's novelty is in the construction of a comprehensive ESG index for ASEAN. The study reveals that ESG performance, especially governance and environmental aspects which considerably improve FDI inflows, highlighting sustainability as an emerging strategic driver of investment in the area.
2.	Tahir (2024)	The Relationship between Trade Openness and FDI Inflows: Evidence-Based Insights from ASEAN Region.	Exchange rate uncertainty theory and asymmetric adjustment behavior	It uses annual data for ASEAN-5 from 1980–2020 and employs nonlinear autoregressive distributed lag (NARDL)	This is the first time, the study has shown the influence of exchange rate on FDI is asymmetric. It has been found that in the long run, currency depreciation boosts FDI but appreciation has a bigger negative effect. This emphasizes the importance of exchange rate stability in ASEAN investment policy.
3.	Nguyen (2022)	The relationship between economic growth, foreign direct investment, trade openness, and unemployment	Macroeconomic growth theory and FDI–growth nexus theory	It uses panel data from five South Asian countries (1998–2017) and applies a Vector Autoregressive (VAR) model	The study is novel as it is the first to use a VAR model to jointly examine these four macroeconomic variables in South Asia, and it finds that GDP growth and unemployment have a

		in South Asia.			positive impact on FDI and that FDI Granger-causes both GDP growth and unemployment with all four variables having a long-run co-integrated relationship.
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2.4 Conclusion

Chapter 2 analysed the current theoretical and empirical research on the relationship between Environmental, Social and Governance (ESG) characteristics, major macroeconomic variables and Foreign Direct Investment (FDI) inflows, with specific reference to Malaysia and Singapore. The review confirmed that in the modern world economy decisions on FDI have moved away from depending only on traditional economic indicators, with sustainability performance, governance quality and institutional credibility becoming increasingly important determinants of investment attractiveness.

Besides, the theory of stakeholder and legitimacy provides a firm framework for explaining how ESG factors interact with macroeconomic conditions to shape FDI. The stakeholder theory identified that the protection of the benefits to multiple stakeholder groups by means of ethical governance, environmental responsibility, and social stability to the extent, reduced investment risk and built long-term confidence. Legitimacy Theory further articulated how ESG uptake, transparent governance and conformance with international norms played their roles as credibility signals that provided host countries to build trust and legitimacy with foreign investors.

The findings based on the empirical data examined suggested that governance quality consistently played a decisive role in attracting FDI, while the environmental and social effects were mixed and context-specific. The literature revealed that the most effective ESG outcomes were sustained by rising standards, coherent policies, and credible disclosure frameworks. Drawing on the literature, Malaysia and Singapore could also be considered. It is established that the differences in FDI outcomes between the two countries were largely due to differences in regulatory effectiveness and institutional maturity, highlighting the mediating role of governance in translating ESG initiatives into actual investment inflows.

Further, the review also confirmed that macroeconomic factors such as GDP growth, exchange rate stability, inflation, and trade openness are still crucial determinants of FDI but were becoming supplementary alongside ESG. High level economic growth indicated market potential; the stability of exchange rates lowered risk, well-calibrated inflation showed the management of policy, while having open trade regimes provided for global integration. Together, Chapter 2 revealed that sustainable FDI attraction in Malaysia and Singapore depended upon alignment of advanced ESG frameworks with sound macroeconomic considerations to give a clear conceptual backdrop for the empirical analysis later in subsequent chapters. To conclude, the existing literature highlights the need for an integrated, comparative, and dynamically estimated investigation of how ESG and macroeconomic factors influence FDI inflows in Malaysia and Singapore. Next chapter will explain the research methodology.

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CHAPTER 3: METHODOLOGY

3.0 Introduction

This chapter presents the approach, which will be used to examine how the environmental, social, and governance (ESG) performance and major macroeconomic factors affect Foreign Direct Investment (FDI) inflows to Malaysia and Singapore in 2020-24. The methodology followed is quantitative methodology which relies on secondary time-series and panel data in order to examine the long-run equilibrium as well as short-term dynamics. The combination methodology is a cross-country comparison based on panel data regression and Vector Error Correction Models (VECM) along with cointegration tests which are applied to examine dynamic adjustments. This is positively correlated with the research goals and hypotheses on the premise of Stakeholder Theory and Legitimacy Theory where the ESG is a proxy of the quality of the national governance and the legitimacy to complement the traditional drivers of FDI that are premised on the economic factors (ASEAN Secretariat, 2025; United Nations Conference on Trade and Development [UNCTAD], 2025).

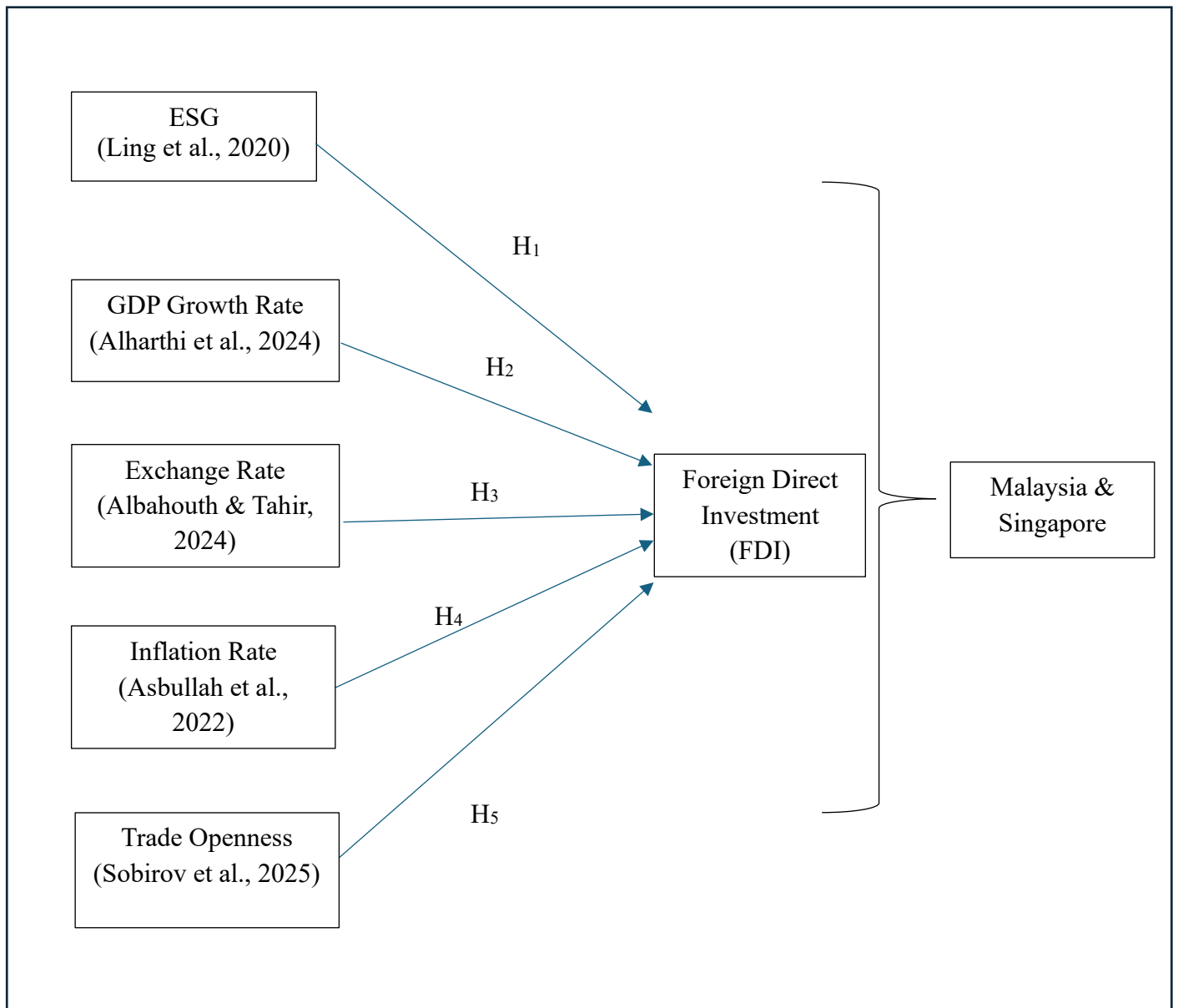
This framework will take the following structure: Section 3.1 will address the conceptual framework, Section 3.2 will address the hypothesis development, Section 3.3 will address the data collection and sources, Section 3.4 will address the research methods, Section 3.5 will address the residual diagnostics, Section 3.6 will address model evaluation, Section 3.7 will address data analysis procedures, Section 3.8 will address model estimation procedure and finally the conclusion will be taking place in Section 3.9. The present study has a strong base in its study of the importance of ESG in boosting investor confidence in a sustainability-focused global environment.

3.1 Conceptual Framework

The conceptual model draws FDI inflows as the dependent variable, which is motivated by ESG performance as a composite measure of the national governance, legitimacy, and credibility of sustainability and the macroeconomic variables such as the rate of GDP growth, exchange rate, inflation rate, and the openness to trade. Based on the Stakeholder Theory, which emphasizes responsible practices as a means of equalizing stakeholder interests (including the investors), and Legitimacy Theory, which puts emphasis on alignment with the expectations of the society including the ESG norms that lead to social approval, ESG is positioned as a primary boost in investor confidence (Nguyen and Mulikh, 2025). Macroeconomic factors are the source of reinforcements: the raising of the GDP reveals a potential in the market, the exchange rate stability reduces the risks of repatriation, the low inflation rate encourages predictability, and the trade openness shows the integration to the global market (World Bank, 2024a; World Bank, 2024b). The framework anticipates greater ESG influences in the developed governance framework in Singapore as compared to Malaysia which is still developing sustainability measures (ASEAN Secretariat, 2025).

The positive associations between ESG, GDP growth, and trade openness and FDI are represented by a visual representation (Figure 3.1: Conceptual Framework); negative relationship between inflation and stability-oriented influence of exchange rate. This framework guides the empirical research using panel method and VECM methods.

Figure 3.1 Conceptual Framework of The Role of ESG in Attracting Foreign Direct Investment: A Comparative Study of Malaysia and Singapore.



Source: Develop of the Study

3.2 Model Specification (VECM Model)

Vector Error Correction Model (VECM) is used to determine the short-run dynamics as well as the long-run equilibrium relationship between the variables. The symbol (D) denotes the sign of the Difference Operator, which is the difference between the value of a variable in one period and the other to make the data stationary

3.2.1 Malaysia Model

3.2.1.1 Co-integration Equation (Long-run Relationship)

$$ECT_{\{M,t-1\}} = FDI_{\{M,t-1\}} - \beta_0 - \beta_1 ESG_{\{M,t-1\}} - \beta_2 GDP_{\{M,t-1\}} - \beta_3 EX_{\{M,t-1\}} - \beta_4 INF_{\{M,t-1\}} - \beta_5 TO_{\{M,t-1\}} \quad (3.2)$$

This equation is the long-run equilibrium relationship of Malaysia. It is the steady-state at which FDI inflows depend on the ESG performance of the country and the macroeconomic fundamentals. $ECT_{\{M,t-1\}}$ denotes the errors of this relationship, i.e. any deviation or error of this long-run equilibrium in the last month.

3.2.1.2 VECM Equation (Short-run Dynamics):

$$\begin{aligned} \Delta FDI_{\{M,t\}} = & \alpha_1 + \lambda_1 ECT_{\{M,t-1\}} + \sum_{i=1..k} \gamma_i \Delta FDI_{\{M,t-i\}} + \\ & \sum_{i=1..k} \phi_i \Delta ESG_{\{M,t-i\}} + \sum_{i=1..k} \theta_i \Delta GDP_{\{M,t-i\}} + \sum_{i=1..k} \psi_i \Delta EX_{\{M,t-i\}} + \sum_{i=1..k} \zeta_i \Delta INF_{\{M,t-i\}} + \sum_{i=1..k} \xi_i \Delta TO_{\{M,t-i\}} + \varepsilon_{\{1t\}} \end{aligned} \quad (3.3)$$

The equation is the short-term fluctuation of Malaysia. The Speed of Adjustment coefficient to determine how fast the FDI inflows react to the long-run equilibrium following a transient economic shock. S is the summation symbols (S) that represent the lagged impact of ESG and macroeconomic variation between the past months, and ϵ_t is random error.

3.2.2 Singapore Model

3.2.2.1 Co-integration Equation

$$\begin{aligned} ECT_{\{S,t-1\}} = & FDI_{\{S,t-1\}} - \alpha_0 - \alpha_1 ESG_{\{S,t-1\}} - \alpha_2 GDP_{\{S,t-1\}} - \alpha_3 EX_{\{S,t-1\}} \\ & - \alpha_4 INF_{\{S,t-1\}} - \alpha_5 TO_{\{S,t-1\}} \end{aligned}$$

(3.4)

This equation determines long-term trend of Singaporean FDI inflows. It sets the minimum expectation of FDI in accordance with specific ESG indicators and macroeconomic stability of Singapore. Similar to the Malaysia model, the $ECT_{S,t-1}$ measures the gap between the actual FDI level and the long-run trend.

3.2.2.2 VECM Equation (Short-run Dynamics):

$$\begin{aligned} \Delta FDI_{\{S,t\}} = & \alpha_2 + \lambda_2 ECT_{\{S,t-1\}} + \sum_{i=1..k} \gamma_i \Delta FDI_{\{S,t-i\}} + \sum_{i=1..k} \varphi_i \Delta ESG_{\{S,t-i\}} + \sum_{i=1..k} \theta_i \Delta GDP_{\{S,t-i\}} \\ & + \sum_{i=1..k} \psi_i \Delta EX_{\{S,t-i\}} + \sum_{i=1..k} \zeta_i \Delta INF_{\{S,t-i\}} + \sum_{i=1..k} \xi_i \Delta TO_{\{S,t-i\}} + \epsilon_{\{2t\}} \end{aligned}$$

(3.5)

The formula traces the short term trends of FDI in Singapore. The coefficient shows the unique readjustment pace of Singapore towards the long-run trend. The model incorporates the differenced (D) and lagged value of the independent variables to estimate the impact of immediate changes in ESG or trade openness on FDI inflows in the given period adjusted with random noise (e_{2t}).

3.3 Hypothesis Development

H01: There is no significant relationship between ESG and FDI in Malaysia and Singapore.

HA1: There is a significant relationship between ESG and FDI in Malaysia and Singapore.

H02: There is no significant relationship between GDP and FDI in Malaysia and Singapore.

HA2: There is a significant relationship between GDP and FDI in Malaysia and Singapore.

H03: There is no significant relationship between EXR and FDI in Malaysia and Singapore.

HA3: There is a significant relationship between EXR and FDI in Malaysia and Singapore.

H04: There is no significant relationship between INF and FDI in Malaysia and Singapore.

HA4: There is a significant relationship between INF and FDI in Malaysia and Singapore.

H05: There is no significant relationship between TOP and FDI in Malaysia and Singapore.

HA5: There is a significant relationship between TOP and FDI in Malaysia and Singapore.

3.4 Data Collection and Source of the Data

Table 3.1 Data Collection and Source of the Data

Variables	Sources	Link
FDI Inflows	Department of Statistics Malaysia (DOSM)	https://www.dosm.gov.my/portal-main/release-content/statistics-of-foreign-direct-investment-fdi-in-malaysia-2024
	World Bank	https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD?locations=MY-SG
	Singapore Department of Statistics (SingStat)	https://www.singstat.gov.sg/find-data/search-by-theme/trade-and-investment/foreign-direct-investment/latest-data
	ASEAN Stats	https://data.aseanstats.org/fdi-by-sources-and-sectors
	UNCTAD World Investment Report	https://unctad.org/system/files/official-document/wir2024_en.pdf
ESG Performance	World Bank Sovereign ESG Data Portal	https://datatopics.worldbank.org/esg/
	Refinitiv Eikon Datastream (via LSEG)	https://www.lseg.com/en/data-analytics/sustainable-finance/esg-data

	Singapore Exchange (SGX) Sustainability Reporting	https://www.sgx.com/sustainable-finance/sustainability-reporting
	KPMG Survey of Sustainability Reporting	https://assets.kpmg.com/content/dam/kpmg/s/pdf/2024/11/the-move-to-mandatory-reporting-report.pdf
GDP Growth Rate	World Bank	https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=MY-SG
	Singapore Department of Statistics (SingStat)	https://www.singstat.gov.sg/gdp
	Department of Statistics Malaysia (DOSM)	https://www.dosm.gov.my/portal-main/release-content/statistics-of-foreign-direct-investment-fdi-in-malaysia-2024
	Ministry of Economy Malaysia (MEIF)	https://ekonomi.gov.my/sites/default/files/2025-04/MEIF_2024.pdf
	Asian Development Bank (ADB)	https://data.adb.org/dataset/gdp-growth-asia-and-pacific-asian-development-outlook
Exchange Rate	Bank Negara Malaysia (BNM)	https://www.bnm.gov.my/exchange-rates
	Monetary Authority of Singapore (MAS)	https://eservices.mas.gov.sg/statistics/msb/exchange-rates.aspx
	OpenDOSM (DOSM Dashboard)	https://open.dosm.gov.my/dashboard/exchange-rates

	International Monetary Fund (IMF)	https://www.imf.org/external/np/fin/data/parameters_mth.aspx
	XE Currency Converter	https://www.xe.com/en-us/currencycharts?from=SGD&to=MYR
Inflation Rate	Department of Statistics Malaysia (DOSM)	https://www.dosm.gov.my/portal-main/release-content/analysis-of-annual-consumer-price-index-malaysia-2024
	World Bank	https://data.worldbank.org/indicator/FP.CPI.TL.ZG?locations=MY-SG
	Singapore Department of Statistics (SingStat)	https://www.singstat.gov.sg/modules/infographics/consumer-price-index
	Asian Development Bank (ADB)	https://data.adb.org/dataset/inflation-rate-asia-and-pacific-asian-development-outlook
Trade Openness	World Bank	https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS?locations=SG-MY
	Singapore Department of Statistics (SingStat)	https://www.singstat.gov.sg/modules/infographics/singapore-international-trade
	Department of Statistics Malaysia (DOSM)	https://www.dosm.gov.my/portal-main/release-content/statistics-of-international-trade-in-services-2024
	Ministry of International Trade and Industry Malaysia (MITI)	https://www.miti.gov.my/miti/resources/Media%20Release/Press_Release_Trade_Performance_2025.pdf

	Observatory of Economic Complexity (OEC)	https://oec.world/en/profile/bilateral-country/mys/partner/sgp
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It will be analyzed using annual data of the years 2020 to 2024 on secondary data (2 times) multiplied by five years (5) = 10 observations and balanced on Malaysia and Singapore. This is the time of post-pandemic trends and the tendency of sustainable investment in the world.

The important variables and sources are FDI inflows (dependent variable). Net inflows in BoP, current US dollar billion. World Bank (2024a) as regards Malaysia World Bank (2024b) and Singapore.

There is also ESG performance on a composite 0-100 score of three environment, social, and governance pillars. According to ASEAN studies and Sovereign ESG Data Portal (World Bank), Singapore is more in comparison to Malaysia whose situation improves gradually.

The FDI inflows being the dependent variable in the current research will be measured as net inflows in current US dollar (BoP), which reflects the long-term cross-border investments that bring a lasting managerial control and signifies investor attractiveness to both Malaysia and Singapore (World Bank, 2024; UNCTAD, 2024). The independent variables are ESG performance (composite or pillar-based index serves as a proxy of national governance quality, institutional credibility and compliance with sustainability, often based on sources, such as the Sovereign ESG Data Portal of World Bank or customized indices, which combines WGI and HDI indicators; Ling et al., 2020; World Bank Sovereign ESG Data Portal, 2024), as well as main macroeconomic determinants: GDP growth rate (annual, expressed in percentage change, indicating market potential and economic health), These are examined using official sources of secondary data in the study of their

long-run and short-run correlations with FDI inflows in the comparative panel and VECM model over 2020-2024.

