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Determinants of foreign direct investment in Malaysia

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Abstract

By using annual time series data spanning 1995 to 2021, this study examines the key factors that influence foreign direct investment (FDI) inflows to Malaysia. This study employed the conventional determinants of FDI and incorporated an under-studied corruption variable to capture the political impact on FDI inflows to Malaysia. The ARDL bounds test results identified short- and long-run positive relationships between FDI inflows and two tested variables: market size and education. A positive long-run relationship was also found between inflation rates and FDI inflows. By contrast, infrastructure facilities were found to be negatively related to FDI inflows in the long run. More importantly, the results ascertained that higher corruption levels hamper FDI inflows to Malaysia in the long term. Moreover, the Granger causality test revealed that market size, inflation rate, and infrastructure facilities are critical causal factors that explain the fluctuations in FDI inflows to Malaysia. In light of the results obtained, some policy recommendations are highlighted to help enhance the attractiveness of FDI, thereby stimulating economic growth in Malaysia.

Keywords:
FDI inflows;
Corruption;
Malaysia;
ARDL bounds test;
Granger causality.

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1. Introduction

The infusion of foreign capital is an integral economic development engine in both developed and developing nations. According to Saini and Singhania (2018), foreign capital flows are necessary for developed countries to promote sustainable development and economic prosperity. According to the Organization for Economic Co-operation and Development (OECD) (2002), foreign direct investment (FDI) as a significant source of private external financing has gained enormous momentum in developing countries, emerging economies, and transitional nations. The growth of globalisation over time has prompted countries to liberalise foreign direct investment (FDI) regimes, complemented by various policies to facilitate FDI inflows. A preponderance of evidence proves that FDI is advantageous for developing countries in building and developing human capital, creating a more competitive and dynamic business climate and boosting the development of corporations. It also triggers technology spillover that allows firms in host countries to acquire new technical knowledge and skills and adopt new technologies in their operations at no cost. Overall, the benefits of FDI enhance economic growth, making FDI a dominant force in the poverty alleviation trajectory of developing nations. The dramatic growth of foreign direct investment (FDI) has been a notable aspect of the global economy in recent decades (Chakrabarti, 2001), and FDI has become indispensable in an open and effective international economic system (Mallampally, P. & Sauvant, K. P., 1999; OECD, 2002). In particular, global FDI flows have witnessed a marked surge over the past three decades (Figure 1a) because

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many countries, especially low- and middle-income countries (LMIC), consider FDI a crucial component of their trading strategy to stimulate economic development (Adams, 2009). The inward stock of FDI in developed and developing countries also exhibited a rising trend between 1980 and 2021, as reported by the UNCTAD STAT. From 1980 to 2021, developed countries recorded a drastic increase in the inward stock of FDI as a percentage of Gross Domestic Product (GDP), from 4.9% to 57.15%, while the inward stock of FDI to developing countries rose substantially from 10.93% to 32.34%.

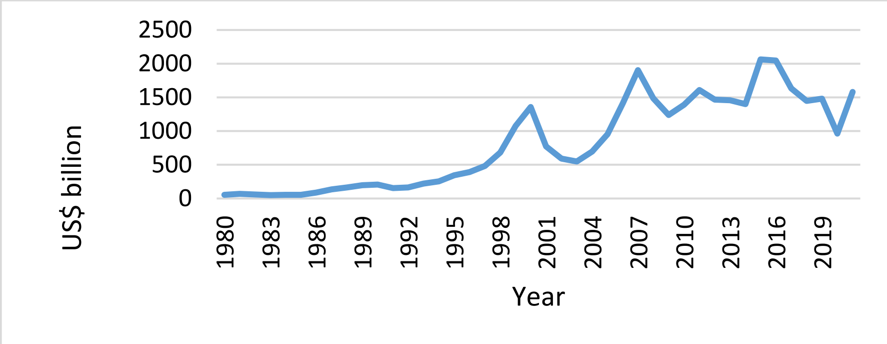

Figure 1a: Global FDI inflows, 1980 - 2021 (US$ billion)
Source: UNCTAD STAT

The overriding factor underlying the sustained growth performance of the Malaysian economy is attributed to the inflows. Malaysia has been a long-standing recipient of FDI because of the openness of its economy (Shuhaimen & Lim, 2016). It is widely acknowledged that the abundance of natural resources, policy reformation, effective macroeconomic management, exceptional economic growth records, and a well-functioning financial system in Malaysia are salient features that successfully build the confidence of foreign investors to inject capital into our country (Ang, 2008). As stated by Lee Heng Guie, the head of economic research on CIMB, Japan, South Korea, the United States (US), Singapore, and Saudi Arabia are the top investors in Malaysia (The Edge Markets, 2012). According to the Malaysian Investment Development Authority (2021), the United States of America, Singapore, and the United Kingdom are the country's major foreign direct investors in 2021, contributing RM15.7 billion, RM9 billion, and RM4.7 billion in FDI inflows, respectively. From a sectoral perspective, the manufacturing sector was the main contributor to Malaysia's FDI inflows in 2021, amounting to RM29.5 billion or 61.4% of the total FDI inflows, followed by the contribution of the services industry at RM12 billion or 24.9% of the total FDI inflows. The mining and quarrying sector contributed RM5.8 billion, or 12.1% of the total FDI inflows. The net FDI inflows in Malaysia demonstrated an upward trend from 1980 to 2021, as depicted in Figure 1b. The net FDI inflows to Malaysia have been dwindling since 2016 and recorded a value of US$8.3 billion in 2018 on account of the lower investment in the mining and quarrying sector, as illustrated in Figure 1b (The World Bank, 2022; DOSM, 2019). In 2020, the unprecedented outbreak of the COVID-19 shock jeopardised the flows of FDI in Malaysia, causing the net FDI inflow to shrink markedly by 55.67%, falling from US$9.15 billion in 2019 to US$4.06 billion (Figure 1b). Malaysia bounced back from disruptions of the COVID-19 pandemic in a year and achieved a US$18.6 billion net FDI inflow in 2021, supported by the gradual recovery of the global economy. Despite the upswing in FDI positions for the period 2010 to 2021 (Figure 1c) and the surge in FDI net inflow in 2021, the decreasing rate of growth in FDI positions (Figure 1d) and the continuous downward trend of net FDI inflows between 2016 and 2020 suggest that Malaysia is facing the threat of losing FDI.

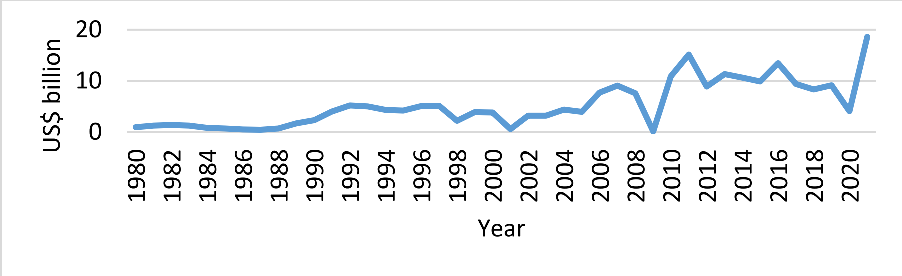

Figure 1b: Net inflows of FDI in Malaysia, 1980 - 2021 (BoP, current US$)
Source: The World Bank

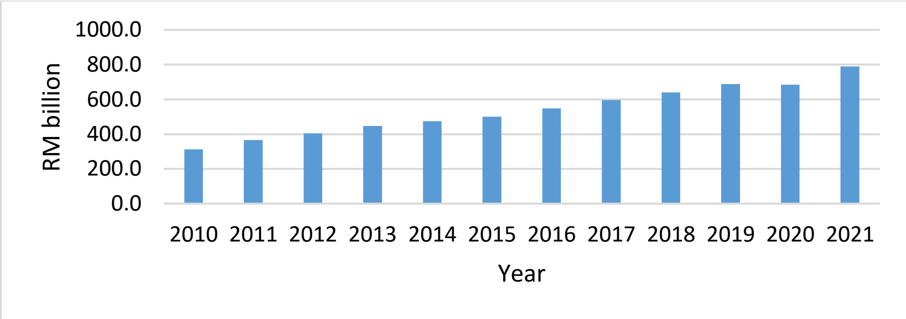

Figure 1c: FDI positions in Malaysia, 2010 - 2021 (RM billion)
Source: DOSM, 2023

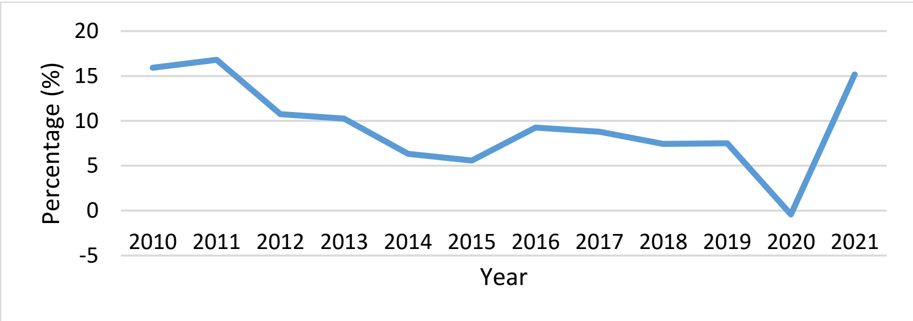

Figure 1d: Rates of change of FDI positions in Malaysia, 2010 - 2021
Source: DOSM