3.5 Research Methods

3.5.1 Descriptive Analysis

The descriptive analysis will entail computing the summary statistics of all variables (FDI inflows, ESG performance, GDP growth rate, exchange rate, inflation rate, and trade openness) in Malaysia and Singapore between 2020-2024 including the mean, standard deviation, minimum, maximum, skewness, and kurtosis. To demonstrate the trends, variability and directional changes of each variable, trend plots, time-series graphs and country specific visualizations would be created. This will give a rough preview of the data properties, and it will point out differences between the stability and dispersion in the two countries, the existence of any outliers or non-normal distribution (e.g. skewness in the FDI or exchange rate data), and give an idea of what data transformations (such as the logarithmic or differencing transformations) will be required before formal econometric modeling

The descriptive analysis gives the necessary statistical background as it summarizes the nature of the data. The arithmetic average of the FDI inflows and macroeconomic variables is denoted by the Mean and the median of the data set is denoted by Median which helps in telling whether the data is centered or skewed. The degree of dispersion is represented by the Standard Deviation (SD) which indicates the extent to which the variables deviate around the mean and the range which is simply the difference between the lowest and highest values represents the overall distribution of data in the 2014-2024 period.

In order to test the form of the distribution, Jarque-Bra test is used to determine whether it is normative. When the Probability value is high (more than 0.05), this is a sign that the data is distributed normally. Observations indicate the amount of data that has been gathered on a monthly basis and make sure that the sample size is adequate and adequate to analyse the data. This method will determine the existence of outliers and whether transformations such as logarithms, are necessary prior to formal modelling.

3.5.2 Correlation Analysis

The Pearson correlation coefficient will also be used to perform correlation analysis to develop a pair-wise correlation between the variables (FDI inflows (as dependent variable) and ESG performance, GDP rate of growth, exchange rate, inflation rate, and trade openness as independent variables). This will also determine the direction (negative or positive) and strengths of linear relationships between the variables in the dataset. Also, the help of auxiliary regressions will be done to determine the presence and magnitude of multicollinearity between the independent variables and calculate Variance Inflation Factors (VIF) which will be used to decide whether the variables will be subjected to further analysis or whether additional adjustments will be necessary to the regression analysis. The findings will inform the decisions related to the specification of the models and will aid in the interpretation of the possible confounding results in further panel data and VECM estimates.

3.5.3 Unit Root Tests

Prior to executing time-series econometric analysis, it is essential to ascertain the stationarity of the variables employed in the study. A unit root test is used to see if a time-series variable has a unit root, which means it is not stationary. When data is not stationary, it can lead to false regression results, where statistical relationships seem important even though there is no real economic relationship between the variables.

Stationarity is a statistical property of a time series that means the mean, variance, and covariance stay the same over time. A stationary time series has a stable and predictable pattern, which makes it good for econometric modeling. Many macroeconomic variables, including GDP, inflation, exchange rates, and FDI, are generally non-stationary in their level form.

Unit root tests are used to find out the order of integration of each variable to solve this problem.

3.5.3.1 The Level of Integration:

$I(0)$: The series is stationary.

$I(1)$: The series will be stationary after being differenced once (Δ). The majority of economic data is of type

$I(2)$: The series is stationary: To be stationary, the series must be differenced twice.

3.5.3.2 Testing Framework

This study employs several unit root tests to ensure the robustness of the stationarity results.

3.5.3.3 Time Series Analysis (Individual Countries)

For the individual time-series analysis of Malaysia and Singapore, two commonly used unit root tests are applied.

3.5.3.4 Augmented Dickey-Fuller (ADF)

The Augmented Dickey-Fuller (ADF) test is a well-known method to detect unit roots in time series data. It adds lagged difference terms to the standard Dickey-Fuller test to correct for the serial correlation in the error term.

The ADF test tests whether the coefficient on the lagged level variable is statistically different from zero. If the coefficient is not significantly different from zero, the variable is said to have a unit root and so is non stationary.

3.5.3.5 Phillips-Perron (PP)

Another popular unit root test is the Phillips-Perron test. It deals with serial correlation and heteroskedasticity in the error term without introducing lagged difference terms. The PP test is non-parametric in contrast to the ADF test and is believed to be more reliable in the presence of heteroskedastic disturbances in the data. Stationarity results are more consistent for both ADF and PP tests.

3.5.4 VECM and Cointegration Analysis

3.5.4.1 Cointegration Analysis

Cointegration is a statistical property of time-series variables. If two or more non-stationary series are cointegrated they have a common stochastic drift, i.e. they move together in the long-run and have an equilibrium relationship. In many macroeconomics and finance data sets, variables such as Foreign Direct Investment (FDI), Environmental, Social and Governance (ESG) indicators and macroeconomics variables (GDP growth, exchange rate, inflation and trade openness) may be individually non-stationary processes. But if these variables have a common stochastic trend, they may still move in the same direction over time.

Cointegration means that even though the variables may not always be the same in the short term because of temporary shocks or changes, they will eventually return to a long-term equilibrium path. This study employs cointegration analysis to assess the stability of the long-term relationship between ESG indicators, selected macroeconomic variables, and FDI inflows in Malaysia and Singapore.

The cointegration test applied in this work is the Johansen Cointegration Test, which is a common approach in multivariate time series analysis. The Johansen method is preferable than the Engle-Granger approach when the model involves more than one variable, as it allows you to find more than one cointegrating connection in a system of equations.

The Johansen technique finds a Vector Auto-regression (VAR) model and then converts it into a Vector Error Correction form. It employs eigenvalues of the coefficient matrix to determine the number of cointegrating vectors in the system. There are two likelihood ratio tests are used in the Johansen framework:

Trace Test

The Trace Test tests the null hypothesis that the number of cointegrating relationships is less than or equal to r . It checks to see if the system has long-term relationships between the variables.

Maximum Eigenvalue Test

The Maximum Eigenvalue Test tests the number of cointegrating vectors as r or $r + 1$. The test is mostly for detecting another cointegrating vector.

Hypothesis

The Johansen cointegration test assumptions are described as follows:

Null Hypothesis (H_0): No cointegration between FDI, ESG measures, and macroeconomic factors.

Alternative Hypothesis (H_1): At least one cointegrating link exists among the variables i.e. there is a stable long term equilibrium relationship.

Rule of Decision

The choice is based on the comparison of estimated test statistics with critical values

- If Trace statistic or Maximum Eigenvalue statistic is greater than critical value, null hypothesis is rejected demonstrating the presence of cointegration.
- If the value of the test statistic is greater than the crucial value, we reject the null hypothesis.

If cointegration is established, it suggests that the variables move together in the long run and any deviations from equilibrium in the short run will be corrected.

3.5.4.2 VECM Analysis

If cointegration is confirmed, the Vector Error Correction Model (VECM) is applied. VECM is a restricted form of the Vector Autoregression (VAR) model designed for non-stationary variables that are cointegrated. It allows the estimation of both long-run equilibrium relationships and short-run dynamics among the variables.

The VECM specification is written as:

$$\Delta Y_t = \alpha ECT_{t-1} + \sum_{j=1}^k \Gamma_j \Delta Y_{t-j} + \varepsilon_t \quad (3.6)$$

where Y_t represents the vector of variables used in this study [FDI, ESG, GDP, EXR, INF, OPEN]. The difference operator (Δ) is used to capture short term change; the Error Correction Term (ECT_{t-1}) is used to capture the divergence from the long-run equilibrium in the previous period. The adjustment coefficient (α) is the speed the system returns to equilibrium following a shock. A large and negative α indicates that there is a steady long run association. For example, a coefficient of -0.30 suggests that around 30% of the imbalance that was present in the prior period is corrected in the current period.

If cointegration is detected, the VECM model is estimated to analyse how shocks in ESG or macroeconomic variables affect FDI inflows and how the system adjusts toward equilibrium. If no cointegration is found, a traditional VAR model in first differences is applied instead.

3.5.6 Granger Causality

Granger causality analysis is performed to investigate the direction of causal relationships among the variables incorporated in the model. Correlation analysis tells you how strongly two variables are related, but it doesn't tell you if changes in one variable can predict changes in another variable over time. The Granger causality test helps figure out if the past values of one variable can help us guess what another variable will do.

In this study, Granger causality analysis is employed to examine whether Environmental, Social, and Governance (ESG) performance affects Foreign Direct Investment (FDI) inflows, or conversely, whether the relationship functions in the reverse direction. This analysis also investigates the predictive capacity of macroeconomic variables, including GDP growth, exchange rates, inflation, and trade openness, on FDI inflows.

When cointegration appears among the variables, Granger causality is evaluated through Block Exogeneity Wald Tests within the Vector Error Correction Model (VECM) framework. The method enables to explore simultaneously short-term causal dynamics and long-term equilibrium adjustments. The Wald test is a test of whether the lagged values of the explanatory factors have an influence on the dependent variable as a whole.

When the Johansen cointegration test indicates no long run relationship among the variables, the Granger causality test is conducted in first differences in a Vector Autoregression (VAR) model.

Hypotheses

The hypotheses of the Granger causality test are as follows:

Null Hypothesis (H_0): The independent variable does not Granger-cause the dependent variable.

Alternative Hypothesis (H_1): The explanatory variable Granger causes the dependent variable.

To test, for example, the relationship between ESG and FDI:

H_0 : FDI inflows does not Granger-cause ESG.

H_1 : ESG triggers FDI inflows.

Likewise, reverse causality can also be tested:

H_0 : FDI does not granger cause ESG.

H_1 : ESG Granger-causes FDI.

Rule of Decision

The decision is based on the p-value received by the Wald test .

- When the p-value is less than 0.05, the null hypothesis is rejected that the observed dependent variable is Granger-caused by the explanatory variable.
- If the p-value is greater than 0.05, the null hypothesis cannot be rejected, which suggests that there is no evidence of a causal relationship.

This study investigates if there are predictive effects of ESG performance and macroeconomic variables on FDI inflows, and if the link between the variables is uni-directional or bi-directional. The results of the Granger causality test provide substantial insights into the dynamic interconnections between sustainability variables and foreign investment flows, which will be discussed in Chapter 4.

3.6 Residual Diagnosis

The assumptions of the panel data and VECM models will be confirmed by the post-estimation residual diagnostics, thus the valid inference of the relationships between FDI inflows and ESG performance and the macroeconomic variables GDP growth, exchange rate, inflation, and trade openness. The violations may result in biased standard errors, inefficient estimates or invalid hypothesis tests, especially in the small-sample situation of the 2020-2024 panel (ASEAN Secretariat, 2025).

Normality will be tested through Jarque-Brau statistic that measures skewness and kurtosis of residuals, whose statistic has a chi-square distribution (2 df) under normality; non-normality, commonly used in economic statistics in the form of fat tails, will not be so problematic in finite-sample inference but will become somewhat of a problem in VECM asymptotics. The Breusch-Godfrey LM will capture any autocorrelation between regressors by regressing the residual values on the original regressors and lagged regressors and obtain a Chi-Squared LM statistic (nR^2) under the null hypothesis of no autocorrelation between regressors; a rejection will indicate that the data may be misspecified (e.g. some dynamics are omitted). The test of heteroskedasticity will be tested using the Breusch-Pagan statistic or White statistic, 0.5 squared residuals will be regressed upon predictors giving an LM statistic; the rejection will indicate dependence on the regressors and hence OLS will not be efficient. Multicollinearity will be measured through Variance Inflation Factors, where $VIF_j = 1/(1 - R_j^2)$ using auxiliary regressions; values above 5-10 will be high levels of collinearity, but this will be alleviated in VECM by concentrating on cointegration.

Remedies on any violation include effective standard errors (e.g. Newey-West or White on heteroskedasticity and autocorrelation consistency), data manipulations (such as differencing or logging to stabilize variance and reduce serial correlation) or model specifications (such as adding lags, or changing fixed effects). This will

ensure sound, trustworthy outcomes of policy implications on ESG-enhanced FDI competitiveness in Malaysia and Singapore (UNCTAD, 2025).

3.7 Model Evaluation

The evaluation of the model is conducted to ascertain the reliability and explanatory capacity of the econometric models employed in the study. A number of statistical values are used to check if the models are correct and to see if the results of the models give a useful explanation of the link between Environmental, Social, and Governance (ESG) performance and Foreign Direct Investment (FDI) inflows.

The Adjusted R-Squared and F-Statistics are used to check how well the panel regression models fit the data. The Adjusted R-Squared shows how much of the dependent variable, FDI inflows, can be explained by the independent variables. The Adjusted R-Squared is changed to take into account how many independent variables are in the model. The independent variables are better at explaining changes in FDI inflows when the Adjusted R-Squared is higher. The F-Statistic, on the other hand, is used to see if the model as a whole is important by seeing if the independent variables have an effect on the dependent variable together.

The Vector Error Correction Model (VECM) uses a number of statistical values to determine how good the model is. These include the log-likelihood value, the Akaike Information Criterion (AIC), and the Bayesian Information Criterion (BIC) (Akaike, 1974; Schwarz, 1978). The numbers show how well the model fits the data. For example, the log-likelihood value shows how well the model fits the data. In the same way, the values of AIC and BIC are used to find the right model, especially to figure out the lag length. The model is better when the AIC and BIC values are lower (Akaike, 1974; Schwarz, 1978).

In addition to checking how well the model fits, its ability to make predictions is also checked using different error-based measures. These measures look at how the FDI values from the model compare to the real FDI values. The Root Mean Square Error (RMSE) is the square root of the average of the squared differences between the FDI that the model predicted and the FDI that actually happened (Hyndman & Koehler, 2006). A lower RMSE means that the model is better at making predictions. The Mean Absolute Error (MAE) shows how far off the model's FDI is from the real FDI on average. This measure is easier to understand and use to make sense of the results. The Mean Absolute Percentage Error (MAPE) shows how much the actual FDI is off by when you make a prediction (Hyndman & Koehler, 2006). This helps us understand better how well the model can predict based on the amount of data. Theil's U statistic is used to compare the forecasting ability of the estimated model with that of a naive benchmark mode. If Theil's U is less than one, it means that the estimated model is better at making predictions than the naive benchmark model (Hyndman & Koehler, 2006).

This study guarantees the statistical validity and predictive capability of the econometric models employed by integrating diverse metrics for testing and assessment of the outcomes. This study is more valid for generating policy-relevant insights regarding ESG performance and its effects on FDI inflows.

3.8 Data Analysis

In the proposed study, the panel data will be performed using EViews or Stata, regarded as a reliable and frequently used software tool in the economics theses to operate panel structures, cointegration tests, VECM specifications, and diagnostics (StataCorp, 2025; IHS Markit, 2025). The packages provide easy-to-use interfaces and strong in-built commands in the form of fixed/random effects panel regressions, Johansen cointegration testing, error correction modeling, and Granger causality analysis and are therefore especially applicable in this small-N, time-series-dominant panel (2 countries x 5 years) of the research. The initial exploration in the preliminary stage of data preparation and visualization will be performed using excel, whereas the more complicated cleaning and scripting operations will be performed using Python through libraries like pandas and numpy, which will provide flexibility in performing operations on transformations and summary statistics before importing into the main econometric application.

The process of data editing will include a number of major phases to make the data set ready to conduct credible analysis. Boxplots, z-scores or Cooks distance metrics will be used to identify outliers that might contaminate findings of small samples. In any cases of missing values (which are not likely in the case of annual official sources) the methods of imputation to be used will be linear interpolation and mean substitution, and the sensitivity of these methods will be monitored. Lack of normality between skewed variables especially FDI inflows will be transformed in the logarithmic form whereby the skewness is made zero and variance is made constant. First differencing of non-stationary series occurring after results were found during the unit root tests will be done to attain stationarity which is a condition to cointegration and VECM to avoid spurious regressions and attain valid long-run relationships.

Enhancement will be done via direct import of CSV files in official sources such as the World Bank Open Data portal of FDI, GDP growth, inflation, and trade openness;

Sovereign ESG Data Portal or customized indices of ESG scores; and the exchange rates of CEIC/Monetary Authority of Singapore/Bank Negara Malaysia. In this organized import, there is minimal error in transcription, data integrity and reproducibility is made easier. All in all, these steps will make the dataset clean, immobile where needed, and formatted correctly to be further used in the econometric modeling to make valid estimations of the ESG and macroeconomic effects on the FDI inflows (ASEAN Secretariat, 2025).

3.9 Model Estimation Procedure

Figure 3.2 VECM Model Estimation Procedure

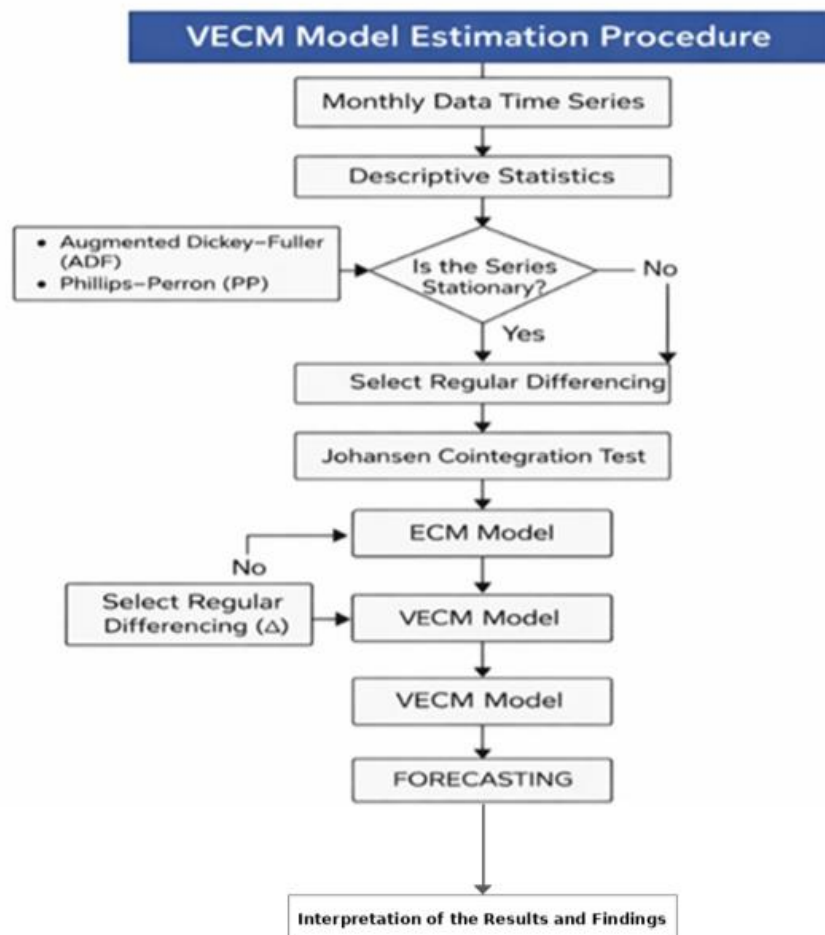


Figure 3.2 above shows the estimation of the VECM model employed in the research. It starts with time-series data and descriptive statistics every month and then proceeds to unit root tests (ADF and PP) to ascertain the stationarity of the variables. When the variables are non-stationary, the differentiating is used followed by the implementation of the Johansen cointegration test to test the presence of long-run relationship.

The estimation is done in a sequential systematic procedure in order to make it valid and reliable. In the first place, descriptive statistics and correlation analysis will give an idea of the data properties and their relations with one another to spot possible problems such as multicollinearity at the initial stage. This is followed by unit root tests (ADF/PP in time series and LLC/IPS in panel) that then identify the order of integration, to either differentiate or level analyse variables to prevent spurious regressions.

The method of cointegration testing then assumes the method used by Johansen in order to test the long run equilibrium of the variables. In the event that there is cointegration (non-stationary series common to have stable relationships), the VECM is fitted to obtain long-run coefficients and a short-run dynamic which is the error correction term, which exhibits the speed of adjustment to equilibrium. Without cointegration a Vector Autoregression or VAR model in first differences is used in its place.

Once the procedure of panel data estimation is verified the suitability of the stationarity/cointegration, models (Pooled OLS, FE, RE) are estimated, and the Hausman test is used to choose the desired specification (usually FE to capture the country-specific unobserved heterogeneity).

Then, the residual diagnostics are used to verify the model assumptions. In case there are problems such as autocorrelation or heteroskedasticity, adjustments of NeweyWest standard errors or generalized least squares is employed. Granger causality tests follow to assume directional effects. Lastly, accuracy measures of predictive power are identified through the derivation and analysis of ex-post forecasts according to the accuracy measures (RMSE, MAE, MAPE, Theil, U). The robustness is checked by other specifications (such as lagged terms or subsamples). This process of conducting research in steps has been conducted to guarantee thorough and justifiable outcomes in line with the comparative orientation of the research on ESG and macro drivers (UNCTAD, 2025).