A stable political environment or good political climate in a country is a critical factor that foreign investors consider in their investment decision-making (Moosa, 2002), as heightening political risks would undoubtedly put tremendous pressure on the economy of the host country, thereby casting a shadow over its economic activities and reducing the incentives for international venture capitalists to invest their hard-earned money in the country (Bitar et al., 2019). This distressing scenario disrupts business activities in the host economy and eventually leads to disinvestment by foreign investors because of unpromising investment returns in the context of uncertainty. As proof, analysts and lawmakers alleged that the eruption of the 1Malaysia Development Bhd. (1MDB) saga in 2015, which involved money laundering and embezzlement, had ruined Malaysia's reputation. Consequently, this financial mismanagement scandal rattled to market sentiment, and foreign investors lost faith in Malaysian stock markets (The Edge Markets, 2016). The appalling 1MDB scandal appears to have kept foreign investors on the edge for a long time, prompting them to turn away from Malaysian markets and look for alternative investment destinations in Southeast Asia. As a result, it has led to a massive outflow of foreign capital during the time (The Straits Times, 2016).

As reported by UNCTAD, FDI in Malaysia registered an inflow of US$2.5 million in 2020, a staggering decline of 67.95% as compared to US$7.8 billion recorded in 2019. This fiasco made

Malaysia the worst performer in the region amidst the backdrop of the COVID-19 pandemic, mainly owing to the domestic political instability that arose from the change of government in March 2020, the execution of containment measures (e.g., movement control order) against the pandemic, unsettled corruption issues (Williams and Nur Muhammad Tajrid Zahalan, 2021; Teoh, 2021; Surendran, 2021), the spike in COVID-19 cases, and the delay in the implementation of the national immunisation programme (Surendran, 2021). Moreover, Onn (2021) highlighted the failure of the federal government to formulate upstanding policies and maintain healthy diplomatic relationships as the root causes of Malaysia's dismal FDI performance in 2020. Political turbulence dampens investors' confidence and nudges them to neighbouring countries, such as Indonesia, Singapore, and Vietnam (Rahman, 2021; Yeoh, 2022). A positive political environment with low corruption, stable government, and good governance is the primary factor influencing Malaysia's FDI attractiveness.

Many researchers have extensively studied the factors that influence FDI inflows in Malaysia, including Ang (2007), Aw and Tang (2010), Ong et al. (2012), Othman (2013), and Mohammed Abdulqader Sultan Hamood et al. (2018). However, there is currently a lack of research on the impact of political factors such as political instability and corruption on inward FDI in Malaysia. Political stability and transparency could be important factors influencing FDI in Malaysia (Aw and Tang, 2010). Thus, this study examines the main factors affecting FDI inflows to Malaysia, including political factors, and investigates the relationships between inward FDI and macroeconomic and political variables.

This research focuses on studying the key factors that influence FDI inflows to Malaysia based on Vernon's product life cycle theory and Dunning's eclectic paradigm. This study uses annual data covering the 27 years between 1995 and 2021 to investigate the relationships between FDI inflows to Malaysia and its determinants, such as market size, inflation rate, education, infrastructure facilities, and the level of corruption. This study uses empirical evidence from past studies and recent research as a reference to gather useful information on the determinants of inward FDI in Malaysia. In addition to the conventional macroeconomic variables widely utilised in prior literature, this study embraces political factors, an understudied variable in the context of FDI in Malaysia. Aw and Tang (2010) examined the impact of corruption levels on inward FDI, but their study captured observations only until 2005. Thus, this study uses observations for the period between 1995 and 2021 to take into account the effects of macroeconomic, socioeconomic, and political factors on FDI inflows to Malaysia during several major economic shocks that took place after 2005. This study's significant contribution is understanding FDI inflows to Malaysia, including FDI performance, amid political turbulence. The findings of this research are beneficial to the government and policymakers as they provide a clear picture of the FDI atmosphere in our country. Hence, they can act accordingly to revise economic and corruption policies and revamp FDI strategies to spur foreign capital inflows more efficiently and effectively.

2. Literature review

This section focuses on the theoretical and empirical underpinnings of FDI gleaned from the abundant information extracted from empirical research on the related topic. It begins by discussing the definition of FDI from different viewpoints, authors, and institutions, followed by a discussion of relevant theories.

2.1 The Product Life Cycle (PLC) Theory

Raymond Vernon, a professor at Harvard Business School, developed product life cycle theory in 1966 to explain the manufacturing success of the United States, which was the leading producer worldwide in many industries in the post-World War II period (Nayak & Choudhury, 2014). According to PLC theory, Vernon believed that a typical trade in goods consists of four main stages: introduction, growth, maturity, and decline. In the initial phase of the product life cycle, local companies create and successfully introduce innovative products primarily to domestic markets and export surpluses to overseas markets with little to no competition (Musabeh, 2018). The second stage of PLC marks product growth. The growth of a product manifests itself as a rise in demand, an increase in its production, and the development of exports of that commodity. Next, a product reaches maturity when it is well-established in the market and widely acclaimed by consumers. The local market eventually reaches saturation,[1] as competitors emulate the firm's innovation. At the market saturation point, local companies start gearing towards market penetration to expand their operations into different territories and explore new markets for their products, including foreign markets, thereby promoting the export of their products (Musabeh, 2018). The concentration of production in less developed countries (LDCs) is characteristic of the decline stage. Multinational enterprises often prefer to build their manufacturing bases in emerging market regions because of the low wages of low-skilled labor (Nayak & Choudhury, 2014; Makoni, 2015). As a result, the comparative advantage transfers from the home country of the innovation to other countries as the product matures through its life cycle, as does FDI. In this final stage, a product's lifecycle exhibits a decline following its decreasing demand and sales (Nayak & Choudhury, 2014).

In summary, PLC theory provides valuable insights into the reasons behind firms' decisions to establish businesses abroad and the relationship between product life cycles and possible FDI flows (Musabeh, 2018). However, it has received criticism from many researchers because of its limitations in explaining FDI flow.

2.2 The Eclectic Paradigm of Dunning

The eclectic paradigm, better known as the ownership, location, and internalisation (OLI) framework, is one of the most popular theories of FDI. The combination of preceding FDI theories, such as the location theory, international trade theory, internalization theory, and Hymer's theory of industrial organisation laid the foundation for the OLI paradigm, making it a robust model for understanding the FDI phenomenon (Moosa, 2002). John Dunning pioneered the eclectic paradigm in 1976 by integrating three crucial factors that affect the decision of a company to expand their businesses internationally–the advantages of ownership (O), location (L), and internalisation (I)–in order to construct a holistic and coherent framework that specifically explains the behaviour of multinational corporations pursuing FDI (Dunning, 2001).

This paradigm postulates that a firm must fulfil three prerequisites before it engages in FDI. First, a firm should possess an ownership advantage over other companies in the market. Second, firms with ownership advantages must exploit the benefits for themselves, instead of selling, leasing, or transferring them to other parties through licensing and management contracts. This circumstance was regarded as internalization by Boddewyn (1985). The third and final condition for a firm to engage in FDI is that the benefits of offshoring production operations must outweigh the benefits of depending on exports (Wadhwa, 2011). The eclectic paradigm emphasises that FDI can occur only when the three conditions mentioned above are met simultaneously, because of their interrelationships.

As Dunning (2001) determined, ownership advantages (O) comprise asset ownership and transaction ownership advantages. Asset ownership advantages refer to the benefits exclusive to a firm that typically derive from its ownership of intangible assets (Dunning, 2001; Denisia, 2010; Nayak & Choudhury, 2014), mainly business proprietary information and intellectual properties, such as brand name, trademark, copyright, patent, technical competence, marketing strategies, trade secrets, property rights of information and technology, and so forth. Transaction ownership benefits arise when multinational corporations are capable of reaping transactional advantages

[1] Market saturation is a situation where the growth trajectory of a product or service in a marketplace stagnates.

and minimizing their transaction costs[2] (Musabeh, 2018). These ownership advantages give a company an edge over its rivals in the foreign market, because they contribute to production cost reduction and competitiveness enhancement (Nayak & Choudhury, 2014; Makoni, 2015). Ownership advantage can also be considered a comparative advantage of FDI.

The second consideration, location advantages (L), are the benefits related to the geographical advantages of a potential host country. Location advantages are categorized as economic, political, and social advantages, as stated by Denisia (2010). Economic benefits encompass qualitative and quantitative factors, such as the availability and costs of resources, wage rates, the quality of human capital, infrastructure standards, and market size. Political advantages are related to the political environment and government policies that influence FDI flow. Social advantages focus on the distance between home and host countries, as well as cultural and ethnic diversity. Firms or organizations should evaluate these location advantages before choosing the most sensible and profitable host country to set up their businesses.

Finally, internalization advantages (I) refer to the benefits acquired by a company when it manufactures its products in-house, instead of outsourcing routes (Nayak & Choudhury, 2014; Marandu & Ditshweu, 2018). Musabeh (2018) assumed that this could be seen as a cost-effective pathway taken by firms, and simultaneously, they use their ownership advantages to overcome imperfect competition in the marketplace. Dunning and Lundan (2008) asserted that internalisation benefits firms by reducing the expenses of breached contracts and related lawsuits and minimising the impact of government interference. It also helps firms control the supply and sale conditions for inputs.

In general, the OLI paradigm is a comprehensive model that captures the various necessary factors that affect FDI flows. It posits that FDI occurs when companies possess ownership-specific advantages they desire to exploit in their businesses set up in foreign lands, which they can only profitably exploit if they practice internalization (Nayyar, 2014). Although eclectic theory lacks explication concerning the subsequent rise of FDI (Boddewyn, 1985), and has been criticized for not being a dynamic model and failing to account for the variations in the international production process, it is still extensively applied in the research field as a tool to study the extent and patterns of MNCs' activities, that is, international businesses and productions (Mudambi, 2004; Zhu, 2008; Liang et al., 2011).

2.3 Empirical foundations

This section discusses the macroeconomic, socioeconomic, and political factors that influence FDI inflows, based on plentiful evidence from past studies. Over the past few decades, numerous studies have investigated the associations between FDI and its determinants, such as market size, inflation rate, education, infrastructure quality, and political factors.

2.3.1 Market size and FDI inflows

Numerous empirical studies use gross domestic product (GDP) per capita as an indicator of the market size of a country because of its capability to reflect the demand of the local population for goods and services, as well as their purchasing power. Petrović-Ranđelović et al. (2017) have researched the impacts of market size and other macroeconomic parameters on FDI inflows from 2007 to 2015 for six nations of the Western Balkans, namely, Albania, Bosnia and Herzegovina, Croatia, Macedonia, Montenegro, and Serbia. Researchers have analysed the effects of specific variables on FDI inflows by applying a multiple regression analysis. The key finding of the research determined that market size is a crucial factor affecting the FDI inflows as they found that market size had a significant positive impact on FDI inflows in the investigated countries.

[2] Market failure will happen when the transaction costs are so high that the existence of the market is no longer worthwhile.

The research results of Oro and Alagidede (2020) are similar to those of Petrović-Ranđelović et al. Oro and Alagidede. The researchers examined the influence of petroleum resources and market size on FDI in Africa using a panel dataset covering up to 49 African countries from 1996 to 2018. The researchers employed a dynamic system generalised method of moments (GMM) analysis and discovered that market size returned a positive and significant association with FDI, implying that market size drives FDI flows in the observed countries.

Azam and Haseeb (2021) studied the determinants of FDI inflows in five leading emerging economies, including Brazil, Russia, India, China, and South Africa (BRICS), with a particular focus on the impact of energy on FDI inflows from 1990 to 2018. The outcomes of the advanced Bootstrap Panel cointegration test confirm that GDP and FDI are covariants in the long run. The researchers found that GDP positively influences FDI in both the short and long run, based on the CS-ARDL, AMG, and CCEMG estimators. A bidirectional causal association between market size and FDI has also been explored based on heterogeneous panel causality estimations.

H1: FDI inflows in Malaysia are positively associated with market sizes.

2.3.2 Inflation rates and FDI inflows

Boateng et al. (2015) examined the impact of various macroeconomic factors on FDI inflows in Norway from 1986 to 2009 by applying a cointegration regression with the Fully Modified OLS method (FMOLS) and the vector autoregressive and error correction model. Researchers discovered that inflation has a significant and negative influence on inward FDI in Norway. They also highlight the significance of macroeconomic policies in improving the dynamic competitive advantage of a home country.

Kumari and Sharma (2017) conducted a panel data study to identify the main determinants of FDI in developing countries using the ordinary least squares (OLS) method. This research considered 18 developing countries across South, East, and Southeast Asia from 1990 to 2012. The outcomes of this study indicate that inflation rates have a significant and negative impact on FDI inflows in developing countries.

Bekhet and Al-Smadi (2021) investigated the relationships between FDI inflows in the Jordanian economy and its determinants between 1978 and 2012 based on a broad testing approach. The main outcome of this study is the discovery of a positive short-run relationship between inflation rates measured by the consumer price index (CPI) and inward FDI, while inflation rates are negatively associated with FDI inflows in the long run.

Korsah et al. (2022) empirically investigated the drivers encouraging inward FDI in emerging economies involving 16 West African countries (WACs) from 1989 to 2018. Fixed- and random-effects econometric regression models were adopted by researchers to estimate the nexus/linkage between macroeconomic indicators and FDI inflows into WACs. Unlike most empirical studies, their findings reveal that inflation is insignificant in attracting FDI inflows into WACs. However, the abundance of natural resources, market size or GDP, imports and exports of goods and services, trade openness, and currency strength, as represented by the exchange rate, are critical contributors to FDI inflows in these countries.

H2: FDI inflows in Malaysia are negatively related with inflation rates.

2.3.3 Education and FDI inflows

Saini and Singhania (2018) studied the potential determinants of FDI in 11 developed countries and 9 developing countries from 2004 to 2013 by applying static and dynamic panel data modelling. The research results identified that an increase in primary education enrolment is associated with an increase in FDI inflows, of which the effect of education level on FDI flows into low-income countries was more pronounced. Thus, researchers argued that achieving a certain level of development in education and skill building is a prerequisite for developing countries to reap benefits from foreign markets.

In addition, Kottaridi et al. (2019) carried out a study investigated the effect of different types of human capital and skills measures on FDI inflows in European Union (EU) countries from 1995 to 2012 using the OLS method, fixed effect estimations, and GMM estimators. The researchers included education expenditure as a share of GDP and total public spending to capture the effect of human capital quality. Their findings showed that government expenditure on upper secondary education as a percentage of total government expenditure significantly attracts FDI inflows in Western EU countries; conversely, spending on education as a share of GDP is insignificant. This implies that foreign investors devote special attention to the structure of government spending in the EU15, which reflects its policy direction. In contrast to the EU15, government expenses on education in CEE countries have a negative impact on inward FDI because investors perceive that expenditures might not be properly utilized and thus do not necessarily translate into higher-quality human resources.

The next research finding also supports the proposition that high-quality human capital entices FDI. Sethi et al. (2022) conducted a cross-country analysis to explore the relationship between human capital and FDI in 172 countries between 1990 and 2015. The researchers utilized a fixed-effect panel regression in their study and concluded that higher primary education enrolment contributes to higher FDI flows into high-income nations, while higher secondary education enrolment has a significant and positive impact on FDI inflows to low-income countries. These results demonstrate that more FDI streams into the host country with higher educational attainment.

H3: Education has a favourable effect on FDI inflows in Malaysia.

2.3.4 Infrastructure facilities and FDI inflows

Rehman and Noman (2021) investigate the effects of infrastructure on exports and FDI inflows between 1990 and 2018. The proxy of infrastructure in the research was represented by the global infrastructure index, a composite index that brings together 30 indicators representing the quality and quantity of sectorial infrastructure comprising the transport, communication, energy, and financial sectors. The study outcomes revealed that higher infrastructure standards led to more FDI inflows to the observed countries. Therefore, researchers affirmed that infrastructure is an important driving force for FDI inflows.

The findings of Hoa et al. (2021) about the determining factors of FDI inflows in the northwestern regions of Vietnam from 2000 to 2019 are in line with the research results discussed above. The researchers used the number of telephone subscribers per 1,000 inhabitants as a proxy for the infrastructure standards. The results indicate that infrastructure facilities positively influence inward FDI in northwest Vietnam, signifying the importance of infrastructure development in facilitating FDI inflows.

Rehman et al. (2022) examined the association between infrastructural development and FDI inflows based on the role of the Belt and Road Initiative (BRI). The researchers analysed panel data from 2000 to 2019 for 66 BRI countries from Europe, Africa, the Middle East, and Asia using the generalized method of movement (GMM) approach. The principal finding of the study was that infrastructure, such as transport and telecommunication, provided a strong impetus to FDI inflows in the BRI countries.

H4: FDI inflows to Malaysia are positively associated with the quality of infrastructure facilities.

2.3.5 Corruption and FDI inflows

Paul and Jadhav (2020) conducted research on the institutional determinants of FDI inflows in 24 emerging markets, such as China, India, Indonesia, Turkey, Thailand, Malaysia, and Pakistan, compiled for the period 2003–2015. The researchers ascertained that, in addition to infrastructure quality and trade cost, FDI in emerging markets is significantly associated with institutional determinants, such as political stability, corruption control, and regulatory quality, based on generalized method of moments (GMM) dynamic estimations. They find that the corruption variable is statistically significant and negatively affects the inflow of FDI into the primary sector in emerging economies.