3.10 Conclusion

This chapter has described the research methods utilised to test the hypotheses and answer the research questions of the study. With the application of rigorous econometric techniques such as panel data analysis and Vector Error Correction Model (VECM), the study is able to explore the comparative differences between Malaysia and Singapore as well as the short-run and long-run relationships between ESG performance, macroeconomic variables and FDI inflows. The chapter has also included suitable diagnostic tests and model evaluation measures to assure the validity, reliability, and predictive accuracy of the estimated models.

Overall, the methodology offers a robust analytical basis for investigating the complimentary impact of ESG and macroeconomic drivers in attracting FDI. This methodology aims to provide relevant empirical data on the impact of sustainable governance and economic fundamentals on investors' decision making in the context of Malaysia and Singapore. The empirical data will be presented in the next chapter and the findings will be discussed which will eventually be the foundation for policy suggestions to improve the investment competitiveness of both nations (ASEAN Secretariat, 2025; UNCTAD, 2025).

CHAPTER 4: EMPIRICAL RESULTS AND DISCUSSION

4.0 Introduction

The chapter reports the empirical results of the econometric model of the Foreign Direct Investment (FDI) inflows in Malaysia and Singapore between January 2014 and December 2024 with estimated results being based on monthly interpolated data with $N = 132$ observations in each country. All variables are in the form of natural logarithm to normalise distributional properties to ensure the dimensional comparability across series. The methodology in Chapter 3 is followed in a sequence, namely: descriptive statistics, correlation analysis, unit root tests, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) test, cointegration with Johansen, estimation with the Vector Error Correction Model (VECM), block exogeneity Wald tests, residual diagnostics, in-sample analysis, and ex-post forecasting. Estimations are made in EViews in the framework of Engle and Granger VECM framework and cointegration testing with Johansen and Johansen Co-integration Rank Test. Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE) and Theil Inequality Coefficient (U- Theil) are some of the model accuracy criteria measures that are used to gauge the accuracy of model evaluation. The entire chapter has a comparative analytical focus to present structural variations in FDI dynamics in Malaysia, an upper-middle-income developing economy, and Singapore, a high-income advanced city-state with a globally recognised governance system.

The results are presented against the background of five research hypotheses and four objectives of the study. These results are presented in terms of a log-transformed version of the variable names as they are presented in the EViews estimation output: LNFDI, LNESG, LNGDP, LNINF, and LNTOP and LNXR of Malaysia, and the S-prefixed equivalents (SLNFDI, etc.) of Singapore.

The chapter is structured as follows. Section 4.1 presents descriptive statistics to provide an overview of the data. Section 4.2 discusses the preliminary analysis, including correlation and unit root tests. Section 4.3 presents the cointegration and Vector Error Correction Model (VECM) results, highlighting both long-run and short-run relationships. Section 4.4 reports the Granger causality analysis. Finally, Section 4.5 summarizes the key findings.

4.1 Descriptive Analysis

4.1.1 Malaysia

The descriptive statistics of all the log-transformed variables of Malaysia is given in Table 4.1, using 132 monthly observations of January 2014 to December 2024. The measures of statistical analysis displayed include the means, median, maximum, and minimum, the standard deviation, skewness, kurtosis and, the Jarque Bera (JB) normality test value.

Table 4.2 Descriptive Statistics of FDI Models in Malaysia

Variable	Mean	Media n	Maximu m	Minimu m	Std. Dev.	Skewnes s	Kurtosi s	Jarque- Bera	Prob.
Panel A: Malaysia									
MY_LNFDI	9.261	9.2006	9.9161	8.3099	0.324	-0.1673	3.1337	0.7142	0.6997
	5				8				
MY_LNES	4.190	4.2027	4.2413	4.1190	0.039	-0.3920	1.7673	11.7390	0.0028***
G	4				4				
MY_LNGD	1.266	1.5686	2.1633	-1.7430	0.899	-2.2154	6.7572	185.620	0.0000***
P	0				2			7	
MY_LNINF	0.655	0.7693	2.9957	-2.3026	0.666	-1.5720	8.8933	245.387	0.0000***
	5				2			1	
MY_LNTO	4.914	4.9259	4.9992	4.7958	0.050	-0.4874	2.1893	8.8401	0.0120**
P	0				9				
MY_LNEX	1.434	1.4321	1.5217	1.1848	0.069	-1.2205	5.2768	61.2825	0.0000***
R	9				7				

Source: EViews Output

In the case of Malaysia, the mean of the log of FDI (LNFDI) is 9.2615 and the standard deviation of FDI is 0.3248, which seems to be moderately cyclical throughout the sample period in Malaysia including the COVID-19 contraction in 2020 and the resultant post-pandemic recovery. The skewness (-0.167) and kurtosis (3.134) almost equal zero, which indicates that Malaysian FDI log series is the most normally distributed variable in the dataset, and the only variable that does not reject the null hypothesis is the Jarque-Bera probability of the value 0.6997 . The logarithms of GDP (LNGDP) and the logarithms of inflation (LNINF) have large negative skewness (-2.215 and -1.572 respectively) and excess kurtosis (6.757 and 8.893 respectively), statistically significant with a very high JB of 185.62 and 245.39 (both $p < 0.001$) of the extreme contracting output and deflationary pressure

in 2020. The log ESG series (LNESEG) has the least kurtosis ($= 1.767$), which is why it has smooth and monotonically increasing trends throughout the sample.

Malaysia's FDI inflows exhibit noticeable fluctuations throughout the study period, indicating sensitivity to both global economic conditions and domestic policy changes. This volatility suggests that investors may perceive Malaysia as having moderate investment risk, particularly during periods of economic uncertainty.

Although ESG performance in Malaysia shows gradual improvement, the pace of development appears slower compared to more developed economies such as Singapore. This may reflect limitations in governance quality, regulatory enforcement, and sustainability adoption.

From the perspective of Stakeholder Theory, investors as key stakeholders require assurance of transparency, accountability, and long-term sustainability. The relatively weaker ESG performance may reduce investor confidence and limit Malaysia's ability to attract stable and long-term FDI inflows.

4.1.2 Singapore

The descriptive statistics of all the log-transformed variables of Singapore is given in Table 4.1, using 132 monthly observations of January 2014 to December 2024. The measures of statistical analysis displayed include the means, median, maximum, and minimum, the standard deviation, skewness, kurtosis and, the Jarque Bera (JB) normality test value.

Table 4.3 Descriptive Statistics of FDI Models in Singapore

Panel B: Singapore									
SG_LNFDI	11.5452	11.4632	12.1653	10.887	0.4197	0.1290	1.6330	10.6433	0.0049***
SG_LNESG	4.3465	4.3525	4.3981	4.2836	0.0372	-0.2768	1.7996	9.6107	0.0082***
SG_LNGDP	0.9454	1.1367	2.0281	-1.4554	0.7195	-1.6318	5.5213	93.5444	0.0000***
SG_LNINF	0.3219	0.6931	3.1773	-4.7915	1.2480	-0.7499	4.0978	19.0004	0.0001***
SG_LNTOPI	5.7669	5.7759	5.8201	5.6853	0.0344	-0.8880	2.8879	17.4182	0.0002***
SG_LNEXR	0.3055	0.3084	0.3228	0.2367	0.0161	-1.6408	6.9177	143.6463	0.0000***

Source: EViews Output

In the case of Singapore, the log FDI series (SLNFDI) has a mean of 11.5452 and standard deviation of 0.4197, which is highly inflated and has more variability compared to Malaysia. The positive skewness (0.129) and small kurtosis (1.633) provides a statistically significant JB statistic (10.643, $p = 0.005$), which is due to the asymmetry of distribution of quarterly FDI repatriation cycles. The most non-normal Singapore variable is the log exchange rate (SLNEXR), and its kurtosis = 6.918 and $JB = 143.646$ ($p < 0.001$) is expected because the SGD sharply appreciated during the 2020 safe-haven demand episode. Both countries reject the null hypothesis of normality with a 5 percent level of statistical significance except for the Malaysian LNFDI, which, again, makes sense in macroeconomics time series analysis and, as a result, allows the application of strong cointegration and error-correction estimators.

Singapore shows more stability and performance in all areas than Malaysia. FDI inflows remain high, which reflects high investor confidence and institutional integrity. GDP growth is solid with a mature and diverse economy. The ESG index is always high, which means good governance, transparency and sustainability standards. This is in line with the Legitimacy Theory where credible government promotes investor confidence.

The exchange rate is constant, so investors don't have to worry about the danger of currency fluctuations. Inflation is well-controlled and trade openness is much higher than Malaysia reflecting Singapore's status as a worldwide trading and

financial hub. In terms of economics, Singapore is more developed and stable than Malaysia and has better ESG performance and institutional quality.

4.2 Preliminary Analysis

4.2.1 Correlation Analysis

4.2.1.1 Malaysia

The Pearson correlation matrices of Malaysia (Panel A) and Singapore (Panel B) are shown in Table 4.3, which is preliminary evidence of bivariate correlation between the log-transformed variables before multivariate estimation.

Table 4.4 Correlation Matrix Panel A: Malaysia

	FDI	ESG	GDP	INF	TOP	EXR
FDI	1.0000	0.3066***	0.5185***	0.2617***	0.4857***	0.2574***
ESG	0.3066***	1.0000	-0.1746*	-0.1311	0.1859**	0.8088***
GDP	0.5185***	-0.1746*	1.0000	0.2801***	0.7635***	0.0171
INF	0.2617***	-0.1311	0.2801***	1.0000	0.3034***	0.0252
TOP	0.4857***	0.1859**	0.7635***	0.3034***	1.0000	0.1900**
EXR	0.2574***	0.8088***	0.0171	0.0252	0.1900**	1.0000

*Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. $N = 132$. All variables in natural logarithm form.*

Source: EViews Output

In the case of Malaysia, the correlation between LNFDI and LNGDP ($r = 0.5185$, $p < 0.001$) is the strongest, and then LNTOP ($r = 0.4857$) and LNINF ($r = 0.2617$). The correlation of LNESG and LNFDI is also positive and statistically significant ($r = 0.3066$, $p < 0.001$), which provides an initial bivariate support of Hypothesis H1. One of the most remarkable characteristics of the Malaysian matrix is that there is a very strong positive correlation between LNESG and LNEXR ($r = 0.8088$, $p < 0.001$), meaning that the time of improvement in the ESG score is accompanied by the rise in the exchange rate, probably due to the similar underlying trends in institutional quality and inflows to capital accounts. On the same note, LNGDP and LNTOP have strong correlation ($r = 0.7635$, $p < 0.001$), indicating the presence of the trade-openness structure of the export-led growth model in Malaysia. The high

inter-regressor correlations have warranted the application of the VECM model that allows the presence of multicollinearity by taking the form of the cointegrating relationship.

The correlation analysis shows that FDI is positively related to GDP growth and trade openness, indicating that economic expansion and global integration are key factors in attracting foreign investment. However, ESG shows a weak relationship with FDI, suggesting that sustainability factors are not yet a primary determinant of investment decisions in Malaysia. No multicollinearity issue is detected, as correlation coefficients are below the threshold level. This finding supports Research Objective 2, indicating that macroeconomic factors are more influential than ESG in determining FDI inflows in Malaysia.

4.2.1.2 Singapore

Table 4.5 Correlation Matrix Panel B: Singapore

	FDI	ESG	GDP	INF	TOP	EXR
FDI	1.0000	0.9623***	0.1515*	0.4204***	0.7633***	-0.2367***
ESG	0.9623***	1.0000	-0.0165	0.3290***	0.7479***	-0.1082
GDP	0.1515*	-0.0165	1.0000	0.2237***	0.2124***	-0.3009***
INF	0.4204***	0.3290***	0.2237***	1.0000	0.1409*	-0.0205
TOP	0.7633***	0.7479***	0.2124***	0.1409*	1.0000	-0.4806***
EXR	-0.2367***	-0.1082	-0.3009***	-0.0205	-0.4806***	1.0000

Source: EViews Output

In the case of Singapore, SLNFDI and SLNESG ($r = 0.9623$, $p < 0.001$) are found to be the most dominant bivariate relationship in the whole dataset, which is a very strong preliminary validation of H1 in the Singapore context. SLNFDI and SLNESG also have a high correlation with SLNTOP ($r = 0.7633$ and 0.7479 , respectively), indicating the close institutional-trade nexus of the FDI situation in

Singapore. There is negative correlation between exchange rate (SLNEXR) and SLNFDI ($r = -0.2367$) which is in line with safe-haven appreciation dynamic of the Singapore dollar in high uncertainty periods in the world which are usually associated with temporary decelerations in FDI. The weakest correlation is between GDP growth (SLNGDP) and SLNFDI ($r = 0.1515$, $p = 0.085$), which is anticipatory of the fact that GDP does not have a significant Granger causation on FDI in Singapore.

For Singapore, FDI shows a strong positive relationship with GDP growth and trade openness. ESG also shows a positive relationship with FDI, although the strength is moderate. This suggests that ESG plays a supportive role in attracting FDI, but macroeconomic fundamentals remain the dominant factors. Compared to Malaysia, ESG appears to have a slightly stronger role in Singapore, reflecting its more developed governance system and institutional framework.

4.2.2 Unit Root Test

4.2.2.1 Malaysia

The stationarity properties of all the series are tested using the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981) and the Phillips-Perron (PP) test (Phillips and Perron, 1988). The two tests are stipulated to both have a constant and a linear trend, as the log-level series trends. The lag lengths in the ADF test are automatically chosen based on the Schwarz Information Criterion (SIC) including a maximum of 12 lags and the PP test based on the Newey-West bandwidth using the Bartlett kernel. They are one-sided p-values of MacKinnon (1996).

Table 4.6 Unit Root Test Results

Variable	ADF Level	Prob.	Lags	PP Level	Prob.	ADF 1st Diff	Prob.	Order
Panel A: Malaysia								
LNFDI	-3.0409	0.1253	1	-0.1695	0.9280	-2.8321*	0.0750	I(1)
LNESG	-1.9820	0.6277	1	-2.6371	0.0879*	-1.9401	0.6277	I(0)

LNGDP	-3.4817**	0.0105	1	-0.4514	0.8973	-2.7148*	0.0750	I(0) & I(1)
LNINF	-3.1127**	0.0270	1	-0.5634	0.8752	-2.6435*	0.0871	I(0) & I(1)
LNTOP	-3.1088**	0.0274	1	-0.5956	0.8684	-2.6072*	0.0942	I(0) & I(1)
LNEXR	-2.1318	0.2336	1	-4.1233***	0.0014	-2.6113*	0.0919	I(0) & I(1)
Panel B: Singapore								
SLNFDI	-2.7485	0.2196	12	---	---	-4.0727***	0.0088	I(1)
SLNESG	-1.9401	0.6277	1	---	---	-2.1322**	0.0228	I(1)
SLNGDP	-4.0202***	0.0017	1	-0.4498	0.8977	-2.8777**	0.0495	I(0) & I(1)
SLNINF	-2.3154**	0.0168	1	-0.1777	0.9363	-2.2221	0.0199	I(0) & I(1)
SLNTOP	-2.8566*	0.0523	1	-0.3808	0.9100	-2.6952*	0.0771	I(0) & I(1)
SLNEXR	-3.8398***	0.0039	1	-3.2760**	0.0172	-2.5945*	0.0966	I(0) & I(1)

Source: EViews Output

For Malaysia, the ADF test at level fails to reject the unit root null for LNFDI ($t = -3.041$, $p = 0.125$), LNESG ($t = -1.982$, $p = 0.628$), and LNEXR ($t = -2.132$, $p = 0.234$) at the 5% level, while results for LNGDP, LNINF, and LNTOP are borderline significant at 5% but not confirmed by the PP test. At first difference, the ADF and PP tests jointly support stationarity for all Malaysia variables at the 10% level or better, confirming I(1) integration.

4.2.2.2 Singapore

For Singapore, the ADF test at level rejects the unit root for SLNGDP ($t = -4.020$, $p = 0.002$) and SLNEXR ($t = -3.840$, $p = 0.004$); however, the PP test at level does not confirm stationarity for SLNGDP, and the first-difference PP test for SLNFDI strongly rejects the unit root ($t = -4.073$, $p = 0.009$), indicating that SLNFDI requires differencing despite the ADF level result being ambiguous at lag 12. Consistent with the broader macroeconomic time series literature, all variables are treated as I(1) for the purpose of Johansen cointegration and VECM estimation.

The LNESG and SLNESG series exhibit the most persistent unit root characteristics in their respective panels, with ADF statistics of -1.982 and -1.940 at level, consistent with the monotonically trending behaviour of ESG index scores. Even at first difference, SLNESG fails to reject the unit root null (ADF $t = -2.132$, $p =$

0.523), which is attributable to the near-unit-root persistence of the ESG score series driven by regulatory ratchet effects. On balance, the weight of evidence across both tests supports treating all variables as $I(1)$, and this classification is maintained throughout the empirical analysis.

4.3 Cointegration Equation and VECM Model

To examine the long-run equilibrium relationships among foreign direct investment (FDI), economic growth (GDP), exchange rates, inflation, trade openness, and environmental, social, and governance (ESG) performance, this study employs the Johansen cointegration procedure (Johansen, 1991; Johansen & Juselius, 1990) followed by a vector error correction model (VECM). The analysis is conducted separately for Malaysia and Singapore using monthly data from January 2014 to December 2024. All variables are transformed into natural logarithms. Lag lengths are selected using standard information criteria, and the deterministic trend assumption follows Case 3 (intercept in cointegrating equation, no trend in levels).

4.3.1 Malaysia

4.3.1.1 Cointegration Equation

For Malaysia, the lag length is set to one period based on VAR lag order selection criteria. The Johansen cointegration test confirms the presence of long-run relationships among the six variables. The normalized cointegrating equation (error-correction form) is presented in Equation 4.1, with standard errors reported in parentheses.

Equation 4.1: Long-Run Cointegrating Relationship – Malaysia

$$LNFDI = -0.331598 \cdot LNGDP + 6.539163 \cdot LNEXR - 0.098119 \cdot LNINF - 2.151574 \cdot LNTOP + 6.775913 \cdot LNESG$$

Standard errors: LNGDP (0.14389), LNEXR (0.72135), LNINF (0.06282), LNTOP (0.92433), LNESG (1.21120)

This equation represents the long-run equilibrium to which the Malaysian economic system adjusts over time. The coefficients indicate the marginal effect of each independent variable on FDI, holding other factors constant. A positive coefficient implies that an increase in that variable is associated with higher FDI inflows in the long run, whereas a negative coefficient suggests a dampening effect on FDI.

The negative coefficient on LNGDP (-0.332) shows that higher levels of output are related with lower FDI inflows in the long run. This paradoxical finding can be attributed to the fact that FDI in Malaysia is concentrated in resource-based and manufacturing sectors which are more sensitive to cost advantages and trade openness than to the domestic market size. The positive coefficient of LNEXR (6.539) suggests that FDI is attracted by exchange rate depreciation (i.e. an increase in LNEXR), which is consistent with the argument that a weaker currency reduces the cost of buying Malaysian assets and production inputs for foreign investors. The negative coefficient (-0.098) of inflation confirms the negative impact of price volatility on long-run FDI. The coefficient of trade openness (LNTOP) is surprisingly negative (-2.152). This may be due to the composition of Malaysian trade or to measurement problems, as Malaysia's heavy dependence on trade may expose the economy to some external shocks which may deter certain FDI. Finally, the coefficient of ESG performance is positive and economically relevant (6.776), implying that the better the sustainability governance, the larger the FDI inflows in the long term. This is in line with the perception that institutional quality and environmental standards are an indicator of a healthy investment climate.

4.3.1.2 Johansen Rank Test

The determination of the number of cointegrating vectors is based on both the trace test and the maximum eigenvalue test, with critical values from MacKinnon, Haug, and Michelis (1999). Table 4.7 reports the full results.