The findings of Saleem et al. (2021) are consistent with those of the previous study mentioned above. The researchers investigated the factors determining FDI inflows in Pakistan from 1980 to 2016 by adopting a bounds test approach. They discovered that political instability negatively affects inward FDI in Pakistan, as corruption and bureaucratic delays hamper the influx of foreign capital into the country.

Furthermore, Shaari et al. (2022) employed the panel Autoregressive Distributed Lag ARDL method to examine the nexus between corruption, environmental degradation, and FDI inflows in ASEAN 3+ countries, namely, China, Japan, and South Korea, between 1995 and 2020. The results also demonstrate that corruption (as measured by the corruption perception index) has a significant impact on FDI. The researchers noticed that declining corruption boosted inward FDI in the investigated countries in the long run.

Munjal et al. (2022) conducted a comparative analysis to examine the role of governance and alliances in attracting Indian and Chinese FDI flows to Africa from 2008 to 2018. Researchers have argued that Indian FDI tends to flow into host countries with better governance, especially in countries with low or controlled corruption and high levels of accountability. In contrast, Chinese FDI was found to be insusceptible to the governance standards of the host country in its geopolitical pursuit of economic hegemony in the region.

H5: Corruption levels negatively influence FDI inflows in Malaysia.

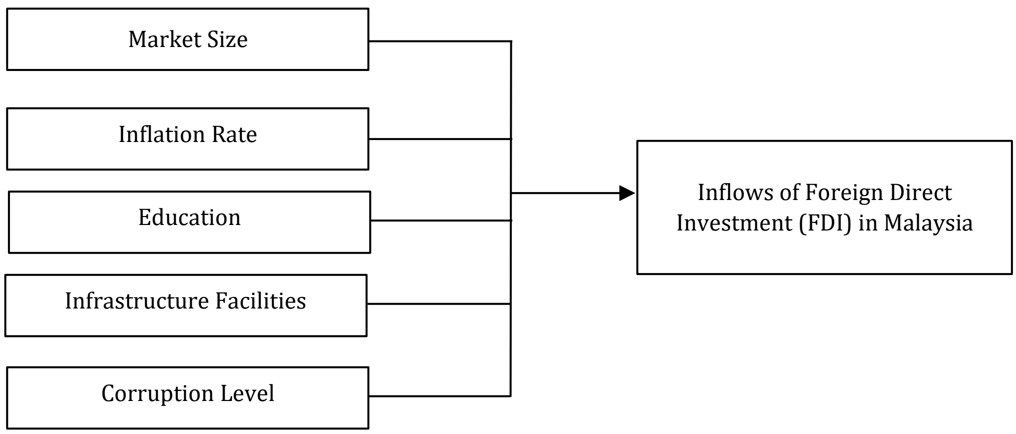

Figure 2: Conceptual framework

3. Research methodology

This section discusses the empirical model adopted in this study, describes the included variables, and their corresponding data sources. It also specifies the econometric approaches applied in this study, such as unit root, cointegration, causality, and diagnostic tests.

3.1 Empirical model

The empirical model of this research is as follows:

$$lnFDI_t = \beta_0 + \beta_1 lnGDPPC_t + \beta_2 lnINF_t + \beta_3 EDU_t + \beta_4 lnINFRA_t + \beta_5 lnCORRUPT_t + \varepsilon_t \qquad (1)$$

where β_0 refers to the constant, and ε_t denotes the residuals. This study employed a semi-log model, also known as a log-linear model, in which most variables were transformed into natural logarithms to stabilise the variances, thereby minimizing heteroscedasticity. The empirical model includes several common fundamental determinants of FDI, such as market size, inflation rate, education, and infrastructure, as identified by Ang (2008), Ong et al. (2012), and Othman (2013). It is worth emphasizing that the focus of this study is specifically on the understudied political factors because the importance of common factors that influence FDI inflows is widely recognized. Thus, a corruption variable is incorporated into the model to examine the influence of corruption levels on FDI inflows in Malaysia.

According to Vernon's Product Life Cycle theory, Dunning's OLI paradigm, and the empirical evidence discussed in section two, location advantages such as a sizeable consumer market contributed to an increase in FDI inflows (Vernon, 1966). Therefore,'slnGDPPCt a positive sign of the market size coefficient ($lnGDPPC_t$) was used to denote the expected positive influence of market size on FDI inflows in Malaysia. In addition, FDI inflows to a host country rose when the country provided economic-specific location benefits to foreign investors, such as a low inflation rate, high-quality human capital, and good infrastructure. Hence, it was hypothesized that the coefficient of the inflation rate ($lnINF_t$) has a negative sign, while the signs of the coefficients of education (EDU_t) and quality of infrastructure facilities ($lnINFRA_t$) were expected to be positive. In addition, a low corruption level is an essential factor driving FDI inflows. Since the corruption perception index with a higher score indicates a lower level of perceived corruption and vice versa, a positive coefficient is expected to reflect the negative relationship between the corruption level ($lnCORRUPT_t$) and FDI inflows in Malaysia.

3.2 Variables and data source

This study investigates the relationship between FDI inflows in Malaysia and its determinants, namely market size, inflation rate, education, quality of infrastructure facilities, and corruption level. This study adopted annual time-series data collected from reliable databases for the period 1995–2021. Table 1 describes the variables of this study and their respective data sources.

3.3 Econometric approach

3.3.1 Unit Root and Stationarity Tests

Stationarity, a fundamental notion in the time-series analysis field, demonstrates that the statistical properties of the data remain unchanged over time. This does not imply that the values for each data point must be identical but rather that the general pattern of the data should not vary with time (Rasheed, 2020). The best indication of stationarity of a time-series variable is that it exhibits mean reversion in that it fluctuates around a constant mean in the long run and is characterised by a finite variance, that is, time-invariant. Time series that exhibit unpredictable patterns are considered to contain one or more unit roots and are often known as nonstationary series. If the variables in the regression model evolve randomly over time (i.e., nonstationary), the standard assumptions for asymptotic analysis become absurd and invalid. Therefore, we cannot validate the hypothesis testing on the regression parameters because the outcomes of the usual t-test would no longer be reliable. Regression of non-stationary variables can lead to so-called spurious regression, which produces misleading statistical evidence suggesting a strong association between two independent variables when, in fact, the two variables are completely uncorrelated (Brooks, 2008; Gujarati & Porter, 2009). Thus, unit root testing is considered an essential step before regression analysis to ensure that the most appropriate statistical approach is applied.

Table 1: Description of variables

Variable	Description	Data Source[3]
$\boldsymbol{lnFDI_t}$	The net inflows of foreign direct investment in Malaysia, (BOP, current US$)	World Development Indicators, World Bank
$\boldsymbol{lnGDPPC_t}$	Gross Domestic Product per Capita (current US$) is used as the proxy for market size.	World Development Indicators, World Bank
$\boldsymbol{lnINF_t}$	Inflation rate is measured by obtaining the rate of change in consumer price index (base year = 2010),	World Development Indicators, World Bank
$\boldsymbol{EDU_t}$	Secondary school enrolment (% gross) as the proxy of education, expressed as the ratio of total student enrolment, regardless of age, to the population of the age group officially corresponding to secondary education.	World Development Indicators, World Bank
$\boldsymbol{lnINFRA_t}$	Mobile cellular subscription indicates the quality of infrastructure facilities.	World Development Indicators, World Bank
$\boldsymbol{lnCORRUPT_t}$	Corruption level in Malaysia as measured by the Corruption Perception Index (CPI). The index rates the perceived corruption level of a country on a scale from 0 to 100, with 0 denoting high levels of corruption and 100 indicating low corruption levels.	Transparency International

Unit root tests, such as the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, are useful tools in econometric analysis for determining the degree of stationarity either at $I(0)$, $I(1)$ or $I(d)$ using an autoregressive model. However, unit root tests have been criticised for their robustness because the tests have low power if the series is stationary but have a root near the boundary of non-stationary (Brooks, 2008). Given the limitation of unit root tests, this study examines the stationarity of the variables by performing ADF and PP tests in conjunction with a stationarity test, that is, the Kwiatkowshi, Phillips, Schmidt, and Shin (KPSS) test, in order to generate a more robust and valid result (Afriyie et al., 2020). The data series found to be non-stationary requires difference transformation to achieve the stationarity property, and it is said to be integrated of order d, $y_t \sim I(d)$, where d is equal to the number of differences needed to induce stationarity.

3.3.2 Cointegration test

This study employs the Autoregressive Distributed Lag (ARDL) bounds approach introduced by Pesaran et al. (2001) to test for cointegration. The ADRL method was utilised in this study because of its robustness and suitability for application in small sample size research. In addition, it is preferable to adopt the ARDL cointegration technique, because it is an ordinary least squares (OLS)-based model (Shrestha & Bhatta, 2018) that allows mixed integration orders of *I(0)* and *I(1)* in the regressors. Nonetheless, the procedure of the unit root tests cannot be perfunctorily implemented or even omitted, as it is still an indispensable step to ensure that the variables are not stationary at *I(2)* to avoid unrealistic and unreliable estimates. If the variables are stationary at *I(2)*, the computed test statistics would become invalid because they violate the assumption that the variables must be stationary at *I(0)*, *I(1)*, or a combination of both (Pesaran et al., 2001).

Another advantage of using the bounds testing method is that it can estimate both the long- and short-run relationships between dependent and independent variables simultaneously. The ARDL bounds test helps to detect the existence of cointegrating vectors that identify long-run

[3] All data was retrieved in 2022.

relationships based on the computed F-statistics. Meanwhile, direct estimates can be made of the short-run relationship between underlying variables (Pesaran et al., 2001). If the F-statistic identifies a single cointegrating vector, the ARDL model of the cointegrating vector is reparameterised into an error correction model (ECM), which provides not only the results showing long-run relationships but also the short-run dynamics of the variables of a single model (Bekhet & Al-Smadi, 2015; Nkoro & Uko, 2016).

According to Pesaran et al. (2001) and Gujarati (2003), the following key assumptions must be fulfilled to ensure that the ARDL model produces unbiased and consistent results: (i) Stationarity: All variables in the model must achieve stationarity either at level form or first difference. (ii) (ii) No perfect multicollinearity: The independent variables have no perfect linear relationship. (iii) No serial correlation: the model's residual is not correlated with itself over time. (iv) Homoscedasticity: The variance of the error term is constant across all the explanatory variables.

The ARDL model, which illustrates the long-run nexus between FDI inflow and its determinants, is formulated as:

$$\Delta lnFDI_t = \beta_0 + \sum_{i=1}^{p} \lambda_i \Delta lnFDI_{t-i} + \sum_{i=0}^{q1} \delta_{1i} \Delta lnGDPPC_{t-i} + \sum_{i=0}^{q2} \delta_{2i} \Delta lnINF_{t-i} + \sum_{i=0}^{q3} \delta_{3i} \Delta EDU_{t-i} + \sum_{i=0}^{q4} \delta_{4i} \Delta lnINFRA_{t-i} + \sum_{i=0}^{q5} \delta_{5i} \Delta lnCORRUPT_{t-i} + \varphi_1 lnFDI_{t-1} + \varphi_2 lnGDPPC_{t-1} + \varphi_3 lnINF_{t-1} + \varphi_4 EDU_{t-1} + \varphi_5 lnINFRA_{t-1} + \varphi_6 lnCORRUPT_{t-1} + \varepsilon_t \quad (2)$$

where Δ is the difference operator. The ARDL bounds method comprises two stages. The computation of the F-statistic in the first stage ascertains the presence of a long-run relationship between the variables by examining the significance of the past values (i.e., lagged levels) of the variables in the error correction form derived from the ARDL model. There are two sets of asymptotic critical values provided by Pesaran et al. (2001) as thresholds for testing cointegration. The set representing the lower bound is calculated under the assumption that all regressors are purely *I(0)I,* whereas the other set indicating the upper boundary is computed given that the explanatory variables are purely *I(1)*. If the F-statistic is less than the lower critical value, the null hypothesis of no cointegration (i.e., $H_0\colon \varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = \varphi_6 = 0$) fails to be rejected. On the other hand, if the F-statistic is greater than the upper critical value, the null hypothesis of no cointegration is rejected in favour of the alternative hypothesis that cointegration exists (i.e., H_1: At least one of the $\varphi_i \neq 0$, where i = 1, 2, ..., 6). Note that for the case in which the *F*-statistic lies between the lower and upper critical values, the result is considered inconclusive or uncertain.

The prerequisite to proceed to the next stage is the fulfilment of the first stage, that is, there is cointegration or long-run relationship between the variables. In the second stage, a long-run model was estimated by selecting the appropriate lag length for the ARDL model based on selection criteria, such as the Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criterion (HQ), and the long-run estimates from the best model were used to estimate an error correction model (Nazeer & Masih, 2017). The error correction model (ECM) for the estimation of short-run associations is specified as

$$\Delta lnFDI_t = \beta_0 + \sum_{i=1}^{p} \lambda_i \Delta lnFDI_{t-i} + \sum_{i=0}^{q1} \delta_{1i} \Delta lnGDPPC_{t-i} + \sum_{i=0}^{q2} \delta_{2i} \Delta lnINF_{t-i} + \sum_{i=0}^{q3} \delta_{3i} \Delta EDU_{t-i} + \sum_{i=0}^{q4} \delta_{4i} \Delta lnINFRA_{t-i} + \sum_{i=0}^{q5} \delta_{5i} \Delta lnCORRUPT_{t-i} + \varphi ECT_{t-1} + \varepsilon_t \quad (3)$$

where p and q denote the lag orders for the dependent variable and each independent variable, respectively. An error correction model (ECM) is an extensively adopted statistical model for analysing the short-term dynamic relationships between variables. The ECM is a type of Vector Autoregression (VAR) model designed to address the non-stationarity problem of co-integrated variables. The model is developed based on the assumption that there is a long-term equilibrium relationship between the variables and that any short-term deviations from this equilibrium will be corrected over time. It incorporates an additional component, namely the error correction term (ECT), which allows the model to account for the dynamics of the system by capturing the short-term deviation from the long-run equilibrium relationship between underlying variables (Nkoro & Uko, 2016).

ECT is an adjustment mechanism used to restore the variables to their long-run equilibrium levels when they wander away from the equilibria in the short run. This difference is multiplied by an error correction coefficient (λ), which reflects the speed of the adjustment process at which the FDI inflow returns to its equilibrium in response to changes in the regressors, with higher values indicating a faster adjustment, and vice versa. It is worth emphasising that a negative and significant λ suggests the existence of a long-run relationship between variables. The idea behind this is that a negative coefficient induces a downward adjustment in the inflow of FDI in the next period if the FDI inflow is above the long-run equilibrium. Similarly, when inward FDI is below the equilibrium, it will adjust upward in the next period, driven by the negative coefficient (Nkoro & Uko, 2016). Overall, ECT is a key element of the ECM that helps explain how the variables respond to short-term shocks while maintaining their long-run equilibrium relationship.

3.3.3 Causality test

Testing for causality is essential in analysing time-series data as it provides complementary information about the relationship between variables. Two or more variables are cointegrated if they move together in such a way that they do not deviate from equilibrium in the long term, or simply put, they share a long-run relationship, even though they may exhibit short-term dynamics. However, cointegration does not necessarily imply a causal relationship between variables (Menegaki, 2019). For instance, this does not mean that infrastructure development and FDI inflows are causally related because the two variables are cointegrated. Hence, it is important to test for causality between the cointegrated variables to understand their causal dynamics and identify the direction of the relationship, that is, unidirectional, bidirectional, or neutral causality relationships (Granger, 1969).

In this study, the Pairwise Granger causality test was used to test for causality between the cointegrated variables. It involves estimating a regression model with the lagged values of a set of explanatory variables and testing whether they can significantly improve their predictive or explanatory power for the outcomes.

$$lnFDI_t = c + \sum_{i=1}^{p} \alpha_{1,i} lnFDI_{t-i} + \sum_{i=1}^{p} \beta_{1,i} lnGDPPC_{t-i} + \sum_{i=1}^{p} \beta_{2,i} lnINF_{t-i} + \sum_{i=1}^{p} \beta_{3,i} EDU_{t-i} + \sum_{i=1}^{p} \beta_{4,i} lnINFRA_{t-i} + \sum_{i=1}^{p} \beta_{5,i} lnCORRUPT_{t-i} + \varepsilon_t \quad (4)$$

where c refers to the intercept term, p indicates the order of lag, subscripted β_j terms denote the coefficients for lags of each regressor, and ε term represents the residual. As demonstrated in Equation 4, the model consists of a p-period lag for the response variable and a p-period lag for the explanatory variables. In other words, it shows the relationship between the current observation of FDI inflows and previous observations of both FDI inflows and the independent variables in the model. If the test result reveals that any lag of the regressors in the model is statistically significant, it indicates that the independent variable Granger causes the dependent variable, far beyond what their common long-run trend can explain (Maitra, 2019).

3.3.4 Diagnostic tests

Specification testing and diagnostic checking are crucial procedures before and after estimating an ARDL model to ensure that the necessary assumptions of the ARDL model are not violated.

Several types of diagnostic tests were applied in this study, including coefficient diagnostics tests, residual diagnostics tests, and stability tests.

Unit root, cointegration, model specification, and multicollinearity tests were undertaken prior to establishing the ARDL model to check the adequacy and suitability of the data, as well as the model specification. Model specification tests were employed to determine the appropriateness of the functional form and lag structure of the model. The widely used measure of the goodness of fit of a statistical model includes R-squared, adjusted R-squared, and information criteria such as AIC and SIC. Higher R-squared and adjusted R-squared values as well as lower AIC and SIC values generally indicate a better fit model. The Ramsey RESET test was performed to check the model for omitted variables or functional form misspecifications to ensure that the model accurately captured the relationship between the dependent and independent variables. This study also performed multicollinearity tests, such as correlation analysis and the variance inflation factor (VIF) test, to detect multicollinearity among the independent variables.