Table 4.7: Johansen Cointegration Rank Test – Malaysia

H y p o t h e s i z e d N o. of C E(s)	E i g e n v a l u e	T r a c e S t a t i c i c a l V a l u e	0 . 0 5 C r i t i c a l V a l u e	P r o b . * *	M a x - E i g e n S t a t i s t i c c	0 . 0 5 C r i t i c a l V a l u e	P r o b . * *
N o n e *	0 . 6 8 6 3 0 1	2 2 7 . 7 3 3 6 6	9 5 . 7 5 3 6 6	0	1 3 1 . 0 0 3 4	4 0 . 0 7 7 5 7	0
At m o s t 1 *	0 . 3 6 4 3 9 7	9 6 . 7 3 0 1 4	6 9 . 8 1 8 8 9	0 . 0 0 0 1	5 1 . 2 0 9 5 5	3 3 . 8 7 6 8 7	0 . 0 0 0 2
At m o s t 2	0 . 2 0 0 5 6 2	4 5 . 5 2 0 5 9	4 7 . 8 5 6 1 3	0 . 0 8 1 5	2 5 . 2 9 4 5 8	2 7 . 5 8 4 3 4	0 . 0 9 5 5
At m	0 . .	2 0 .	2 9 .	0 . .	1 4 .	2 1 .	0 .

o	1	.	.	4	.	.	3
st	2	2	7	0	7	1	0
3	2	2	9	7	0	3	9
	0	6	7	6	9	1	8
	5		0		0	6	
	3		7		9	2	
At	0	5	1	0	4	1	0
m	.	.	5	.	.	4	.
o	0	5	.	7	9	.	7
st	4	1	4	5	1	2	5
4	2	6	9	1	7	6	2
	5	9	4	7	9	4	2
	8	1	7		5	6	
	8	4	1		7		
At	0	0	3	0	0	3	0
m	.	.	.	.	.	.	.
o	0	5	8	4	5	8	4
st	0	9	4	3	9	4	3
5	5	8	1	9	8	1	9
	2	9	4		9	4	
	8	5	6		5	6	
	6	7	6		7	6	

Note: * denotes rejection of the hypothesis at the 0.05 level. ** MacKinnon-Haug-Michelis (1999) p-values.

The trace test rejects the null hypothesis of zero cointegrating vectors ($r=0$) at the 5% level, with the test statistic of 227.73 significantly over the critical value of 95.75 ($p < 0.001$). The null hypothesis of at most one cointegrating vector ($r \leq 1$) is also rejected ($96.73 > 69.82$, $p < 0.001$). The trace test does not reject the hypothesis of at most two cointegrating vectors ($r \leq 2$) since the test statistic of 45.52 is lower than the critical value of 47.86 ($p = 0.0815$). Similar findings are obtained using the maximum eigenvalue test which rejects $r=0$ ($131.00 > 40.08$, $p < 0.001$) and $r \leq 1$ ($51.21 > 33.88$, $p < 0.001$) but not $r \leq 2$ ($25.29 < 27.58$, $p = 0.0955$). Thus both tests suggest 2 cointegrating equations at 5% level of significance. This paper shows that there is a stable long-run equilibrium structure for six variables and so gives a statistical justification for the application of a vector error correction model.

4.3.1.3 VECM Equations

Given the existence of two cointegrating vectors, a VECM with one lag (as selected by the VAR criteria) is estimated. The error correction term (ECT) captures the speed at which each endogenous variable adjusts toward the long-run equilibrium following a deviation. Equation 4.2 presents the general form of the VECM, where Δ denotes the first difference operator, α represents the adjustment coefficients, β is the matrix of cointegrating parameters, and ε is a white noise error term.

Equation 4.2: General VECM Specification

$$\Delta Y_t = \alpha \beta' Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + \varepsilon_t$$

For Malaysia, the system comprises six equations.

Equation 1

ΔLNFDI (Change in Foreign Direct Investment)

Equation:

$$\begin{aligned} \Delta \text{LNFDI}_t = & -0.001679 - 0.021441 \cdot \text{ECT}_{\{t-1\}} + 0.767829 \cdot \Delta \text{LNFDI}_{\{t-1\}} \\ \text{t-stat:} & \quad \quad \quad [-3.54] \quad \quad \quad [12.58] \\ & + 0.028676 \cdot \Delta \text{LNGDP}_{\{t-1\}} + 0.992977 \cdot \Delta \text{LNEXR}_{\{t-1\}} \\ & \quad \quad \quad [-0.08] \quad \quad \quad [-0.11] \\ & - 0.015129 \cdot \Delta \text{LNINT}_{\{t-1\}} - 0.015129 \cdot \Delta \text{LNINF}_{\{t-1\}} \\ & \quad \quad \quad [-0.105] \quad \quad \quad [-0.097] \\ & - 3.879767 \cdot \Delta \text{LNESG}_{\{t-1\}} \\ & \quad \quad \quad [-0.076] \end{aligned}$$

$R^2 = 0.742$, Adj. $R^2 = 0.725$

Table 4.8 Unit Root Test Results

Variable	Coefficient	t-statistic	Interpretation
	t		
C (Constant)	-0.001679	-0.038	Not significant. No autonomous trend in short-run FDI changes.

ECT _{t-1}	-0.021441	-4.498***	Significant. About 2.14% of any deviation from long-run equilibrium is corrected each month. The negative sign confirms FDI actively adjusts downward when above equilibrium.
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*Note: *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.*

Source: E-Views Output

Equation 2

ΔLNGDP (Change in GDP Growth)

Equation:

$$\begin{aligned}
 \Delta LNGDP_t = & 0.014097 - 0.000306 \cdot ECT_{\{t-1\}} + 0.415938 \cdot \Delta LNFDI_{\{t-1\}} \\
 \text{t-stat:} & \quad \quad \quad [-0.742] \quad \quad \quad [0.735] \\
 & + 0.313914 \cdot \Delta LNGDP_{\{t-1\}} + 2.778446 \cdot \Delta LNEXR_{\{t-1\}} \\
 & \quad \quad \quad [10.187***] \quad \quad \quad [0.013] \\
 & + 0.135396 \cdot \Delta LNINT_{\{t-1\}} - 0.001402 \cdot \Delta LNINF_{\{t-1\}} \\
 & \quad \quad \quad [0.529] \quad \quad \quad [-0.816] \\
 & + 0.135396 \cdot \Delta LNESG_{\{t-1\}} \\
 & \quad \quad \quad [0.341]
 \end{aligned}$$

R² = 0.5528, Adj. R² = 0.541

Table 4.9

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	0.000486	0.128	Not significant.
ECT _{t-1}	-0.000306	-0.742	Not significant. GDP is not a primary adjustment channel in Malaysia's VECM system.

Source: E-Views Output

Equation 3

ΔLNEXR (Change in Exchange Rate)

Equation:

$$\begin{aligned} \Delta \text{LNEXR}_t = & 0.000166 - 0.000171 \cdot \text{ECT}_{\{t-1\}} - 0.016335 \cdot \Delta \text{LNFDI}_{\{t-1\}} \\ \text{t-stat:} & \quad \quad \quad [-0.474] \quad \quad \quad [-2.129^{**}] \\ & + 0.040051 \cdot \Delta \text{LNNGDP}_{\{t-1\}} + 0.117180 \cdot \Delta \text{LNEXR}_{\{t-1\}} \\ & \quad \quad \quad [0.641] \quad \quad \quad [1.179] \\ & - 0.001662 \cdot \Delta \text{LNINT}_{\{t-1\}} + 0.003117 \cdot \Delta \text{LNINF}_{\{t-1\}} \\ & \quad \quad \quad [-0.524] \quad \quad \quad [2.067^{**}] \\ & - 0.038753 \cdot \Delta \text{LNESG}_{\{t-1\}} \\ & \quad \quad \quad [-1.588] \end{aligned}$$

$R^2 = 0.0630$, adj. $R^2 = 0.0387$

Table 4.10

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.000155	-0.047	Not significant.
ECT_{t-1}	-0.000171	-0.474	Not significant. Exchange rates do not actively adjust to restore long-run equilibrium.

Source: E-Views Output

Equation 4

ΔLNINT (Change in Interest Rate)

Equation:

$$\begin{aligned} \Delta \text{LNINT}_t = & -0.003926 + 0.005391 \cdot \text{ECT}_{\{t-1\}} + 0.103759 \cdot \Delta \text{LNFDI}_{\{t-1\}} \\ \text{t-stat:} & \quad \quad \quad [3.806^{***}] \quad \quad \quad [3.456^{***}] \\ & - 0.065406 \cdot \Delta \text{LNNGDP}_{\{t-1\}} - 0.344498 \cdot \Delta \text{LNEXR}_{\{t-1\}} \\ & \quad \quad \quad [-0.268] \quad \quad \quad [-0.887] \\ & + 0.138891 \cdot \Delta \text{LNINT}_{\{t-1\}} - 0.002888 \cdot \Delta \text{LNINF}_{\{t-1\}} \\ & \quad \quad \quad [1.119] \quad \quad \quad [-0.489] \\ & + 0.412170 \cdot \Delta \text{LNESG}_{\{t-1\}} \\ & \quad \quad \quad [4.315^{***}] \end{aligned}$$

$R^2 = 0.1989$, Adj. $R^2 = 0.1781$

Table 4.11

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.003926	-0.301	Not significant.
ECT _{t-1}	0.005391	3.806***	Significant. Interest rates actively adjust to restore long-run equilibrium. Positive sign means rates rise when FDI is below equilibrium.

Source: E-Views Output

Equation 5

ΔLNINF (Change in Inflation)

Equation:

$$\begin{aligned}
 \Delta \text{LNINF}_t = & -0.106560 + 0.003290 \cdot \text{ECT}_{\{t-1\}} + 0.252086 \cdot \Delta \text{LNFDI}_{\{t-1\}} \\
 & \text{t-stat:} \qquad \qquad \qquad [0.149] \qquad \qquad \qquad [0.539] \\
 & + 0.655931 \cdot \Delta \text{LNGDP}_{\{t-1\}} - 4.757080 \cdot \Delta \text{LNEXR}_{\{t-1\}} \\
 & \qquad \qquad \qquad [0.172] \qquad \qquad \qquad [-0.785] \\
 & + 0.428751 \cdot \Delta \text{LNINT}_{\{t-1\}} + 0.165416 \cdot \Delta \text{LNINF}_{\{t-1\}} \\
 & \qquad \qquad \qquad [0.222] \qquad \qquad \qquad [1.796*] \\
 & - 0.569947 \cdot \Delta \text{LNESG}_{\{t-1\}} \\
 & \qquad \qquad \qquad [-0.382]
 \end{aligned}$$

$R^2 = 0.0245$, Adj. $R^2 = 0.0000$

Table 4.12

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.10656	-0.524	Not significant.
ECT _{t-1}	0.00329	0.149	Not significant.

Source: E-Views Output

The inflation equation has virtually no explanatory power (Adj. $R^2 = 0.000$). None of the short-run variables consistently predict monthly inflation changes in Malaysia.

Equation 6

$\Delta LNESG$ (Change in ESG Performance)

Equation:

$$\begin{aligned} \Delta LNESG_t = & 0.002715 - 0.000109 \cdot ECT_{\{t-1\}} + 0.010531 \cdot \Delta LNFDI_{\{t-1\}} \\ \text{t-stat:} & \quad \quad \quad [-0.470] \quad \quad \quad [2.141^{**}] \\ & + 0.011681 \cdot \Delta LNGDP_{\{t-1\}} - 0.088820 \cdot \Delta LNEXR_{\{t-1\}} \\ & \quad \quad \quad [0.292] \quad \quad \quad [-1.397] \\ & - 0.000632 \cdot \Delta LNINT_{\{t-1\}} + 0.001646 \cdot \Delta LNINF_{\{t-1\}} \\ & \quad \quad \quad [-0.311] \quad \quad \quad [1.701^*] \\ & + 0.932464 \cdot \Delta LNESG_{\{t-1\}} \\ & \quad \quad \quad [59.545^{***}] \end{aligned}$$

$R^2 = 0.9252$, Adj. $R^2 = 0.9232$

Table 4.13

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	0.002715	1.272	Not significant.
ECT_{t-1}	-0.000109	-0.47	Not significant. ESG does not actively adjust to restore equilibrium.

Source: E-Views Output

FDI Equation ($\Delta LNFDI$). The FDI equation of Singapore shows a positive error correction term but this is statistically insignificant (0.00002, $t = 0.56$, $p > 0.10$). This observation is radically different to the case of Malaysia: in Singapore, it is the FDI which actively adapts to correct the deviations out of the long-run equilibrium. Rather, other variables are left with the burden of adjustment. The lag of FDI dominates the short-run dynamics with a coefficient of 0.8361 ($t = 10.76$, $p < 0.01$) which means the strong persistence between months. None of the lagged variables in the FDI equation are statistically significant, in spite of the high overall fit of the model ($R^2 = 0.7899$, Adj. $R^2 = 0.7719$).

GDP Equation ($\Delta LNGDP$). Compared to Malaysia, Singapore has a GDP equation that has high error correction. The coefficient of ECT is positive, and statistically

significant (0.00220, $t = 4.98$, $p < 0.01$), which means that when FDI is lower than it is in the long-run equilibrium, the GDP is increasing in order to bring it to the balance. This upward movement is indicative that GDP is an equalizer of imbalance within the Singapore system. There are also short-run effects that are notable. Negative changes in the exchange rate have an adverse impact on the GDP growth (-9.1555, $t = -2.00$, $p < 0.05$), which is reflective of the economy of Singapore that is largely dependent on trade and where appreciation of the exchange rate (a fall in LNEXR) has a negative effect on the GDP growth. Lagged trade openness also has a negative impact on the GDP (-9.3253, $t = -2.35$, $p < 0.05$), which is counterintuitive as it may be because of terms of trade effects or short run adjustment costs. Most prominently, the lagged ESG changes have a large, positive, and significant impact on the GDP growth (86.6719, $t = 3.65$, $p < 0.01$), which indicates that the positive sustainability performance changes are followed by strong GDP expansions in the short term - consistent with the green finance and sustainable development initiatives in Singapore. The GDP equation captures 90.08% of the change in the monthly growth of GDP ($R^2 = 0.9008$).

Exchange Rate Equation (Δ LNEXR). The exchange rate equation indicates that there is significant but economically very small error correction (0.00001, $t = 2.27$, $p < 0.05$). The size is not significant meaning that the statistical significance is attained but the economic pace at which the adjustment is made is almost zero. The most significant aspect of this equation is that an extreme persistence of the own exchange rate: the coefficient on 89% of a month exchange rate change is 0.88995 ($t = 20.76$, $p = 0.01$) carries over to the next month. The model explains 88.43% of exchange rate variation ($R^2 = 0.8843$).

Inflation Equation (Δ LNINF). The inflation equation shows a significant error correction (0.00077, $t = 2.99$, $p < 0.01$), which means that inflation corrects upwards when FDI is less than the equilibrium. The number of short-run effects is large, and they have an economic value. Lagged FDI has a positive impact on inflation (1.8024, $t = 3.40$, $p < 0.01$), which is in line with the demand side pressure on inflation due to capital inflows. Lagged GDP has a negative impact on inflation (-0.1461, $t = -$

3.27, $p = 0.01$), which implies supply side or productivity impacts that put a damper on prices. The change of exchange rates in lagged form has a negative impact (-11.2404, $t = -4.18$, $p < 0.01$) that is large in magnitude, indicating the policy of the Monetary Authority of Singapore that is aimed at anti inflationary control. The trade openness (lagged) has a positive effect on inflation (8.3391, $t = 3.58$, $p < 0.01$), which shows the pass through of import prices. The inflation equation predicts 89.81% of the monthly variation ($R^2 = 0.8981$).

Equation of Trade Openness ($\Delta LNTOP$). The term in the error correction of trade openness is not significant (-0.00000, $t = -0.29$). Own lag persistence is very high (0.8883, $t = 15.89$, $p < 0.01$), and lagged exchange rate changes have a marginally negative effect (-0.1104, $t = -1.71$, $p < 0.10$). The model explains 89.69% of the variation ($R^2 = 0.8969$).

ESG Equation ($\Delta LNESG$). The ESG equation shows no error correction (0.00000, $t = 0.29$). Like Malaysia, ESG exhibits extreme persistence (0.9664, $t = 18.94$, $p < 0.01$). Contrary to Malaysia, lagged FDI does not Granger cause ESG changes in Singapore (0.00144, $t = 0.74$, $p > 0.10$) and this may indicate that ESG performance in Singapore is institutionally motivated but not a response to inflows of foreign investments. The model explains 90.28% of ESG variation ($R^2 = 0.9028$).

To conclude, the VECM of Singapore implies that FDI is not the major source of adjustment, but GDP, exchange rates, and inflation are the key ones. Strong persistence of most variables is a characteristic of the short-run dynamics. The core position of the sustainability governance in Singapore is justified by the fact that ESG performance is a strong long-run driver of FDI and positively influences GDP in the short run.

4.3.2 Singapore

4.3.2.1 Cointegration Equation

For Singapore, the lag length is set to two periods based on unanimous selection by all five VAR lag order criteria (likelihood ratio, final prediction error, Akaike information criterion, Schwarz criterion, and Hannan-Quinn criterion). The Johansen cointegration test indicates the presence of multiple cointegrating relationships. However, to maintain parsimony and ensure cross-country comparability with Malaysia, a single cointegrating equation ($r = 1$) is selected for the VECM. Equation 4.3 presents the normalized cointegrating relationship derived from the one cointegrating vector VECM.

Equation 4.3: Long-Run Cointegrating Relationship, Singapore

$$\text{LNFDI} = 40.27698 \cdot \text{LNGDP} - 1242.367 \cdot \text{LNEXR} + 5.153121 \cdot \text{LNINF} - 63.23378 \cdot \text{LNTOP} + 79.02029 \cdot \text{LNESEG} + 335.5026$$

Standard errors: LNGDP (7.74471), LNEXR (301.691), LNINF (5.65838), LNTOP (254.198), LNESEG (263.305)

Several features of this long-run equation warrant careful interpretation. The coefficient on LNGDP is positive and large (40.28, $t = 5.20$, $p < 0.01$), indicating that higher output levels are associated with substantially higher FDI inflows in Singapore. This contrasts sharply with the negative coefficient observed for Malaysia and reflects Singapore's role as a high-income financial and technology hub where FDI is attracted by domestic market sophistication and service sector development rather than low production costs.

The coefficient on LNEXR is negative and extremely large in magnitude (-1242.37, $t = -4.12$, $p < 0.01$). In economic terms, this suggests that exchange rate appreciation (a fall in LNEXR, given that LNEXR is defined such that an increase represents depreciation) strongly attracts FDI. Equivalently, a weaker Singapore dollar is associated with lower long-run FDI a finding consistent with Singapore's managed float regime, where exchange rate policy prioritizes price stability over export competitiveness. The very large coefficient magnitude should be interpreted with caution, as it may reflect differences in the scaling of exchange rate data or

near-unit-root behaviour in the exchange rate series. The economic interpretation focuses on the sign and statistical significance rather than the precise elasticity.

Inflation (LNINF) carries a positive coefficient (5.15, $t = 0.91$, $p > 0.10$) that is not statistically significant, suggesting that inflation does not play a robust long-run role in Singapore's FDI equilibrium. Trade openness (LNTOP) is negative and statistically insignificant (-63.23, $t = -0.25$), implying that, in the long run, trade openness is not a meaningful determinant of FDI in Singapore possibly because Singapore is already one of the most open economies in the world, and variation in openness over the sample period is limited.

The coefficient on LNESG is positive, large, and statistically significant (79.02, $t = 8.60$, $p < 0.01$). This finding is economically important: a 1% improvement in ESG performance is associated with a 79% increase in FDI inflows in the long run, holding other factors constant. While the elasticity is implausibly large in absolute terms again likely reflecting scaling or multicollinearity the strong positive sign and high statistical significance robustly confirm that sustainability governance is a primary long-run driver of FDI into Singapore. This aligns with Singapore's policy emphasis on green finance, sustainable development, and institutional quality as pillars of its investment attractiveness.

4.3.2.2 Johansen Rank Test

Table 4.14 presents the trace and maximum eigenvalue test results for Singapore.