After estimating the ARDL model, diagnostic tests were performed to assess the goodness of fit and identify specification errors in the model. It is indispensable to run coefficient diagnostic tests after applying ARDL analysis to evaluate the reliability and validity of the estimated coefficients in the regression model. The Wald Chi-Squared test was applied because it is a versatile tool for evaluating the validity of the model specification, particularly in identifying which variables are significant and can be removed from the model. It assesses not only the statistical significance of individual coefficients but also the overall significance of a group of coefficients in the regression model. In this research, the Wald test was conducted to determine the significance of all independent variables, with the null hypothesis that all of the regression coefficients in the model (model 1) except the intercept are equal to zero, that is, $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$, indicating that none of the explanatory variables have an effect on the response variable. If the Wald test statistic exceeds the critical value from the chi-squared distribution, the null hypothesis is rejected in favour of the alternative hypothesis that at least one of the regression coefficients is not equal to zero, suggesting that at least one independent variable significantly affects the dependent variable.

In addition, residual diagnostic tests, such as the Jarque-Bera test, the Breusch-Pagan-Godfrey test, and the Breusch-Godfrey serial correlation LM test were adopted to ensure that the error terms of the model were normally distributed and constant across all independent variables (i.e., homoscedasticity), white noise (i.e., no autocorrelation), and are independent and identically distributed (IDD). The Breusch-Godfrey LM test was applied in this study because of its superiority in detecting higher-order autocorrelations (i.e., not only first-order autocorrelations) and its robustness in checking for autocorrelation in regressions that contain the lagged dependent variable (i.e., past observations of the dependent variable) as one of the explanatory variables. If the LM test statistic is greater than the chi-squared critical value, the null hypothesis that there is no autocorrelation in the model is rejected in favour of the alternative hypothesis that the model is free of autocorrelation problems. Furthermore, stability tests such as the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) charts were used to check the stability of the coefficients in the model over time, as their stability has a significant impact on the reliability of the results.

4. Results and discussion

This section presents and reports the empirical findings of the statistical tests used in this study. It includes descriptive statistics, specification testing and diagnostic checking, cointegrating and ECM regression analysis, and causality relationships between the variables of this study.

4.1 Descriptive statistics and correlation matrix

Table 2 depicts the descriptive statistics and correlation matrix of the variables employed in this study. The statistics revealed that $lnGDPPC_t$, $lnINF_t$, $lnINFRA_t$, and $lnCORRUPT_t$ were approximately symmetric, as their skewness values were close to zero. All independent variables, except $lnGDPPC_t$, have a kurtosis close to 3, indicating that they are nearly mesokurtic, that is, a kurtosis similar to a normal distribution. In the case of $lnGDPPC_t$, its kurtosis is relatively far from the empirical rule for kurtosis but still within the acceptable range that can be considered normal. Therefore, $lnGDPPC_t$, $lnINF_t$, $lnINFRA_t$, and $lnCORRUPT_t$ follow an approximately normal distribution, as supported by the insignificant test statistics and p-values of the Jarque-Bera test. In contrast, EDU_t exhibits a negatively skewed pattern, as denoted by its negative skewness. The extremely high skewness of the dependent variable $lnFDI_t$, also indicates that it is highly skewed to the left. Thus, the distribution of $lnFDI_t$ is asymmetrical and leptokurtic, as demonstrated by the extremely large kurtosis. These features indicate that $lnFDI_t$ and $EDU_t$are not normally distributed, as verified by the statistically significant test statistic and the p-value of the normality test.

The correlation matrix shows that $lnFDI_t$ and $lnGDPPC_t$ have a moderately positive linear relationship, which is consistent with the findings in the existing literature that market size has a favourable effect on FDI inflows. Surprisingly, $lnFDI_t$ was found to be positively associated with $lnINF_t$, but had a weak relationship. This finding contradicts the assumptions in the literature that high inflation has an adverse impact on FDI inflows. In addition, the correlation matrix provides evidence of a weak positive relationship between $lnFDI_t$ and EDU_t as well as $lnINFRA_t$. These findings coincide with established bodies of knowledge, such as theories and the outcomes of previous related studies. Moreover, a very weak positive relationship between $lnFDI_t$ and $lnCORRUPT_t$ was discovered, in line with the presumption that high corruption levels have undesirable consequences on FDI inflows. FDI inflows have moderate and weak correlations with the independent variables in this study. Nevertheless, a weak correlation does not necessarily indicate the absence of cointegration between inward FDI and its determinants.

Table 2: Descriptive statistics and correlation matrix

Variable	$lnFDI_t$	$lnGDPPC_t$	$lnINF_t$	EDU_t	$lnINFRA_t$	$lnCORRUPT_t$
Mean	22.3788	8.8326	2.2677	79.0863	16.5800	3.9032
Median	22.7478	8.8774	2.0826	79.7300	17.1374	3.9120
Maximum	23.6462	9.3176	5.2979	85.4491	17.6699	3.9741
Minimum	18.5575	8.1044	-1.1452	64.8216	13.8206	3.7612
Standard Deviation	1.0509	0.4254	1.3848	5.6024	1.2232	0.0551
Skewness	-2.0853	-0.2599	0.0935	-1.1921	-0.9707	-0.9982
Kurtosis	8.0410	1.4771	3.5052	3.9045	2.5590	3.4994
Jarque-Bera	48.1564	2.9130	0.3265	7.3148	4.4592	4.7648
Probability	0.0000	0.2331	0.8494	0.0258	0.1076	0.0923
$lnFDI_t$	1.0000					
$lnGDPPC_t$	0.5253	1.0000				
$lnINF_t$	0.2268	-0.2177	1.0000			
EDU_t	0.2950	0.5343	-0.2573	1.0000		
$lnINFRA_t$	0.3376	0.8679	-0.3333	0.7882	1.0000	
$lnCORRUPT_t$	0.0021	-0.3580	0.1892	-0.1245	-0.4321	1.0000

Notes: $lnFDI_t$, $lnGDPPC_t$, $lnINF_t$, EDU_t, $lnINFRA_t$, and $lnCORRUPT_t$ represent FDI inflows, market size, inflation rates, education, quality of infrastructure facilities, and corruption levels, respectively.

4.2 OLS regression analysis

The Ramsey RESET test result indicates that the regression model is free of specification errors, such as the omission of relevant variables or inappropriate functional form, or, simply put, the model is properly specified. In addition, the Wald test demonstrated that at least one of the estimated coefficients was significantly different from zero at the 5% significance level. Thus, it is evident that at least one of the independent variables plays a role in the model and adds explanatory power. In addition, the Breusch-Pagan-Godfrey test reveals no significant evidence of heteroskedasticity in the model; in layman's terms, the error variances of the model are constant across observations. Furthermore, the Breusch-Godfrey LM test results suggest the absence of first-order autocorrelation, but second-order autocorrelation in the residuals of the model. In addition, the statistically significant p-value of the Jarque-Bera test indicates that the disturbances in the model are not normally distributed.

Table 3: OLS regression analysis

Regressor	Coefficient	Standard Error	t-Statistic	P-Value
Constant	2.7934	14.7648	0.1892	0.8518
$\ln GDPPC_t$	2.9397	0.9307	3.1587***	0.0047
$\ln INF_t$	0.2147	0.1261	1.7028	0.1034
EDU_t	0.1022	0.0612	1.6698	0.1098
$\ln INFRA_t$	-0.8862	0.5037	-1.7595*	0.0931
$\ln CORRUPT_t$	-0.0650	3.6899	-0.0176	0.9861
Goodness of Fit:				
R^2	0.5016			
Adjusted R^2	0.3830			
DW statistic	2.3513			
F-statistic	4.2272*** (0.0081)			

Hypothesis Testing	Critical Values at α = 0.05	Test Statistics and P-Values	Decision
Specification Testing and Diagnostic Checking:			
Ramsey RESET Test	4.35	3.9190 (0.0617)	Do not reject H_0
Wald Test	2.685	4.2272*** (0.0081)	Reject H_0
Breusch-Pagan-Godfrey Test	11.070	8.3410 (0.1384)	Do not reject H_0
Breusch-Godfrey Serial Correlation LM Test:			
(i) First-order autocorrelation	3.841	1.0692 (0.3011)	Do not reject H_0
(ii) Second-order autocorrelation	5.991	6.5327** (0.0381)	Reject H_0
Jarque-Bera Test		42.8739*** (0.0000)	Reject H_0
Variance Inflation Factors:	centred VIF		
(i) $\ln GDPPC_t$	5.9791		
(ii) $\ln INF_t$	1.1630		
(iii) EDU_t	4.4822		
(iv) $\ln INFRA_t$	14.4811		
(v) $\ln CORRUPT_t$	1.5773		

*Notes: Values in (.) indicate the p-values for each test. ***, **, and * denote statistically significant at 1%, 5%, and 10% significance levels, respectively.*

As shown by the variance inflation factor (VIF) results, the centered VIF values for $lnINF_t$ and $lnINCORRUPT_t$ are very low, in the range of 1.10 and 1.60. These low-centered VIF values indicate a very low degree of multicollinearity between the inflation rate and corruption-level variables, or simply, no multicollinearity. However, there is high multicollinearity disclosed as the centered VIF value for $lnINFRA_t$, that is, 14.4811, considerably exceeds the generally accepted cut-off value of 10. This result implies that the infrastructure facilities variable is highly correlated with other regressors in the model, that is, market size and education variables, as demonstrated by the relatively high centered VIF values for $lnGDPPC_t$ and EDU_t. Thus, the VIF results confirmed that the model had a high degree of multicollinearity. Although the existence of multicollinearity will result in unsatisfactorily large variances and affect the significance of test statistics, the test statistics are considered unbiased and remain valid as the probability distributions are still centered around the true values if the model specification is correct. If the test statistic is sufficiently large for the coefficient to be statistically significant, we can ignore this issue, and no remedial measures are needed.