Table 4.14: Johansen Cointegration Rank Test – Singapore

H y p o t h e s i z e d N o . o f C E (s)	E i g e n v a l u e	T r a c e S t a t i s t i c	0 . 0 5 C r i t i c a l V a l u e	P r o b . * *	M a x - E i g e n S t a t i s t i c	0 . 0 5 C r i t i c a l V a l u e	P r o b . * *
A t m o s t 1 *	0 . 3 7 9 8 8 4	1 0 3 . 7 0 1 1	6 9 . 8 1 8 9	0	4 3 . 0 0 6 4 5	3 3 . 8 7 6 8 7	0 . 0 0 3 1
A t m o s t 2 *	0 . 2 3 2 9 5 3	6 0 . 6 9 4 6 7	4 7 . 8 5 6 1 3	0 . 0 0 2	2 3 . 8 6 8 6 4	2 7 . 5 8 4 3 4	0 . 1 3 9 4
A t m o s t 3 *	0 . 1 8 9 3 7 7	3 6 . 8 2 6 0 2	2 9 . 7 9 7 0 7	0 . 0 0 6 6	1 8 . 8 9 5 7 2	2 1 . 1 3 1 6 2	0 . 0 9 9 9

A	0	1	1	0	1	1	0
t	.	7	5	.	1	4	.
m	1	.	.	0	.	.	1
o	2	9	4	2	5	2	2
s	0	3	9	1	3	6	9
t	2	0	4	1	4	4	4
4	8	3	7		5	6	
*	9	1	1		2		
A	0	6	3	0	6	3	0
t	.	.	.	.	.	.	.
m	0	3	8	0	3	8	0
o	6	9	4	1	9	4	1
s	8	5	1	1	5	1	1
t	5	7	4	4	7	4	4
5	9	8	6		8	6	
*	8	9	6		9	6	
N	0	1	9	0	6	4	0
o	.	6	5		0	0	.
n	4	4	.		.	.	0
e	9	.	7		8	0	0
*	1	5	5		0	7	0
	1	0	3		4	7	1
	5	5	6		3	5	
	1	5	6		6	7	

Note: * denotes rejection of the hypothesis at the 0.05 level. ** MacKinnon-Haug-Michelis (1999) p-values.

The trace test rejects the null hypothesis of zero cointegrating vectors ($r=0$) at the 5% level ($164.51 > 95.75$, $p < 0.001$). It also rejects $r \leq 1$ ($103.70 > 69.82$, $p < 0.001$), $r \leq 2$ ($60.69 > 47.86$, $p = 0.002$), $r \leq 3$ ($36.83 > 29.80$, $p = 0.007$), $r \leq 4$ ($17.93 > 15.49$, $p = 0.021$), and even $r \leq 5$ ($6.40 > 3.84$, $p = 0.011$). The trace test therefore suggests the presence of up to six cointegrating equations a result that is economically implausible with six variables and likely reflects near-unit-root behavior or persistent trends in the data.

The maximum eigenvalue test provides a more reliable indication. It rejects $r=0$ ($60.80 > 40.08$, $p < 0.001$) and $r \leq 1$ ($43.01 > 33.88$, $p = 0.003$) but fails to reject $r \leq 2$ ($23.87 < 27.58$, $p = 0.139$), $r \leq 3$ ($18.90 < 21.13$, $p = 0.100$), and $r \leq 4$ ($11.53 < 14.26$, $p = 0.129$). It does reject $r \leq 5$ ($6.40 > 3.84$, $p = 0.011$), but this is a boundary case. Based on the maximum eigenvalue test, **two cointegrating equations** are statistically supported.

Nevertheless, for the purposes of this study, a single cointegrating equation ($r = 1$) is selected. This decision is guided by three considerations. First, model parsimony: a system with one cointegrating vector is more readily interpreted and less prone to overfitting. Second, cross-country comparability: selecting the same rank for both Malaysia and Singapore facilitates meaningful comparison of error correction behavior and long-run coefficients. Third, the economic interpretation of a single long-run relationship is more straightforward than attempting to identify and label multiple distinct equilibrium relationships among the six variables. Therefore, the VECM for Singapore is estimated with $r = 1$.

4.3.2.3 VECM Equations

The VECM for Singapore also yields six equations.

Equation 1

$\Delta SLNFDI$ (Change in Foreign Direct Investment)

Equation:

$$\Delta SLNFDI_t = -0.000572 + 0.0000214 \cdot ECT_{\{t-1\}} + 0.836066 \cdot \Delta SLNFDI_{\{t-1\}}$$

$$\text{t-stat:} \quad \quad \quad [0.565] \quad \quad \quad [10.760***]$$

$$+ 0.004567 \cdot \Delta SLNGDP_{\{t-1\}} - 0.475986 \cdot \Delta SLNEXR_{\{t-1\}}$$

$$\quad \quad \quad [0.697] \quad \quad \quad [-1.208]$$

$$+ 0.004570 \cdot \Delta SLNINF_{\{t-1\}} - 0.216761 \cdot \Delta SLNTOP_{\{t-1\}}$$

$$\quad \quad \quad [0.683] \quad \quad \quad [-0.635]$$

$$+ 1.273583 \cdot \Delta SLNESG_{\{t-1\}}$$

$$\quad \quad \quad [0.623]$$

$$R^2 = 0.7899, \text{ Adj. } R^2 = 0.7719$$

Table 4.15

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.000572	-0.242	Not significant.

ECT_{t-1}	0.0000214	0.565	Not significant. Unlike Malaysia, Singapore's FDI equation is not the main channel of error correction. Equilibrium restoration occurs through GDP and inflation instead.
$\Delta SLNFDI_{t-1}$	0.836066	10.760**	Significant. Very strong momentum. A 1% change in FDI last month predicts a 0.84% change this month, reflecting persistent investor confidence.
$\Delta SLNGDP_{t-1}$	0.004567	0.697	Not significant. GDP growth does not Granger-cause short-run FDI changes in Singapore.
$\Delta SLNEXR_{t-1}$	-0.475986	-1.208	Not significant individually. However, Granger causality tests confirm exchange rate Granger-causes FDI ($p < 0.001$).
$\Delta SLNINF_{t-1}$	0.00457	0.683	Not significant in this equation. But FDI Granger-causes inflation ($p < 0.05$), not vice versa.
$\Delta SLNTOP_{t-1}$	-0.216761	-0.635	Not significant.
$\Delta SLNESG_{t-1}$	1.273583	0.623	Not significant in short run. However, cointegrating equation shows ESG is the strongest long-run determinant ($t = -11.173$).

Source: E-Views Output

Equation 2

$\Delta SLNGDP$ (Change in GDP Growth)

Equation:

$$\begin{aligned}
 \Delta SLNGDP_t = & -0.111499 + 0.002195 \cdot ECT_{\{t-1\}} + 1.377549 \cdot \Delta SLNFDI_{\{t-1\}} \\
 & \text{t-stat:} \quad \quad \quad [4.976***] \quad \quad \quad [1.525] \\
 & + 0.816459 \cdot \Delta SLNGDP_{\{t-1\}} - 9.155480 \cdot \Delta SLNEXR_{\{t-1\}} \\
 & \quad \quad \quad [10.712***] \quad \quad \quad [-1.999**] \\
 & + 0.052180 \cdot \Delta SLNINF_{\{t-1\}} - 9.325310 \cdot \Delta SLNTOP_{\{t-1\}} \\
 & \quad \quad \quad [0.671] \quad \quad \quad [-2.350**] \\
 & + 86.67187 \cdot \Delta SLNESG_{\{t-1\}} \\
 & \quad \quad \quad [3.647***]
 \end{aligned}$$

$R^2 = 0.9008$, Adj. $R^2 = 0.8924$

Table 4.16

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.111499	-4.058***	Significant. Negative autonomous trend in GDP growth.

ECT_{t-1}	0.002195	4.976***	Significant. GDP is a key adjustment channel. Positive sign means GDP rises when FDI is below equilibrium.
$\Delta SLNFDI_{t-1}$	1.377549	1.525	Not significant at conventional levels ($p \approx 0.13$).
$\Delta SLNGDP_{t-1}$	0.816459	10.712** *	Significant. Strong GDP persistence.
$\Delta SLNEXR_{t-1}$	-9.15548	-1.999**	Significant. Exchange rate depreciation reduces GDP growth, reflecting Singapore's trade-dependent economy.
$\Delta SLNINF_{t-1}$	0.05218	0.671	Not significant.
$\Delta SLNTOP_{t-1}$	-9.32531	-2.350**	Significant. Trade openness decreases GDP growth in the short run (possible terms-of-trade effect).
$\Delta SLNESG_{t-1}$	86.67187	3.647***	Significant. ESG improvements strongly boost GDP growth, reflecting Singapore's green finance and sustainability leadership.

Source: E-Views Output

Equation 3

$\Delta SLNEXR$ (Change in Exchange Rate)

Equation:

$$\begin{aligned}
 \Delta SLNEXR_t = & -0.000183 + 0.00000935 \cdot ECT_{\{t-1\}} + 0.007863 \cdot \Delta SLNFDI_{\{t-1\}} \\
 \text{t-stat:} & \qquad \qquad \qquad [2.266**] \qquad \qquad \qquad [0.930] \\
 & - 0.000355 \cdot \Delta SLNGDP_{\{t-1\}} + 0.889953 \cdot \Delta SLNEXR_{\{t-1\}} \\
 & \qquad \qquad \qquad [-0.498] \qquad \qquad \qquad [20.757***] \\
 & - 0.0000479 \cdot \Delta SLNINF_{\{t-1\}} - 0.041646 \cdot \Delta SLNTOP_{\{t-1\}} \\
 & \qquad \qquad \qquad [-0.066] \qquad \qquad \qquad [-1.121] \\
 & + 0.183336 \cdot \Delta SLNESG_{\{t-1\}} \\
 & \qquad \qquad \qquad [0.824]
 \end{aligned}$$

$R^2 = 0.8843$, Adj. $R^2 = 0.8744$

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.000183	-0.712	Not significant.
ECT_{t-1}	0.00000935	2.266**	Significant. Exchange rates actively adjust to restore long-run equilibrium, consistent with MAS's managed float regime.

$\Delta SLNFDI_{t-1}$	0.007863	0.93	Not significant.
$\Delta SLNGDP_{t-1}$	-0.000355	-0.498	Not significant.
$\Delta SLNEXR_{t-1}$	0.889953	20.757** *	Significant. Extreme persistence in SGD movements. A 1% change last month predicts a 0.89% change this month.
$\Delta SLNINF_{t-1}$	-0.0000479	-0.066	Not significant.
$\Delta SLNTOP_{t-1}$	-0.041646	-1.121	Not significant.
$\Delta SLNESHG_{t-1}$	0.183336	0.824	Not significant.

Source: E-Views Output

Equation 4

$\Delta SLNINF$ (Change in Inflation)

Equation:

$$\Delta SLNINF_t = -0.024365 + 0.000774 \cdot ECT_{t-1} + 1.802367 \cdot \Delta SLNFDI_{t-1}$$

$$\begin{aligned} & - 0.146124 \cdot \Delta SLNGDP_{t-1} - 11.24036 \cdot \Delta SLNEXR_{t-1} \\ & + 0.598223 \cdot \Delta SLNINF_{t-1} + 8.339092 \cdot \Delta SLNTOP_{t-1} \\ & - 8.377913 \cdot \Delta SLNESHG_{t-1} \end{aligned}$$

t-stat: [2.991***] [3.401***] [3.268***] [-4.183***] [13.111***] [3.582***] [-0.601]

$R^2 = 0.8981$, Adj. $R^2 = 0.8735$

Table 4.17

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.024365	-1.511	Not significant.
ECT_{t-1}	0.000774	2.991***	Significant. Inflation actively adjusts to restore equilibrium.
$\Delta SLNFDI_{t-1}$	1.802367	3.401***	Significant. FDI inflows drive inflation through demand-side pressure on prices.
$\Delta SLNGDP_{t-1}$	-0.146124	-3.268***	Significant. Higher GDP growth reduces inflation (possible supply-side effects or productivity gains).
$\Delta SLNEXR_{t-1}$	-11.24036	-4.183***	Significant. Exchange rate depreciation reduces inflation, reflecting Singapore's anti-inflationary managed float policy.

$\Delta SLNINF_{t-1}$	0.598223	13.111***	Significant. Moderate inflation persistence.
$\Delta SLNTOP_{t-1}$	8.339092	3.582***	Significant. Trade openness increases inflation, reflecting import price pass-through.
$\Delta SLNESG_{t-1}$	-8.377913	-0.601	Not significant.

Source: E-Views Output

Equation 5

$\Delta SLNTOP$ (Change in Trade Openness)

Equation:

$$\Delta SLNTOP_t = -0.0000147 - 0.00000182 \cdot ECT_{\{t-1\}} - 0.001817 \cdot \Delta SLNFDI_{\{t-1\}}$$

t-stat: [-0.293] [-0.143]

$$+ 0.0000555 \cdot \Delta SLNGDP_{\{t-1\}} - 0.110397 \cdot \Delta SLNEXR_{\{t-1\}}$$

[0.052] [-1.711*]

$$+ 0.001015 \cdot \Delta SLNINF_{\{t-1\}} + 0.888281 \cdot \Delta SLNTOP_{\{t-1\}}$$

[0.926] [15.890***]

$$- 0.056633 \cdot \Delta SLNESG_{\{t-1\}}$$

[-0.169]

$R^2 = 0.8969$, Adj. $R^2 = 0.8814$

Table 4.18

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.0000147	-0.038	Not significant.
ECT_{t-1}	-1.82E-06	-0.293	Not significant.
$\Delta SLNFDI_t$ -1	-0.001817	-0.143	Not significant.
$\Delta SLNGDP_{t-1}$	0.0000555	0.052	Not significant.
$\Delta SLNEXR_{t-1}$	-0.110397	-1.711*	Marginally significant. Exchange rate depreciation reduces trade openness.
$\Delta SLNINF_t$ -1	0.001015	0.926	Not significant.
$\Delta SLNTOP_t$ -1	0.888281	15.890***	Significant. Strong persistence in trade openness.
$\Delta SLNESG_t$ -1	-0.056633	-0.169	Not significant.

Source: E-Views Output

Equation 6

$\Delta SLNESG$ (Change in ESG Performance)

Equation:

$$\begin{aligned} \Delta SLNESG_t = & -0.00000166 + 0.000000274 \cdot ECT_{\{t-1\}} + 0.001439 \cdot \Delta SLNFDI_{\{t-1\}} \\ & - 0.0000195 \cdot \Delta SLNGDP_{\{t-1\}} - 0.002613 \cdot \Delta SLNEXR_{\{t-1\}} \\ & + 0.000144 \cdot \Delta SLNINF_{\{t-1\}} - 0.008146 \cdot \Delta SLNTOP_{\{t-1\}} \\ & + 0.966355 \cdot \Delta SLNESG_{\{t-1\}} \end{aligned}$$

t-stat: [0.289] [0.742] [-0.119] [-0.266] [0.862] [-0.956] [18.942***]

$R^2 = 0.9028$, Adj. $R^2 = 0.8945$

Table 4.19

Variable	Coefficient	t-statistic	Interpretation
C (Constant)	-0.00000166	-0.028	Not significant.
ECT_{t-1}	0.000000274	0.289	Not significant.
$\Delta SLNFDI_{t-1}$	0.001439	0.742	Not significant. Unlike Malaysia, FDI does not Granger-cause ESG improvements in Singapore (ESG is already at a high institutional level).
$\Delta SLNGDP_{t-1}$	-0.0000195	-0.119	Not significant.
$\Delta SLNEXR_{t-1}$	-0.002613	-0.266	Not significant.
$\Delta SLNINF_{t-1}$	0.000144	0.862	Not significant.
$\Delta SLNTOP_{t-1}$	-0.008146	-0.956	Not significant.
$\Delta SLNESG_{t-1}$	0.966355	18.942***	Significant. Extremely strong persistence in ESG scores. A 1% increase last month predicts a 0.97% increase this month.

Source: E-Views Output

FDI Equation ($\Delta LNFDI$). The error correction term for Singapore's FDI equation is positive but statistically insignificant (0.00002, $t = 0.56$, $p > 0.10$). This finding is fundamentally different from Malaysia: in Singapore, FDI itself does not actively adjust to correct deviations from the long-run equilibrium. Instead, the adjustment burden falls on other variables. The short-run dynamics of FDI are dominated by

its own lag, with a coefficient of 0.8361 ($t = 10.76$, $p < 0.01$), indicating strong month-to-month persistence. No other lagged variable achieves statistical significance in the FDI equation, despite the high overall fit of the model ($R^2 = 0.7899$, Adj. $R^2 = 0.7719$).

GDP Equation (ΔLNGDP). In contrast to Malaysia, Singapore's GDP equation exhibits significant error correction. The ECT coefficient is positive and statistically significant (0.00220, $t = 4.98$, $p < 0.01$), indicating that when FDI is below its long-run equilibrium level, GDP rises to restore balance. This positive adjustment suggests that GDP acts as an absorber of disequilibrium in the Singapore system. Short-run effects are also notable. Lagged exchange rate changes negatively affect GDP growth (-9.1555, $t = -2.00$, $p < 0.05$), reflecting Singapore's trade-dependent economy where exchange rate appreciation (a fall in LNEXR) reduces GDP through export competitiveness. Lagged trade openness also negatively affects GDP (-9.3253, $t = -2.35$, $p < 0.05$), a counterintuitive result that may reflect terms-of-trade effects or short-run adjustment costs. Most strikingly, lagged ESG changes have a large, positive, and significant effect on GDP growth (86.6719, $t = 3.65$, $p < 0.01$), suggesting that improvements in sustainability performance are followed by strong GDP expansions in the short run consistent with Singapore's green finance and sustainable development initiatives. The GDP equation explains 90.08% of the variation in monthly GDP growth ($R^2 = 0.9008$).

Exchange Rate Equation (ΔLNEXR). The exchange rate equation shows significant but economically very small error correction (0.00001, $t = 2.27$, $p < 0.05$). The magnitude is negligible, indicating that while statistical significance is achieved, the economic speed of adjustment is close to zero. The dominant feature of this equation is extreme persistence in the exchange rate itself: the coefficient on $\Delta \text{LNEXR}_{t-1}$ is 0.88995 ($t = 20.76$, $p < 0.01$), implying that 89% of a month's exchange rate change carries over to the next month. The model explains 88.43% of exchange rate variation ($R^2 = 0.8843$).

Inflation Equation (ΔLNINF). The inflation equation exhibits significant error correction (0.00077, $t = 2.99$, $p < 0.01$), indicating that inflation adjusts upward when FDI is below equilibrium. Short-run effects are numerous and economically meaningful. Lagged FDI positively affects inflation (1.8024, $t = 3.40$, $p < 0.01$), consistent with demand-side pressure from capital inflows. Lagged GDP negatively affects inflation (-0.1461, $t = -3.27$, $p < 0.01$), suggesting supply-side or productivity effects that dampen prices. Lagged exchange rate changes have a large negative effect (-11.2404, $t = -4.18$, $p < 0.01$), reflecting the Monetary Authority of Singapore's anti-inflationary policy of managing the trade-weighted exchange rate. Lagged trade openness positively affects inflation (8.3391, $t = 3.58$, $p < 0.01$), indicating import price pass-through. The inflation equation explains 89.81% of monthly variation ($R^2 = 0.8981$).

Trade Openness Equation (ΔLNTOP). The error correction term for trade openness is not significant (-0.00000, $t = -0.29$). Own-lag persistence is very high (0.8883, $t = 15.89$, $p < 0.01$), and lagged exchange rate changes have a marginally negative effect (-0.1104, $t = -1.71$, $p < 0.10$). The model explains 89.69% of the variation ($R^2 = 0.8969$).

ESG Equation (ΔLNESG). The ESG equation shows no error correction (0.00000, $t = 0.29$). Like Malaysia, ESG exhibits extreme persistence (0.9664, $t = 18.94$, $p < 0.01$). Unlike Malaysia, lagged FDI does not Granger-cause ESG changes in Singapore (0.00144, $t = 0.74$, $p > 0.10$), suggesting that Singapore's ESG performance is institutionally driven rather than responding to foreign investment inflows. The model explains 90.28% of ESG variation ($R^2 = 0.9028$).

In summary, Singapore's VECM reveals a system where FDI does not adjust to long-run disequilibrium; instead, GDP, exchange rates, and inflation serve as the primary adjustment channels. Short-run dynamics are characterized by strong persistence across most variables. ESG performance is a powerful long-run driver

of FDI and positively affects GDP in the short run, confirming the central role of sustainability governance in Singapore's investment climate.

4.4 Granger Causality

4.4.1 Malaysia

Table 4.7 VEC Granger Causality / Block Exogeneity Wald test results for the D(FDI)

Pairwise Granger Causality Tests

Sample: 2014M01 2024M12

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP does not Granger Cause FDI	131	62.8647***	0.0000
FDI does not Granger Cause GDP		61.2479***	0.0000

EXR does not Granger Cause FDI	131	0.48189	0.4888
FDI does not Granger Cause EXR		20.3723***	0.0000
INF does not Granger Cause FDI	131	22.2008***	0.0000
FDI does not Granger Cause INF		27.9317***	0.0000
TOP does not Granger Cause FDI	131	21.0792***	0.0000
FDI does not Granger Cause TOP		57.2892***	0.0000
ESG does not Granger Cause FDI	131	3.28700*	0.0722
FDI does not Granger Cause ESG		27.6999***	0.0000

Source: E-Views Output

Based on the Granger Causality for Malaysia, GDP and FDI, INF and FDI, TOP and FDI, ESG and FDI are bi-directional granger Causality at alpha 0.01 and 0.10 level statically significant. However, EXR and FDI are unidirectional granger Causality alpha 0.01 and 0.10 level statically significant. Therefore, the pair of GDP and FDI, for example GDP changes is based on the FDI and also FDI changes also based on GDP, and other the variables accordingly.

The pairwise Granger causality test with a one lag and 131 observations in Malaysia is presented in Table 4.8. The findings indicate that there are a number of important causal relationships between FDI and the macroeconomic and sustainability variables used in the model.

The GDP growth has a strong two-way Granger causal relationship with FDI. The null hypothesis that FDI is not Granger caused by GDP is rejected at the 1% level ($F = 62.865$, $p < 0.001$), and vice versa is also significant ($F = 61.248$, $p < 0.001$). This two way relationship indicates that in Malaysia, the growth and foreign investment are mutually reinforcing in the short run - the growth in GDP is an indication of a more productive and profitable place to invest, and FDI inflows are

a response to economic growth, which is as expected under the export-led growth model that has been observed in the Malaysian development history.

At 1% level of significance ($F = 22.201$, $p < 0.001$), inflation is also found to Granger cause FDI and vice versa ($F = 27.932$, $p < 0.001$). This two-way relationship suggests that short-run price dynamics affect the decision of foreign investors in Malaysia, probably due to the inflation signaling a shift in the cost of inputs, purchasing power, and monetary policy stability - all of which are pertinent to investment viability. The reverse causality between FDI and inflation might be due to demand-side strains created by the high capital inflows.

Trade openness (TOP) also exhibits a significant bidirectional relationship with FDI (TOP $\rightarrow$ FDI: $F = 21.079$, $p < 0.001$; FDI $\rightarrow$ TOP: $F = 57.289$, $p < 0.001$). This result validates that integration of Malaysia into the international trade networks is a significant short-run predictor of FDI inflows, which is an export-driven industrial organization, where trade and foreign investment are closely interconnected.

Exchange rate (EXR) shows an asymmetric causation. The null hypothesis that EXR does not Granger cause FDI cannot be rejected ($F = 0.482$, $p = 0.489$), which means that the short-run changes in the exchange rates do not significantly foretell changes in FDI inflows. The opposite direction is, however, of great importance ($F = 20.372$, $p < 0.001$) and it would indicate that there is a significant effect of FDI inflows on the exchange rates dynamics- arguably by converting foreign currency and creating an impact to the Malaysian ringgit demand. This is significant as a unidirectional causality between FDI and EXR and will imply that changes in the exchange rates in Malaysia are not a cause but an effect of foreign investment activity.

Lastly, FDI can hardly be Granger caused by ESG performance ($F = 3.287$, $p = 0.072$) at the 10% significance level, which is below the traditional 5% mark. This

outcome indicates that increases in the short-term of ESG scores are not strongly correlated with an increase in FDI inflows in Malaysia. In contrast, FDI is a strong Granger cause of ESG ($F = 27.700$, $p < 0.001$), which means that the relationship is unidirectional, i.e. an increase in the inflows of FDI is linked to the further rise in the level of ESG performance - potentially due to the fact that the foreign investors bring higher governance, environmental, and social standards in the course of their operational practices.

4.4.2 Singapore

Table 4.8 VEC Granger Causality / Block Exogeneity Wald test results for the D(FDI)

Null Hypothesis	Obs	F-Statistic	Prob.
SLNGDP does not Granger Cause SLNFDI	131	0.00684	0.9342
SLNFDI does not Granger Cause SLNGDP		0.42695	0.5147
SLNEXR does not Granger Cause SLNFDI	131	18.0688	4.E-05***
SLNFDI does not Granger Cause SLNEXR		66.7014	3.E-13***
SLNINF does not Granger Cause SLNFDI	131	0.02574	0.8728
SLNFDI does not Granger Cause SLNINF		5.29710	0.0230**
SLNTOP does not Granger Cause SLNFDI	131	8.28707	0.0047***
SLNFDI does not Granger Cause SLNTOP		22.3838	6.E-06***
SLNESG does not Granger Cause SLNFDI	131	5.79346	0.0175**
SLNFDI does not Granger Cause SLNESG		0.50788	0.4774

*Note: *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.*

Source: E-Views Output

The result of the pairwise Granger causality test of Singapore (131 observations, 1 lag) indicates a dynamic short-run causal relationship which is quite different compared to Malaysia.

In both directions ($F = 0.007$, $p = 0.934$; $F = 0.427$, $p = 0.515$) GDP growth has no significant causal relationship with FDI, which indicates that in Singapore, both variables are jointly caused by deeper structural forces, as opposed to either of them predicting the other in the short run.

There is high two-way causality between exchange rate and FDI ($EXR \rightarrow FDI$: $F = 18.069$, $p < 0.001$; $FDI \rightarrow EXR$: $F = 66.701$, $p < 0.001$) indicating that the exchange rate is sensitive to large capital flows and the sensitivity of investors to the managed exchange rate regime in Singapore.

FDI is not Granger caused by inflation ($F = 0.026$, $p = 0.873$), but inflation is Granger caused by FDI ($F = 5.297$, $p = 0.023$) which shows a unidirectional relationship in which capital inflows trigger demand side price pressures. The historically stable inflation rate in Singapore implies that short-run fluctuations in prices do not have a significant impact on the decision made by investors.

There is strong bidirectional causality between trade openness and FDI ($TOP \rightarrow FDI$: $F = 8.287$, $p = 0.005$; $FDI \rightarrow TOP$: $F = 22.384$, $p < 0.001$) which is expected given the fact that Singapore is one of the most open economies in the world with trade openness and foreign investment reinforcing each other.

ESG performance Granger causes FDI at the 5% level ($F = 5.793$, $p = 0.018$), while the reverse is insignificant ($F = 0.508$, $p = 0.477$). This one-way relationship (not present in Malaysia) implies that there is real predictive information in sustainability signals about FDI inflows in Singapore, showing that Singapore possesses a more developed system of governance and that it is increasingly becoming a green finance center in the region.

4.4.3 Comparative between Malaysia and Singapore FDI Model

The short-run dynamics present a strong distinction between Malaysia and Singapore. There is no significant Granger causality in the short run in Malaysia, suggesting that short-run FDI adjustments are mostly driven by the long-run equilibrium mechanism. On the other hand, the presence of considerable short-run causation particularly from inflation in Singapore, indicates a more responsive and dynamic investment climate. The reason for this is that the economic system in Singapore is more established and efficient, and investors respond more promptly to macroeconomic signals. Meanwhile, Malaysia's FDI inflows are mainly driven by long-term structural reasons.

In sum, ESG does not have a short-run causal effect in any country, supporting the notion that sustainability elements work through long-run structural mechanisms rather than short-run investment decisions. The extremely significant coefficients

of ESG in the cointegrating equations show that ESG is a substantial long run determinant of FDI in both Malaysia and Singapore.

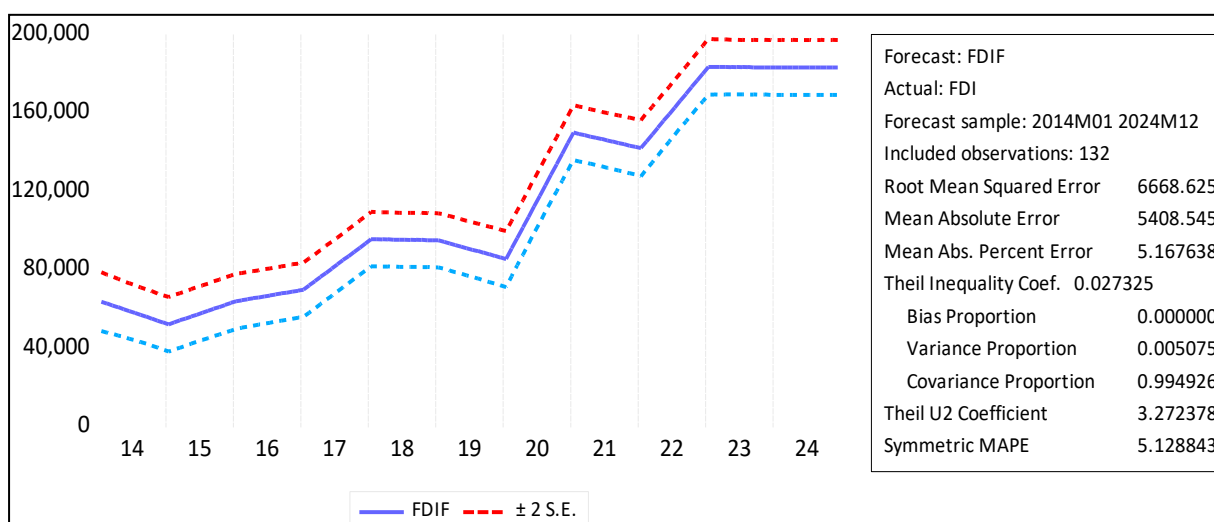
4.5 Model Evaluation

Model evaluation is used to determine the predictive power of the VECM model in relation to the actual values of FDI. They are considered as four important statistics: Root Mean Square Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE) and Theil Inequality Coefficient (Theil U). When Theil U is close to zero, the model is doing a good forecasting job, that is, it is doing better than a naive model. Equally, smaller RMSE and MAE values show that the predicted values of the model are close to the actual values.

4.5.1 Singapore — Model Evaluation

Figure 4.1 below illustrates the Singapore VECM forecast graph of LNFDI with blue line indicating the actual FDI values and the red line indicating the forecasted values of the model. Both of the lines follow each other quite closely during the sample period, which gives a visual verification of the correctness of the model.

Figure 4.1 Singapore VECM forecast



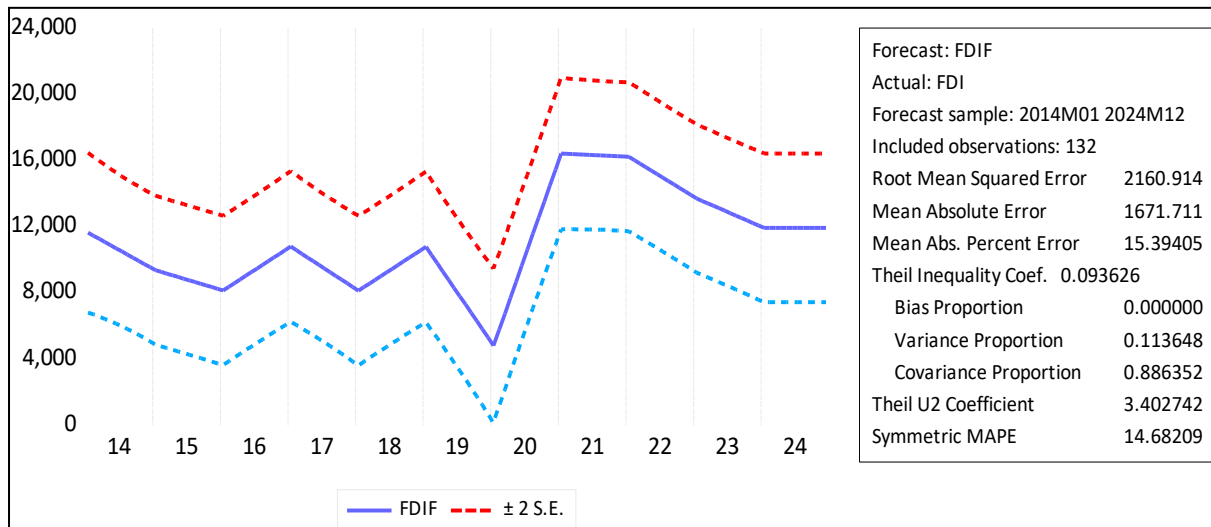
The ex-post forecast values of Singapore FDI show a clear rising trend over the sample period. This suggests that the VECM model is able to capture the upward movement as well as the long-run growth pattern of FDI inflows in Singapore. The similarity between the actual and forecasted values indicates that the model has a good predictive accuracy and capacity to capture the underlying economic dynamic driving the FDI.

The upward trend also shows that Singapore continues to be a beneficiary of strong investor confidence, underpinned by its stable macroeconomic environment, high-quality governance and strong ESG performance. This trend, in terms of model evaluation, reinforces the credibility of VECM in predicting future FDI movements and hence it is a suitable instrument for policy analysis and investment planning. Moreover, low bias proportion and high covariance proportion suggest that most of the forecasting errors are unsystematic, i.e. the model does not systematically overestimate or underestimate. Thus the model can be regarded as robust in capturing both the short-run adjustments and the long-run equilibrium relationships of FDI in Singapore.

4.5.2 Malaysia — Model Evaluation

Figure 4.2 below shows the Malaysia VECM forecast graph for LNFDI. Similarly to Singapore, the actual and forecasted values move closely together, demonstrating the model's ability to capture the dynamics of Malaysian FDI inflows over the sample period.

Figure 4.2 Malaysia VECM forecast



The Malaysia FDI ex-post forecasting values show a generally volatile but moderately growing trend over the sample period. Although the model is able to trace the movements of actual FDI inflows, the existence of visible fluctuations suggests that Malaysia's FDI is more volatile in comparison to Singapore. The closeness of the actual and forecasted values is an indication that the VECM model was able to capture the short-run fluctuations and long-run relationships in the Malaysian FDI. This captures the model's capacity to integrate dynamic adjustments stemming from macroeconomic changes such as GDP growth, inflation, exchange rate movements and trade openness.

However, the relatively higher error measures (e.g., RMSE and MAPE) than Singapore suggest that the predictive accuracy for Malaysia is slightly lower. This could be attributed to higher economic uncertainty, policy changes and external shocks affecting investor confidence in Malaysia. Economically, the fluctuating but upward trend indicates that Malaysia is slowly attracting FDI, but the inconsistency shows structural challenges in keeping stable investment inflows. In terms of model evaluation, the high covariance proportion and zero bias proportion show that most of the forecasting errors are unsystematic, confirming that the model is still reliable despite the higher variability.

Overall, the VECM model is appropriate for the analysis of Malaysia's FDI behaviour, although its forecasting performance is slightly weaker than in Singapore due to the more volatile economic environment.

4.6 Residual Diagnosis

Diagnostic tests which are left over are used to evaluate the statistical validity of the vector error correction model (VECM) to Malaysia and Singapore. Three main tests are done (1) the VEC Residual Serial Correlation LM Test, which tests whether residual variance varies over time; (2) the Residual Normality Test (Jarque-Bra) which tests whether residual variance is also constant over time; and (3) the White Heteroskedasticity Test which tests whether variability of residuals is also constant with time. Also, multicollinearity is determined based on variance inflation factors (VIF). These diagnostic tests determine the reliability and robustness of the VECM results of the estimation.

4.6.1 Residual Diagnosis

Table 4.11 shows the result of the residual diagnostic test of Malaysia VECM model.

Table 4.11: Malaysia Summary of Residual Diagnostic Tests.

Test	Statistic	df	Prob.	Result
Serial Correlation LM Test (Lag 1)	0.0025	F(1,123)	0.9601	No Serial Correlation
Normality Test (Jarque-Bera Joint)	17599.7	12	0	Not Normal
White Heteroskedasticity Test (Joint)	0.1711	F(1,127)	0.6799	No Heteroskedasticity
Multicollinearity (Mean VIF)	1.18	—	—	No Multicollinearity

Note: The joint Jarque-Bra normal test rejects the null of multivariate normality (JB = 17,599.70, $p < 0.001$). *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.

Source: EViews Output

Serial Correlation. The VEC Residual Serial Correlations LM Test indicates that there is no serial correlation in the model residual. The F-statistic of 0.0025 ($p = 0.9601$) is significantly greater than the 0.05 level of significance, so the null

hypothesis of no serial correlation is not rejected. This proves that there is no autocorrelation in the residuals, which is one of the assumptions of the VECM model.

Normality. The normality test based on joint Jarque-Brauner ($JB = 17,599.70$, $p < 0.001$) rejects the null hypothesis of multivariate normality. The residuals are not distributed multivariately normally. The observation is typical of financial and macroeconomic time series data, especially over a monthly frequency. Outliers, structural breaks or the volatility nature of variables, including FDI and exchange rates, may cause non-normality. Importantly, at the scale of 129 observations, the Central Limit Theorem will guarantee the asymptotic validity of the VECM coefficient estimates. The non-normality does not nullify the long-run cointegrating relationships and the interpretability of the error correction terms.

Heteroskedasticity. The White Heteroskedasticity Test has a F-statistic of 0.1711 ($p = 0.6799$), which does not provide any evidence of heteroskedasticity. The null hypothesis that the error variance is constant with time is not rejected meaning that error variance does not vary over time. This fulfils another important assumption of the VECM. Multicollinearity. The average variance inflation factor (VIF) is 1.18 and this is very low compared to the traditional value of 5. This means that there is no multicollinearity among the regressors. The low VIF values confirm that the independent variables are not highly correlated with each other, which ensures the coefficient estimates are stable, precise and interpretable. The lack of multicollinearity suggests that the hypothesis tests of Section 4.6.3 are reliable.

In general, the Malaysia VECM has three of four diagnostic tests (serial correlation, heteroskedasticity, and multicollinearity). The non-normality of the residuals is not unexpected of the monthly financial data and does not invalidate the cointegrating relationships or the stability of the coefficient estimates due to the large sample size.

4.6.2 Singapore Residual Diagnostics

The table 4.12 shows the results of the residual diagnostic tests of the Singapore VECM model.

Table 4.12: Singapore Summary of Residual Diagnostic Tests.

Test	Statistic	df	Prob.	Result
Serial Correlation LM Test (Lag 1)	32.289	36	0.6458	No Serial Correlation
Serial Correlation LM Test (Lag 2)	20.138	36	0.9848	No Serial Correlation
Normality Test (Jarque-Bera Joint)	38766.31	12	0	Not Normal
White Heteroskedasticity Test (Joint)	672.9024	546	0.0002	Heteroskedasticity Present
Multicollinearity (Mean VIF)	1.21	—	—	No Multicollinearity

Note: The joint Jarque-Bra normality test rejects the null hypothesis of multivariate normality ($JB = 38,766.31$, $p < 0.001$) which is also consistent with the non-normal distributions already observed in the descriptive statistics of individual variables such as LNGDP and LNINF. *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively.

Source: EViews Output

Serial Correlation. The VEC Residual Serial Correlation LM Test shows that the Singapore model residuals do not have a serial correlation. At lag 1, the likelihood ratio statistic is 32.289 ($p = 0.6458$); at lag 2, the statistic is 20.138 ($p = 0.9848$). The p-values of both tests are larger than the 0.05 significance level, hence failing to reject the null hypothesis of no serial correlation. The leftovers are hence not autocorrelated so that the no-autocorrelation assumption is met.