4.3 Unit root and stationarity tests

Table 4 shows the results of the unit root and stationarity tests. Inferences were made based on lower AIC and SIC values at the 5% significance level. The statistically significant test statistics of the ADF test suggest that $lnFDI_t$ and $lnINF_t$ are stationary at the level for both constant, constant, and trend. Furthermore, the ADF test demonstrates that EDU_t is an *I(0)* series with constant and trend. The ADF test results also indicated that $lnINFRA_t$ and $lnCORRUPT_t$ are stationary at a constant level. Moreover, $lnGDPPC_t$ is proven by the KPSS test to be stationary at a constant and trend level. In summary, all variables in this research are *I(0)* series, technically speaking, a mixture of *I(0)* and *I(1)*; hence, the ARDL bounds testing method is appropriate for testing the cointegration between the response and explanatory variables.

Selecting an appropriate lag length is crucial before performing the ARDL test because it ensures that the ARDL model is well-specified and reliable in capturing the long-run relationship between the variables of interest. The number of past periods (i.e., lag length) included in the model in this study was identified based on the Akaike Information Criteria (AIC). In the model selection criteria graph in Figure 3, the ARDL model (2, 1, 0, 1, 0, 0) has the lowest AIC among the top 20 models. Hence, this model is selected to examine the dynamic relationships between FDI inflows and their determinants.

Table 4: Unit root and stationarity tests results

Variables	I(0)		I(1)		Inferences
	Constant	Constant & Trend	Constant	Constant & Trend	I(d)
ADF					
$lnFDI_t$	-4.3119*** (0.0024)	-5.1852*** (0.0015)	-5.9374*** (0.0001)	-5.8168*** (0.0004)	*I(0)*
$lnGDPPC_t$	-0.6198 (0.8496)	-1.9280 (0.6114)	-4.7122*** (0.0010)	-4.6165*** (0.0059)	*I(1)*
$lnINF_t$	-4.4978*** (0.0015)	-4.9071*** (0.0029)	-8.2018*** (0.0000)	-5.4800*** (0.0009)	*I(0)*
EDU_t	-2.7118* (0.0856)	-4.5813*** (0.0085)	-5.1226*** (0.0004)	-5.2499*** (0.0014)	*I(0)*
$lnINFRA_t$	-6.2151*** (0.0000)	-1.2646 (0.8744)	-3.1379** (0.0397)	-4.0577** (0.0197)	*I(0)*
$lnCORRUPT_t$	-3.0066** (0.0474)	-3.0561 (0.1372)	-4.1469*** (0.0041)	-4.0991** (0.0193)	*I(0)*
PP					
$lnFDI_t$	-4.3119*** (0.0024)	-5.5413*** (0.0007)	-19.6865*** (0.0001)	-21.0059*** (0.0000)	*I(0)*
$lnGDPPC_t$	-0.5922 (0.8560)	-1.9497 (0.6002)	-4.7049*** (0.0010)	-4.6063*** (0.0060)	*I(1)*
$lnINF_t$	-4.4978*** (0.0015)	-4.9071*** (0.0029)	-20.6344*** (0.0001)	-18.3955*** (0.0000)	*I(0)*
EDU_t	-2.7557* (0.0786)	-2.7528 (0.2256)	-5.1226*** (0.0004)	-5.2499*** (0.0014)	*I(1)*
$lnINFRA_t$	-5.8796*** (0.0001)	-1.5116 (0.7992)	-2.5764 (0.1110)	-3.9213** (0.0263)	*I(0)*
$lnCORRUPT_t$	-3.0066** (0.0474)	-3.0561 (0.1372)	-5.5864*** (0.0001)	-5.4803*** (0.0008)	*I(0)*
KPSS					
$lnFDI_t$	0.5276**	0.1027	0.3799*	0.3386***	*I(0)*
$lnGDPPC_t$	0.6939**	0.1085	0.1248	0.1255*	*I(0)*
$lnINF_t$	0.3218	0.0689	0.5000**	0.4521***	*I(0)*
EDU_t	0.5671**	0.1013	0.1638	0.0778	*I(0)*
$lnINFRA_t$	0.6977**	0.2050**	0.6819**	0.1509**	*I(1)*
$lnCORRUPT_t$	0.2584	0.0953	0.0688	0.0592	*I(0)*

*Notes: Figures presented in (.) indicate the p-values for each test. ***, **, and * denote statistically significant at 1%, 5%, and 10% significance levels, respectively. The tests were run with automatic lag length selection based on SIC from 0 to 6, Barlett kernel spectral estimation method, and automatic bandwidth selection based on Newey-West Bandwidth.*