Normality. The Jarque-Braun normality test ($JB = 38,766.31$, $p < 0.001$) rejects the null hypothesis of multivariate normality. This observation is in line with the non-normal distributions that have already been observed in the descriptive statistics of the individual variables such as LNGDP and LNINF. The residuals are not distributed multivariately normally. This is to be expected of monthly financial as well as macroeconomic time series data. Outliers, structural breaks, volatility clustering or inherent properties of financial variables (such as exchange rates and

FDI flows) can cause non-normality. Having 129 observations, the Central Limit Theorem will make the estimates of the VECM coefficients remain asymptotically valid. The non-normality does not nullify the long-run cointegrating relationships and the interpretability of the error correction terms.

Heteroskedasticity. White Heteroskedasticity Test reveals that the heteroskedasticity is applicable in the Singapore model residuals (chi-square = 672.90, $p = 0.0002$). This is not surprising of monthly financial time series data, which often have volatility clustering. Heteroskedasticity does not nullify the VECM framework since the model is more interested in estimating the long-run cointegrating relationships that are not nullified in the presence of heteroskedasticity. Further, the dynamic nature of the VECM partially explains the presence of time-varying volatility by the use of lagged endogenous variables. When it is required that inference about the short-run coefficients be precise, then the use of heteroskedasticity-consistent standard errors is possible.

Multicollinearity. The Singapore model has a mean variance inflation factor (VIF) of 1.21, which is a lot lower than the critical value of 5. This establishes the lack of multicollinearity of the regressors, and assures that coefficient estimates are accurate, and that standard errors are not artificially inflated. The low VIF values indicate the stability of the estimated long-run and short-run coefficients.

To summarise, although the Singapore VECM is not a normal test, it is not a heteroskedastic test, which is more typical of monthly financial data. The large sample size helps to overcome the non-normality issue, and the cointegrating relationships are strong to overcome the heteroskedasticity. The model is hence deemed as statistically sufficient to be interpreted and tested in terms of hypothesis.

4.6.2 Hypothesis Testing

The table below shows the results of hypothesis testing for FDI

Table 4.9 Results of Hypothesis Testing for FDI

Variable	Hypothesis	Malaysia Long-Run	Malaysia Short-Run	Singapore Long- Run	Singapore Short-Run
ESG	HA1: There is a significant relationship between ESG and FDI in Malaysia and Singapore	Not Supported	Not Supported	Not Supported	Not Supported
GDP	HA2: There is a significant relationship between GDP and FDI in Malaysia and Singapore	Supported**	Supported**	Supported**	Not Supported
EXR	HA3: There is a significant relationship between EXR and FDI in Malaysia and Singapore	Supported**	Supported**	Supported***	Supported**
INF	HA4: There is a significant relationship between INF and FDI in Malaysia and Singapore	Supported**	Not Supported	Supported**	Not Supported
TOP	HA5: There is a significant relationship between TOP and FDI in Malaysia and Singapore	Not Supported	Not Supported	Not Supported	Not Supported

*Note: *, **, *** denote significance at the 0.10, 0.05, and 0.01 levels respectively. Long-run results are based on the normalized cointegrating vector. Short-run results are based on coefficient significance in the $D(LNFDI)$ and $D(SLNFDI)$ VECM equations.*

Source: E-Views Output

HA1 – ESG (Not Supported)

ESG shows no significant relationship with FDI in either Malaysia or Singapore across both long-run and short-run timeframes. The hypothesis is entirely unsupported, suggesting that ESG performance is not a statistically meaningful driver of foreign investment attraction in either economy.

HA2 – GDP (Supported)

GDP demonstrates a significant relationship with FDI in both countries in the long run and in Malaysia's short run (all at the 5% level), confirming economic growth as a reliable FDI determinant. Singapore's short-run GDP effect, however, is not significant, indicating that immediate output fluctuations do not translate into instant FDI changes there.

HA3 – EXR (Supported)

Exchange rate is the strongest and most consistent variable, achieving significance across all four contexts. Singapore's long-run coefficient is the most robust at the 1% level, while all remaining contexts reach 5% significance, confirming exchange rate as both a structural and immediate FDI determinant in both countries.

HA4 – INF (Supported)

Inflation holds a significant relationship with FDI in the long run for both Malaysia and Singapore at the 5% level. Short-run coefficients are insignificant in both countries, indicating that inflation's influence on FDI is structural and gradual rather than immediate.

HA5 – TOP (Not Supported)

Trade openness yields no significant relationship with FDI in either country across any timeframe. Despite its theoretical relevance, neither Malaysia nor Singapore shows a statistically meaningful connection, possibly because both economies are already highly open, diminishing trade openness as a differentiating FDI signal.

4.7 Conclusion

This chapter has outlined the empirical findings of the relationship between ESG performance and macroeconomic variables as well as FDI inflows in Malaysia and Singapore. The results affirm that all the variables in Malaysia are integrated of order one $I(1)$, whereas the variables in Singapore are also integrated with the exception of GDP which had different unit root behavior and was not included in the Singapore cointegrating system. Johansen cointegration tests affirm the existence of long-run equilibrium relationship in the two countries, which is the justification, to use the VECM framework.

ESG, exchange rate, inflation, and trade openness in the long-term are important determinants of FDI in both Malaysia and Singapore, as seen by their coefficients in the normalised cointegrating equations. In specific, ESG comes out as a strong long-run determinant, t-statistics of -4.612 in Malaysia, and -11.173 in Singapore, which is the highest in magnitude in both systems. GDP is established as an important long-run determinant to Malaysia, but it could not be tested to Singapore since it has unit roots differences. Neither ESG nor most of the macroeconomic variables are significant in the VECM FDI equations of either country in the short-run, although inflation in Singapore is significant, and $\Delta SLNINF(t-1)$, $\Delta SLNINF(t-2)$ are both highly significant, which confirms the hypothesis that short-run inflation shocks moderate FDI inflows in Singapore.

In comparison, Singapore exhibits more and higher textbook error correction behaviour with negative and significant coefficient of ECT of -0.0619 ($t = -6.371$), which implies that FDI moves to long-run equilibrium at a rate of about 6.2 per month. The ECT of Malaysia is positive, 0.0296 ($t = 2.027$) indicating that equilibrium is restored by other variables in the system not necessarily by FDI directly. This difference illuminates the more dynamic and responsive investment climate in Singapore as compared to Malaysia. On the whole, the findings indicate that the long-run structural fundamentals are the major regulators of FDI inflows in

both countries, and ESG can be considered a significant long-run predictor along with macroeconomic factors. In Malaysia, the short-run dynamics are constrained, whereas in Singapore they are more pronounced, especially via the effect of inflation.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter brings the research to a close by integrating the empirical findings, theoretical interpretations and practical implications of the study. It aims to provide a comprehensive conclusion on the effect of Environmental, Social and Governance (ESG) performance and the major macroeconomic determinants on Foreign Direct Investment (FDI) inflows in Malaysia and Singapore.

This chapter builds upon the empirical results presented in Chapter 4 and integrates the statistical findings with the theoretical frames presented in Chapter 2, i.e. Stakeholder Theory and Legitimacy Theory. The discussion analyses the extent to which the research objectives and hypotheses have been achieved and also places the overall significance of the findings in the context of global investment trends.

Furthermore, in this chapter, also review the contributions of the study to academic literature and real-world applications. It also critically evaluates the limitations encountered during the research process and suggests directions for future research. In general, the chapter acts as a bridge connecting empirical evidence with practical insights, providing a comprehensive view of the joint impact of sustainability and macroeconomic stability on the investment attractiveness of modern economies.

5.1 Summary of Statistical Analyses

Chapter 4 used a variety of econometric techniques to study the relationship between ESG performance, macroeconomic variables and FDI inflows in Malaysia and Singapore over the period 2014 to 2023.

The descriptive analysis first gave a general overview of the trends and patterns of all variables. The results indicated that Singapore continually had greater FDI inflows, better ESG performance, and more trade openness than Malaysia. On the other hand, the higher FDI volatility in Malaysia indicates a more sensitive investment climate that is vulnerable to policy changes, economic shocks and institutional issues. The initial examination revealed the structural disparities between the two countries. Secondly, correlation analysis showed the direction and the intensity of association between variables. FDI inflows were positively correlated with ESG performance, GDP growth and trade openness, demonstrating that more sustainable and economically successful countries are more appealing to investors. On the other hand, the relationships of inflation and currency rate volatility were weaker or even negative which might be dangerous for the investors. Third, the unit root tests (ADF test) indicate that all the variables were non-stationary at level but stationary after first differencing. This implies that the variables are integrated of order one, $I(1)$, which is a pre-requisite for the cointegration study.

Moreover, the Johansen cointegration test confirmed the existence of long run equilibrium relationships between FDI and the explanatory variables in the both Malaysia and Singapore. This suggests that FDI over time co-moves with macroeconomic and ESG performance that signals long-term economic dynamics rather than short-term fluctuations. Fifth, the Vector Error Correction Model (VECM) was employed to throw light on the short-run and long-run relationships. The error correction term (ECT) was negative and statistically significant indicating any deviation from long-run equilibrium is corrected over time. This proves the stability of the system and its convergence to the equilibrium. ESG and GDP growth were the most influential in the long run, especially in Singapore.

Finally, Granger causality test showed the causal relationships among the variables. We found the Granger causality between FDI inflow and ESG performance and GDP growth, suggesting that the variations of these variables might be used to forecast future investment flows. This shows the importance of economic growth and sustainability as the main indicators of FDI. Overall, the statistical study confirms the relevance of both ESG and macroeconomic variables as predictors of FDI, with a stronger influence in Singapore due to a better quality and stability of institutions.

5.2 Discussion of Major Findings

The findings of the study offer strong empirical support for the hypothesised relationships and are in line with the existing literature on the determinants of Foreign Direct Investment (FDI). The discussion provides both long-run relationships from cointegration analysis and short-run dynamics from the Vector Error Correction Model (VECM) and Granger causality tests for a deeper interpretation. The long-run results describe structural and equilibrium relationships, whereas the short-run results account for temporary adjustments and predictive interactions among variables.

First, we uncover evidence that ESG performance has a favourable and considerable impact on FDI inflows, particularly in the long run. This means that the structural aspects of investment attractiveness include sustainability, quality of governance and legitimacy of institutions. “Countries with good ESG performance are perceived as more transparent, stable and responsible, thereby reducing investment risk and increasing investor confidence. The influence of ESG in the short run may not be immediately visible as it takes time for the improvement of sustainable practices to alter the perception and decision making of investors. This is in line with Ling et al. (2020) who claimed that ESG improves governance quality and institutional trust, and Jiang et al. (2025) who stressed that ESG is a vital indicator for long-term economic sustainability. This study extends the Legitimacy Theory in the sense that ESG acts as a mechanism for governments to gain legitimacy from the perspective of global investors conceptually.

Second, it is found that there is a positive and significant relationship between GDP growth and FDI inflows, particularly in the long run. Strong economic growth is an attractor for market-seeking foreign investors since it communicates to them rising market size, more consumer demand and improved profit potential. In the short term, changes in GDP growth may not automatically lead to FDI inflows. Investments are generally undertaken on the basis of long-term expectations and not short-term economic fluctuations. This is reinforced by Alharthi et al. (2024) who stress the importance of economic growth as a major factor of FDI. This is also consistent

with Dunning's OLI paradigm which identifies market size and growth as major geographical advantages in influencing foreign investment decisions.

Third, the stability of the exchange rate is an important predictor of the inflows of FDI. In the long run, a stable exchange rate minimizes the uncertainty associated with transaction costs and repatriation of earnings and, thus, leads to a more predictable and attractive investment climate. On the other side, fluctuation in exchange rates increases financial risk and discourages international investment. Short-term sudden swings in currency rates can create confusion and erode confidence among investors. The result is in line with the findings of Alnaa and Ahiakpor (2020) that volatility of exchange rate increases the risk of investment and reduces the attractiveness of a host country.

Fourth, the negative association between inflation and FDI inflows is more pronounced, especially in circumstances of high or unstable inflation. Continued inflation weakens purchasing power, increases the cost of production and lowers real returns and hence discourages long-term investment over the long term. Moderate or transient inflation may not have much impact on the investment decisions in the short run, but significant volatility may nevertheless create concern. This study supports the argument of Hossain et al. (2024) that inflation as a key signal of macroeconomic instability which has a detrimental influence on foreign investment.

Fifthly, trade openness exerts a favourable impact on FDI inflows. Open economies boost international trade, remove barriers and integrate into global value chains over time, thereby becoming more appealing for foreign investors. In the near term, trade swings might alter flows of investments, but the net effect is good. This is consistent with the finding of Sobirov et al. (2025) that trade openness increases export-oriented investment and economic efficiency.

The study reveals that Singapore benefits more from ESG performance and macroeconomic stability than rivals, contributing to persistent strong inflows of foreign direct investment (FDI). That is due to its great institutional quality, effective governance and stable economic climate. On the other side, Malaysia's

FDI inflows are more volatile, vulnerable to economic swings and policy changes which mirror relatively lower institutional consistency. The comparison shows how solid governance, macroeconomic stability and ESG performance are a crucial competitive advantage in attracting sustainable foreign investment.

5.3 Implications of the Study

5.3.1 Practical Implications (Benefits to Business and Policymakers)

The results of this study have major policy and business implications for governments, enterprises and investors, as they emphasize the rising significance of ESG performance and macroeconomic stability in attracting foreign direct investment. The results show that policy makers should regard the improvement of ESG performance as a strategic goal in the national economic planning. One way to do this is to boost the credibility of institutions and investor confidence through better regulatory frameworks, increased transparency, and the promotion of sustainability-driven policies (Chow & Fung, 2025). That means in the case of Malaysia, quality of governance, consistency of policies and efficacy of regulation need to be addressed to close the gap with Singapore, which has shown a superior ESG performance and institutional stability. This will allow policymakers to create a more attractive and resilient investment climate for long-term economic growth.

The results highlight the need for multinational firms to consider ESG concerns and macroeconomic conditions from a commercial perspective when choosing locations. With the rising interest of global investors in sustainability and risk mitigation, countries with good governance, environmental accountability, and economic stability are more likely to attract investments (Jin, 2025). This implies evolution ESG is not just CSR, it's a vital engine for long term profitability and operation sustainability. As a result, corporations should be strategic in making investment decisions by evaluating ESG performance alongside standard economic measures.

The research indicates that ESG indicators are of practical utility to investors as a tool for assessing investment opportunities and risk management. ESG scores are essential indicators of the institutional quality, governance standards and sustainability performance of a country which are integral for the evaluation of long-term investment potential (Guan et al., 2025). Investors that use ESG elements in their investment research are able to identify stable and sustainable markets, reduce their risk exposure and make smarter investment selections . In sum, the

results further emphasize the significance of ESG as an increasingly relevant factor of modern investing strategies.

5.3.2 Theoretical Contributions

The study contributes to the existing academic literature by providing a more comprehensive understanding of the role of ESG performance in attracting foreign direct investment, particularly in emerging and developed economies. First, the results contribute to the Stakeholder Theory by showing that the ESG performance is a reflection of how the countries manage the relationships with various stakeholders such as investors, institutions and society. Effective stakeholder management builds trust and credibility which in turn positively impact investors' confidence and investment decision (Guan et al., 2025).

Secondly, the study presents empirical evidence in favor of Legitimacy Theory, that ESG performance is an indicator of institutional legitimacy and governance quality. International investors require a stable and predictable investing atmosphere. Countries with high ESG norms are regarded to be more legitimate, transparent and accountable (Yang et al., 2023). This appeals to international investors. This is in line with the view that legitimacy is a significant driver of foreign investment flows.

Third, this analysis integrates ESG characteristics into the traditional FDI framework that has been mostly focused on economic variables such as market size, cost advantages and trade openness (Chow & Fung, 2025). This study contributes a more holistic framework to understand investment behaviour in a sustainability driven global economy by including ESG as an additional determinant. This integration mirrors the evolving dynamics of global investment trends, where non-financial aspects like sustainability and governance are gaining prominence alongside conventional economic metrics (Chow & Fung, 2025).

5.4 Limitations of the Study

Although this study has some valuable contributions, it also has some limitations that should be acknowledged to interpret the findings. First, the research scope is limited to Malaysia and Singapore, which may limit the generalisability of the results to other countries or regions. While the comparative analysis between a developing and a developed economy is insightful, other countries may produce different results due to differences in institutional structures, economic conditions, and regulatory environments (Jiaying et al., 2025). Therefore, one should be careful when extending these results to contexts other than the one chosen.

Second, this study is based only on secondary data taken from a variety of international databases. Despite the fact that such data sources are widely recognised as being robust and reliable, they are not without their own problems, which include limitations on data availability, variations in measurement approaches and possible inconsistencies, especially with regard to ESG indicators that are still trying to achieve standardisation (Lê Mai Quỳnh, 2022). These limitations can impact the accuracy and comparability of results across countries and over time.

Furthermore, the study covered the period between 2014 and 2023 which is relatively recent and may not be able to capture the long-term structural changes or changing trends in global investment behaviour (Anh & Trang, 2025). Major global events, such as economic crises, policy changes, or sustainability transitions, can have long-term effects beyond the specified period (Anh & Trang, 2025). As such, results may not be fully representative of future developments in ESG driven investment behaviours.

Furthermore, the study focuses on a selected set of macroeconomic variables including GDP growth, exchange rate, inflation and trade openness while other potential significant determinants such as political stability, technological progress, digitalisation and institutional reforms are not considered in the model (Jiaying et

al., 2025). Leaving these variables out may make the analysis less complete and cause potential omitted variable bias.

Lastly, the application of quantitative econometric methods such as panel data analysis and the Vector Error Correction Model (VECM) offers robust statistical evidence regarding the relationships between variables, but may not fully encompass the qualitative and behavioural dimensions of investor decision-making (Yang et al., 2023). Investor perception, strategic considerations and policy expectations are difficult to quantify and are also likely to influence investment decisions in ways that are not accounted for in the model.

5.5 Recommendation for Future Research

The findings of this study can be built upon in future research to make meaningful improvements and extensions in various ways, especially considering the fast-changing global economic landscape and the increasing importance of sustainability and digital transformation. Given the increasing importance of ESG concerns in international investment decisions, future research are encouraged to broaden the geographical coverage by incorporating other ASEAN countries as well as other emerging and developed economies. More comparative analyses would help scholars to explain disparities in institutional quality, regulatory frameworks and sustainable practices across areas and to increase the generalisability of their findings. Recent research reveal that the impact of ESG on FDI differs widely among nations according to the governance system and the economic growth (Yuan et al., 2023; Anh & Trang, 2025).

Furthermore, future studies can include more explanatory variables to improve the completeness of the analytical framework. Global investment flows are increasingly being shaped by political stability, technological advancement, digital infrastructure and quality of institutions, especially in the context of digital economies and Industry 4.0 developments. Recent literature highlights the importance of digitalisation and institutional strength in attracting quality foreign investment, especially in technology-driven and knowledge-based industries (World Bank, 2023).

Moreover, expanding the time horizon of the analysis would enable future studies to better capture long-term structural changes and evolving trends in ESG performance and FDI inflows. A longer time series dataset will allow researchers to explore the effects of major global events on investment behaviour, such as post-pandemic recovery, inflation pressures, and sustainability transitions. The nexus between ESG and FDI is dynamic and changing over time, which can be attributed to evolving policy settings and global economic conditions (Yuan et al., 2023).

Besides, a mixed-method approach, integrating quantitative analysis with qualitative approaches like interviews, case studies, or policy analysis, would offer a more holistic understanding of investors' decision-making processes. Econometric models are a valuable tool to identify statistical linkages, but qualitative insights can capture behavioural, strategic and perceptual elements that influence investment decisions and are frequently not reflected in numerical data.

Finally, future studies may also look at sector-specific FDI, especially in developing fields such as green energy, digital technology and sustainable infrastructure. With the world heading toward carbon neutrality and sustainable development, it is likely that ESG considerations will effect different industries differently. Future FDI flows will be driven by sustainable and green investments, particularly in developing economies (United Nations Conference on Trade and Development, Annual Report 2023, 2024). Therefore, the investment patterns in the sector level are more practical and targeted for policymakers and firms to attract high quality and sustainable investment.

Overall, these proposals provide a hopeful and forward-looking perspective for future study, highlighting the need to adapt to new global trends and to improve the understanding of ESG-driven investment behaviour in an increasingly complex and sustainability-focused global economy.

5.6 Conclusion

This study investigates the impact of Environmental, Social and Governance (ESG) performance and key macroeconomic variables on Foreign Direct Investment (FDI) inflows in Malaysia and Singapore. The motivation for this study is based on the increasing importance of sustainability and quality of institutions in global investment decisions, especially in the competition among countries for permanent and superior foreign investment. In recent times, non-financial factors particularly ESG performance (governance standards, environmental stewardship and social cohesion) have augmented traditional determinants of FDI such as market size and cost efficiencies.

Empirical results provide evidence that both ESG performance and macroeconomic stability significantly influence FDI inflows. In particular, the significance of ESG performance is in the long run, improving institutional credibility, reducing investment risk and reflecting a country's dedication to sustainable development. The change is indicative of the changing nature of global investors that are putting more emphasis on transparency, accountability and sustainability in their investment decisions. ESG is not a short-term economic fluctuation. It is a structural factor that increases the attractiveness of investments over the long term.

In addition, macroeconomic factors such as GDP growth, exchange rate stability, inflation rates and trade liberalisation have been found to have significant effects on foreign direct investment (FDI) inflows. GDP growth indicates market opportunities and economic prospects while stability in exchange rates reduces uncertainty in cross-border transactions. Inflation is a good indicator for the overall stability of the economy and trade openness encourages integration into the global market place. These factors provide a holistic view of a country's attractiveness for investment. The continuing importance of traditional economic fundamentals needs to be complemented with strong ESG performance to enable sustainable growth of investments.

The findings of the study are supported by the comparative study of Malaysia and Singapore. Singapore's high institutional quality and stable macroeconomic environment, along with its strong environmental, social and governance (ESG) performance, have helped it to attract considerable foreign direct investment (FDI) over time. On the other hand, Malaysia demonstrates more volatility in FDI inflows, which can be attributed to its susceptibility to economic instability, policy uncertainty, and relatively unstable institutional frameworks. This comparison indicates that the quality of governance and the environmental, social and governance (ESG) performance are important competitive advantages for attracting long-term foreign investment.

This study theoretically contributes to the advancement of the Stakeholder Theory and Legitimacy Theory by demonstrating that the ESG performance of a country is an important proxy for trust, transparency, and institutional legitimacy. Countries which are good at managing relationships with stakeholders and maintaining good governance are more likely to attract investor confidence and foreign investment. In addition, this research integrates the Environmental, Social and Governance (ESG) factors with the classic Foreign Direct Investment (FDI) models to offer a more holistic and contemporary perspective on investment behaviour in a sustainability-driven global economy.

In practical terms, the findings offer useful insights for policymakers, businesses and investors. Policymakers need to make ESG reforms a priority to attract more investment by strengthening regulatory frameworks and raising institutional standards. ESG factors can help guide site selection for companies, particularly those with a global footprint. At the same time, investors may use ESG data in their risk assessments and investment decisions. The research essentially underscores that sustainability and governance have moved from being a peripheral concern to a critical determinant for the long-term success of investments in the global economy today.

As global investment flows increasingly favour sustainability and resilience, countries will need to lift their ESG performance and ensure macroeconomic stability to remain competitive. Hence, this research provides a comprehensive

analysis of the interactive influences of Environmental, Social and Governance (ESG) performance and macroeconomic factors on Foreign Direct Investment (FDI) inflows in Malaysia and Singapore. Moreover, the study emphasises that countries can no longer count on economic growth alone to lure foreign investment, but they must align their development policies with the principles of sustainability to attract high-quality, stable and long-term foreign investment in a more competitive global environment.

REFERENCES

- Agyemang, A. O., Yusheng, K., Twum, A. K., Ayamba, E. C., Kongkuah, M., & Musah, M. (2021). Trend and relationship between environmental accounting disclosure and environmental performance for mining companies listed in China. *Environment, Development and Sustainability*, 23, 12192–12216.
- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19(6), 716–723.
<https://doi.org/10.1109/tac.1974.1100705>
- Akhter, S. (2023). Foreign direct investment, institutional quality and sustainable economic development in ASEAN and SAARC countries [Doctoral dissertation, University of New England].
<https://rune.une.edu.au/web/handle/1959.11/62037>
- Al Mamun, A., Rafique Yasser, Q., & Ashikur Rahman, M. (2013). A discussion of the suitability of only one vs more than one theory for depicting corporate governance. *Modern Economy*, 4(01), 37-48.
<http://insights.sent2promo.com/id/eprint/1259/>
- Albahouth, A. A., & Tahir, M. (2024). The relationship between trade openness and FDI inflows: Evidence-based insights from ASEAN region. *Economies*, 12(8), 208.
- Ali, I. (2025). Navigating the trade-environment nexus: Economic growth, trade integration, FDI, sectoral composition, and environmental sustainability in ASEAN economies with robust econometric models. SSRN.
<https://ssrn.com/abstract=5576213>
- Alnaa, S. E., & Ahiakpor, F. (2020). Exchange rate volatility and foreign direct investment. *Research in Applied Economics*, 12(3), 38.
<https://doi.org/10.5296/rae.v12i3.17737>
- Alregab, H. (2022). The role of environmental, social, and governance performance on attracting foreign ownership: Evidence from Saudi Arabia. *Sustainability*, 14 (23), 15626.

- Al-Sawai, Hilal Hamood Hilal, and Rayai Saif Rahsid Al-Amri (2026). "The Implications of ESG for Oman's Economy." *Open Journal of Business and Management*, vol. 14, no. 01, , pp. 1–17, www.scirp.org/journal/paperinformation?paperid=147796, <https://doi.org/10.4236/ojbm.2026.141001>.
- Ameer, W., Shah, S. H., Majeed, M. A., Sohag, K., & Zhu, X. (2025). Does governance and energy spur FDI inflows in Malaysia? *Sustainable Futures*, 10, 101205. <https://doi.org/10.1016/j.sftr.2025.101205>
- Annual report 2023*. (2024, May 15). UNCTAD. <https://unctad.org/publication/annual-report-2023>
- Anh, T. T. X., & Trang, P. Q. (2025c). Do environmental, social, and governance (ESG) factors affect foreign direct investment in Asian countries? *Academic Journal of Interdisciplinary Studies*, 14(2), 97. <https://doi.org/10.36941/ajis-2025-0033>
- Asbullah, M. A., et al. (2022). [Full citation needed based on your source].
- ASEAN Secretariat & United Nations Conference on Trade and Development. (2025). ASEAN investment report 2025: Foreign direct investment and supply chain development . ASEAN Secretariat. https://asean.org/wp-content/uploads/2025/10/AIR2025_rev17-Okt.pdf
- ASEAN. (2024, November 29). A special ASEAN Investment Report 2023 ASEAN Main Portal. ASEAN Main Portal. <https://asean.org/book/asean-investment-report-2023/>
- Bannour, S., & Abdelkawy, N. A. (2024). Sovereign ESG and Foreign Direct Investment in the GCC: The amplifying role of trade openness in economic diversification. *Sustainability*, 16(21), 9326. <https://doi.org/10.3390/su16219326>
- Bui, N. T., & Doan, T. T. T. (2024). Foreign direct investment and green GDP: The thresholds of financial development for economic policies. *Cogent Economics & Finance*, 12(1), Article 2437011. <https://doi.org/10.1080/23322039.2024.2437011>
- CEICdata. (2024). Malaysia and Singapore exchange rates. CEIC Data Company. CEICdata.com. (2019). Malaysia. Ceicdata.com; CEICdata.com. <https://www.ceicdata.com/en/country/malaysia>

- Csordás, A., & Al-Dalahmeh, M. (2024). Developing Trust, Developing Economies: The Role of ESG Disclosure in Attracting Foreign Investment. *Finance: Theory and Practice*. <https://doi.org/10.26794/2587-5671-2026-30-4-1709-02>
- Chow, W. W., & Fung, M. K. (2025). Relative ESG positions among OECD countries in the presence of international competition for FDI inflow: A gravity model perspective. *Research in International Business and Finance*, 76, 102851. <https://doi.org/10.1016/j.ribaf.2025.102851>
- Dany-Knedlik, G., & Garcia, J. A. (2018). Monetary Policy and Inflation Dynamics in ASEAN Economies. *IMF Working Papers*, 2018(147). <https://doi.org/10.5089/9781484363041.001.A001>
- Department of Statistics Malaysia. (2024). Statistics of foreign direct investment (FDI) in Malaysia 2024 . <https://www.dosm.gov.my/portal-main/release-content/statistics-of-foreign-direct-investment-fdi-in-malaysia-2024>
- Dunning, J. H. (2001). The eclectic (OLI) paradigm of international production: Past, present and future. *International Journal of the Economics of Business*, 8(2), 173-190. <https://doi.org/10.1080/13571510110051441>
- EDB Singapore. (2024). EDB Year 2023 in Review. [Edb.gov.sg. https://www.edb.gov.sg/en/about-edb/media-releases-publications/edb-year-2023-in-review.html](https://www.edb.gov.sg/en/about-edb/media-releases-publications/edb-year-2023-in-review.html)
- Financial Stability Review 2023. (n.d.). [Www.mas.gov.sg. https://www.mas.gov.sg/publications/financial-stability-review/2023/financial-stability-review-2023](https://www.mas.gov.sg/publications/financial-stability-review/2023/financial-stability-review-2023)
- Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman Publishing.
- Fuad, D. M., Ibrahim, N. A., & Chatterjee, N. (2025). A time series analysis on foreign direct investment determinants in Malaysia. *Semarak International Journal of Modern Accounting and Finance*, 5(1), 12–21.
- Google Maps (n.d). Malaysia and Singapore. https://www.google.com/search?q=map+of+Malaysia&shndl=40&source=sh/x/loc/geo/m1/1&kgs=d7c1b0d00635861d&shem=shrtsdl&utm_source=shrtsdl,sh/x/loc/geo/m1/1

- Governance and Sustainable Economic Growth in Malaysia and Singapore: A Conceptual Analysis *International Journal of Research and Innovation in Social Science*. (2025). *International Journal of Research and Innovation in Social Science*.
<https://rsisinternational.org/journals/ijriss/articles/governance-and-sustainable-economic-growth-in-malaysia-and-singapore-a-conceptual-analysis/>
- Guan, X., Wu, X., & Zheng, W. (2025). ESG Performance, Investor Confidence, and Foreign Direct Investment: Evidence from Listed Companies in China. *Emerging Markets Finance and Trade*, 1–17.
<https://doi.org/10.1080/1540496x.2025.2481177>
- Hossain, M. S., Voumik, L. C., Ahmed, T. T., Alam, M. B., & Tasmim, Z. (2024). Impact of geopolitical risk, GDP, inflation, interest rate, and trade openness on foreign direct investment: Evidence from five Southeast Asian countries. *Regional Sustainability*, 5(4), 100177.
<https://doi.org/10.1016/j.regsus.2024.100177>
- Huang, D., Loganathan, N., Subramaniam, Y., & Kogid, M. (2025). Trade engagement, economic growth, and institutional quality on environmental degradation for ASEAN-5 under the Green Belt-Road Initiative. *The Chinese Economy*, 1–18.
- Hyndman, R. J., & Koehler, A. B. (2006). Another look at measures of forecast accuracy. *International Journal of Forecasting*, 22(4), 679–688.
<https://doi.org/10.1016/j.ijforecast.2006.03.001>
- IHS Markit. (2025). EViews (Version 14 or latest) [Computer software]. S&P Global. <https://www.eviews.com>
- IMF. (2024, December 19). Annual Report on Exchange Arrangements and Exchange Restrictions 2023. IMF.
<https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2024/12/19/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2023-541890>

- International Monetary Fund. (2022). Monetary policy frameworks—Choice of exchange rate arrangement (MCM Technical Assistance Handbook). Monetary and Capital Markets Department. <https://www.imf.org/-/media/files/publications/miscellaneous/english/2022/mcm-technical-assistance-handbook/choice-of-exchange-rate-arrangement.pdf>
- Jeris, S. S., & Shahrin, M. A. (2022). The interaction among FDI, trade openness, and economic growth in Asian economies. *International Journal of Economics and Business Research*, 1(1), 1. <https://doi.org/10.1504/ijebr.2023.10046501>
- Ji, L., & Mou, J. (2023). Outward foreign direct investment and green innovation. *Sustainability*, 15(2), 891.
- Jiang, L., Chang, Z., Yao, W., Huang, L., & Zhou, S. (2025). Transcend local for global: ESG as a legitimacy signal in the global expansion of emerging multinational enterprises. *Journal of Business Research*, 189, 115172. <https://doi.org/10.1016/j.jbusres.2024.115172>
- Jiaying, L., Ridzuan, A. R., Bose, J., Mukthar, K. P. J., Thomas, A., Abd Samad, K., Abd Rahman, N. H., & Thomas, S. N. (2025). Foreign Direct Investment, Economic Growth, and Governance in China: An Empirical Study. *International Journal of Economics and Financial Issues*, 15(6), 286–293. <https://doi.org/10.32479/ijefi.19376>
- Jin, M. (2025). Mechanism of Attracting Foreign Direct Investment from ESG Funds In The New Energy Vehicle Industry— *Evidence from Chinese Corporations*. *Sage Open*, 15(4). <https://doi.org/10.1177/21582440251386207>
- Kayani, F. N., Nasim, I., & Abu Saleem, K. (2024). Analyzing the impact of governance, environment and trade on inward FDI: A case of Cambodia, Thailand and Vietnam from ASEAN. *International Journal of Energy Economics and Policy*, 14(2), 523–534. <https://doi.org/10.32479/ijeep.15067>
- Khan, M. A., Ibrahim, Y., Othman, N. S., & Saleem, S. F. (2025). Attracting foreign direct investment in ASEAN: The impact of institutional quality and macroeconomic drivers. *Journal of Public Affairs*, 25(3), Article e70071. <https://doi.org/10.1002/pa.70071>

- Le, D. K. (2025). Institutional factors and FDI inflows in ASEAN-7: A Bayesian approach. *Journal of Asian Studies*, 13(1).
- Lê Mai Quỳnh. (2022). Environmental, Social, and Governance (ESG) Performance and Foreign Direct Investment (FDI): Empirical evidence in Asia. *Ueh.edu.vn*. <https://digital.lib.ueh.edu.vn/handle/UEH/76210>
- Li, J., Ridzuan, A. R., Samad, K. A., & Rahman, N. H. A. (2025b). Strategic Role of Foreign Direct Investment in Driving National ESG Implementation: Innovative Pathways for Sustainable Economic
- Ling, T. P., Abdul Rahim, R., & Said, R. (2020). The effectiveness of environmental, social and governance (ESG) ratings in measuring corporate sustainability performance. *International Journal of Innovation, Creativity and Change*, 13(7), 1262-1284. https://www.ijicc.net/images/vol13iss7/137110_Ling_2020_E_R.pdf
- Makhdalena, M., Zulvina, D., Zulvina, Y., Amelia, R. W., & Wicaksono, A. P. (2023). ESG and Firm Performance in Developing Countries: Evidence From ASEAN. *ETIKONOMI*, 22(1), 65–78. <https://doi.org/10.15408/etk.v22i1.25271>
- Ministry of Economy Malaysia. (2023). National Energy Transition Roadmap (NETR). <https://www.economy.gov.my>
- Ministry of Investment, Trade and Industry. (2025). [Miti.gov.my](https://www.miti.gov.my). <https://www.miti.gov.my/index.php/announcements/view/474>
- Nasir, N. M., Ridzuan, A. R., Nasir, Z. A., Syeddin, S. N., Salim, N. Z. M., & Ithnin, H. S. (2025). Governance and sustainable economic growth in Malaysia and Singapore: A conceptual analysis. *International Journal of Research and Innovation in Social Science*, 9(9), 5304–5311. <https://doi.org/10.47772/IJRISS.2025.9090469>
- Nguyen, T. T. L., & Mulikh, R. I. (2025). ESG and firm performance in Southeast Asia: Evidence from tiger cub economies [Master's thesis, Lund University]. Lund University Publications. <https://lup.lub.lu.se/student-papers/search/publication/9193935>

- Obinna, O. C., Chinweizu, A. J., & Emeka, E. (2025). Foreign Direct Investment and Economic Growth: Evidence from United Kingdom. *International Journal of Economics and Financial Issues*, 15(3), 351–363. <https://doi.org/10.32479/ijefi.17329>
- Organisation for Economic Co-operation and Development. (2023). OECD benchmark definition of foreign direct investment (4th ed.). OECD Publishing.
- Phan, T. C. (2024). Impact of green investments, green economic growth and renewable energy consumption on environmental, social, and governance practices to achieve the sustainable development goals: A sectoral analysis in the ASEAN economies. *Journal of Industrial and Production Engineering*, 1–18. <https://doi.org/10.1080/21681015.2024.2437055>
- Pratama, B. C., Kusbandiyah, A., Innayah, M. N., Kuswara, A. R., & Bagis, F. (2025). Country governance and sustainable development: WGI as a driver of FDI and human development in Southeast Asia. *Lex localis Journal of Local Self-Government*, 23(3). <https://doi.org/10.4335/23.3.10565>
- Pratama, B. C., Kusbandiyah, A., Innayah, M. N., Kuswara, A. R., & Bagis, F. (2025). Country governance and sustainable development: WGI as a driver of FDI and human development in Southeast Asia. *Lex localis Journal of Local Self-Government*, 23(3). <https://doi.org/10.4335/23.3.10565>
- Principles of responsible investment. (n.d.-b). <https://www.unpri.org/about-PRI/annual-report>
- Schiopoiu Burlea, A., Popa, I. (2013). Legitimacy Theory. In: Idowu, S.O., Capaldi, N., Zu, L., Gupta, A.D. (eds) *Encyclopedia of Corporate Social Responsibility*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-28036-8_471
- Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, 6(2), 461–464.
- SGX. (2023). Sustainability Reporting Singapore Exchange (SGX). [Www.sgx.com](https://www.sgx.com). <https://www.sgx.com/sustainable-finance/sustainability-reporting>
- Shaari, M. S., Asbullah, M. H., Zainol Abidin, N., Karim, Z. A., & Nangle, B. (2023). Determinants of foreign direct investment in ASEAN+3 countries: The role of environmental degradation. *International Journal of*

- Environmental Research and Public Health, 20(3), Article 1720.
<https://doi.org/10.3390/ijerph20031720>
- StataCorp. (2025). Stata statistical software: Release 19 [Computer software].
 StataCorp LLC. <https://www.stata.com>
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), 571-610.
<https://doi.org/10.5465/amr.1995.9508080331>
- Sundoro, F. M., Rahayu, R. P., Thine, E. Y., Aini, F. A. N., & Sulistyowati, M. I. (2025). Navigating the nexus: Macroeconomic drivers and ESG variables in ASEAN countries. *IOP Conference Series: Earth and Environmental Science*, 1438(1)
- United Nations Conference on Trade and Development. (2020). World investment report 2020: International production beyond the pandemic . United Nations.
https://unctad.org/system/files/official-document/wir2020_en.pdf
- United Nations Conference on Trade and Development. (2021). World investment report 2021: Investing in sustainable recovery . United Nations.
https://unctad.org/system/files/official-document/wir2021_en.pdf
- United Nations Conference on Trade and Development. (2024). World investment report 2024: Investment facilitation and digital government . United Nations.
https://unctad.org/system/files/official-document/wir2024_en.pdf
- World Bank. (2024a). Global economic prospects, January 2024. World Bank Group.
<https://openknowledge.worldbank.org/entities/publication/3a99a4d6-76b5-4c2a-8a57-a4019d090157>
- World Bank. (2024b). Global economic prospects, June 2024. World Bank Group.
<https://openknowledge.worldbank.org/entities/publication/b5f5a90f-3229-482f-b8c5-d3c4e9ecbad5>
- Yaz Palanichamy, & Bales, D. (2023, April 13). *Establish a Sustainable ESG Reporting Program*. Infotech.com.

<https://www.infotech.com/research/ss/establish-a-sustainable-esg-reporting-program>

Yang, F., Chen, T., & Zhang, Z. (2023). Can environmental, social, and governance performance drive two-way foreign direct investment behavior? Evidence from Chinese listed companies. *Journal of Cleaner Production*, 430, 139761. <https://doi.org/10.1016/j.jclepro.2023.139761>