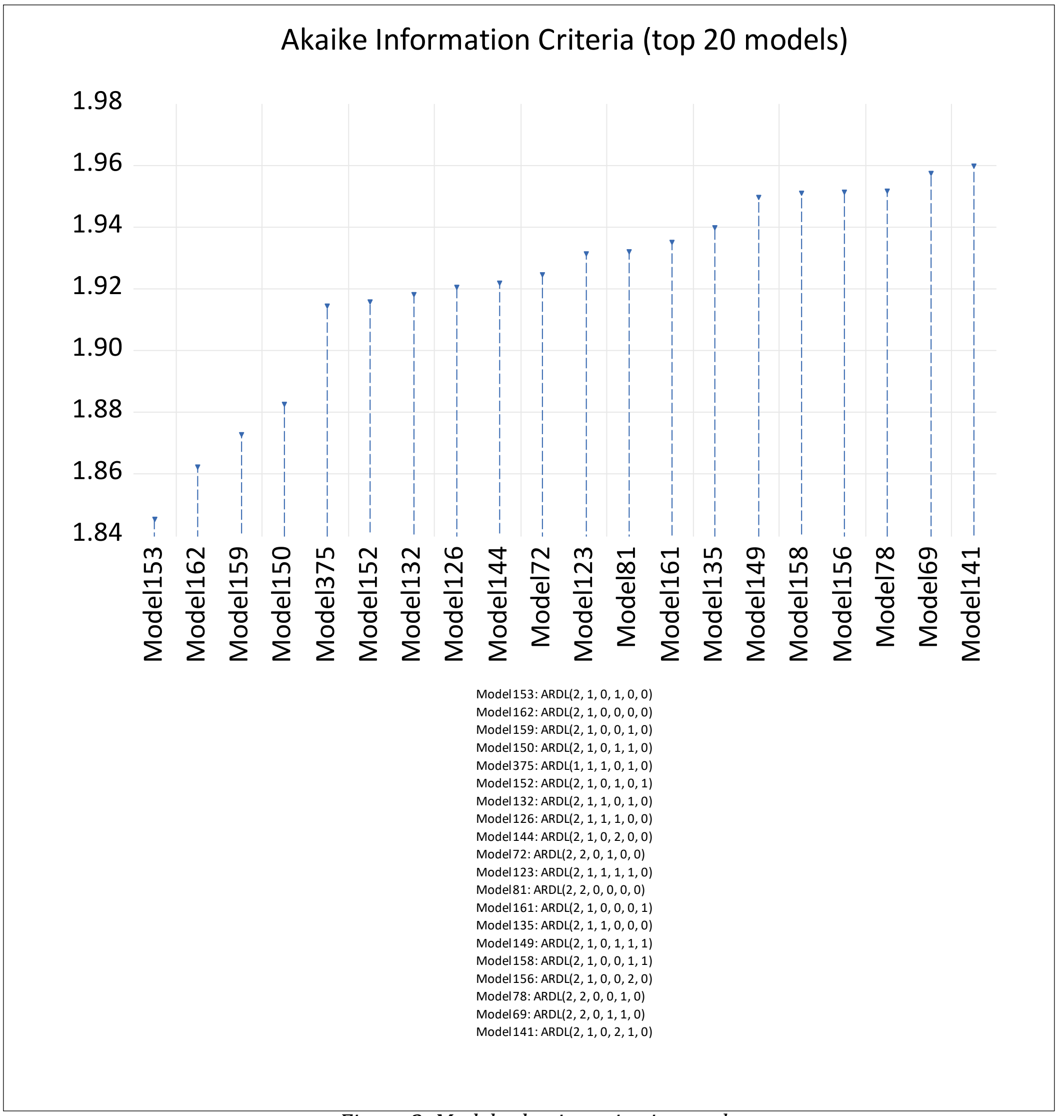

Figure 3: Model selection criteria graph

4.4 ARDL model estimation and cointegration

The model estimation results in Table 5 demonstrate that the ARDL model has fairly high R-squared and adjusted R-squared values. An R-squared value of 0.8548 indicates that approximately 85.48% of the variability in FDI inflows can be accounted for by variations in market size, inflation rates, education, infrastructure quality, and corruption levels in the long run. In addition, the adjusted R-squared value of 0.7676 suggests that approximately 76.76% of the long-term variation in FDI inflows can be explained by the regression model, considering the number of explanatory variables and sample size. In summary, the *R*-squared and adjusted *R*-squared values imply that the regression model provides a reasonably good fit to the data as it explains a substantial proportion of the variability in FDI inflows. In addition, the diagnostic test justifies the robustness and reliability of the model in that the test outcomes suggest that the disturbances are normally distributed, serially independent at lag one, and homoscedastic. The stability test also reveals that the model is statistically stable, as demonstrated by the CUSUM and CUSUMSQ plots that remain within the lower and upper critical bounds at a 5% level of significance (see Figure 4 and Figure 5). In short, the strong goodness of fit, desirable residual properties, and stability of the regression model reflect the quality and appropriateness of the model to generate accurate and consistent estimates as well as to draw reliable and valid conclusions.

Table 5: Estimation of the ARDL model (2, 1, 0, 1, 0, 0)

Regressor	Coefficient	Standard Error	t-Statistic	P-Value
$\ln FDI_{t-1}$	-0.4116	0.1649	-2.4962**	0.0247
$\ln FDI_{t-2}$	-0.3377	0.1501	-2.2499**	0.0399
$\ln GDPPC_{t}$	8.0984	1.4604	5.5454***	0.0001
$\ln GDPPC_{t-1}$	-2.7753	1.4734	-1.8836*	0.0792
$\ln INF_{t}$	0.2318	0.0905	2.5625**	0.0217
EDU_{t}	0.0933	0.0556	1.6771	0.1142
EDU_{t-1}	0.0724	0.0586	1.2369	0.2351
$\ln INFRA_{t}$	-1.8080	0.4046	-4.4681***	0.0005
$\ln CORRUPT_{t}$	6.2445	2.8576	2.1852**	0.0452
Constant	-15.8794	10.2978	-1.5420	0.1439
Goodness of Fit:				
R^2	0.8548			
Adjusted R^2	0.7676			
DW statistic	2.2433			
F-statistic	9.8086*** (0.0001)			
Diagnostic Checking:				
Normality	0.5870 (0.7457)			
First-Order Autocorrelation	0.7755 (0.3785)			
Second-Order Autocorrelation	6.5306** (0.0382)			
Heteroskedasticity	6.6751 (0.6709)			

*Notes: Figures in (.) indicate the p-values for each test. ***, **, and * denote statistically significant at 1%, 5%, and 10% significance levels, respectively.*

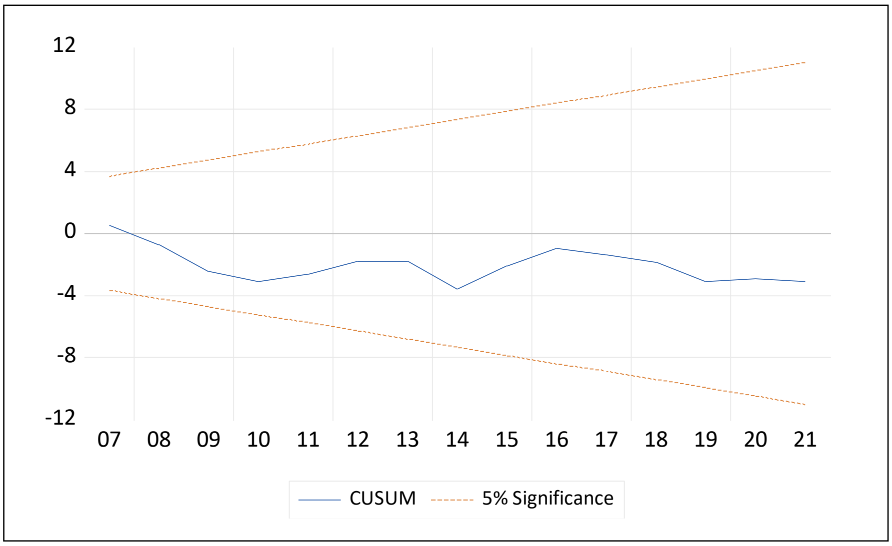

Figure 4: Cumulative sum (CUSUM) plot

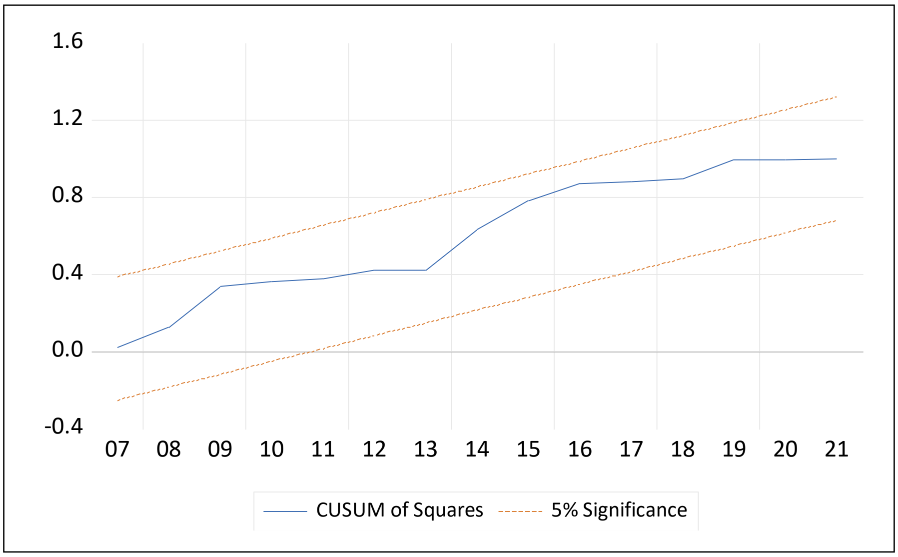

Figure 5: Cumulative sum of squares (CUSUMSQ) plot

Table 6 illustrates the cointegration test result of the ARDL model (2, 1, 0, 1, 0, 0). Since the F-statistic exceeds the upper bound critical values, which are 3, 3.38, and 4.15 at 10%, 5%, and 1% significance levels, respectively, there is sufficient evidence to reject the null hypothesis of no cointegration between the dependent variable and the regressors. Thus, the statistically significant F-statistic suggests that there is a cointegrating relationship between $lnFDI_t$ and its determinants, namely $lnGDPPC_t$, $lnINF_t$, EDU_t, $lnINFRA_t$, and $lnCORRUPT_t$. In other words, inflows of FDI and its determinants are ascertained to have a long-run equilibrium relationship.

Table 6: Cointegration test results

F-Statistic	Significance Level	Bound Critical Values (with constant and no trend)		Outcome
		I(0)	*I(1)*	
8.7654***	10%	2.08	3	Cointegration exists
	5%	2.39	3.38	Cointegration exists
	1%	3.06	4.15	Cointegration exists

*Notes: ***, **, and * indicate statistically significant at 1%, 5%, and 10% significance levels, respectively.*

4.5 Long run relationship analysis

The long-run model estimation results in Table 7 reveal that market size is positively related to FDI inflows in the long run, as indicated by its highly significant *t*-statistics at the 1% significance level. This outcome is consistent with the findings of previous studies, including Ang (2008), Ong et al. (2012), and Othman (2013). Specifically, the estimated long-run coefficient of $lnGDPPC_t$ is 3.0429, which implies that an increase in market size of 1% is associated, on average, with a 3.0429% increase in FDI inflows, holding other independent variables constant. According to Vernon's Product Life Cycle theory, FDI inflows are hypothesized to vary depending on the stage of the product life cycle in the host country. FDI inflows may be lower in the introduction stage when the product is new with uncertain demand, because investors are cautious and hesitant to invest in an untested market. Nevertheless, FDI inflows are expected to increase as the product enters the growth stage, and demand rises steadily because investors see the potential for growth and profitability. Hence, market size is likely to have a favorable impact on FDI inflows, as a huge potential customer base of the product within the market is appealing information for investors who desire to invest in successful products or industries, which is also supported by Dunning's eclectic paradigm.

Moreover, sufficient evidence indicates the importance of education in FDI inflows. The analysis suggests that FDI inflows and education have a positive relationship in the long run, which is consistent with the findings of Mohammed Abdulqader Sultan Hamood et al. (2018). The coefficient of EDU_t illustrates that for each 1% increase in the secondary school enrolment rate, FDI inflows are expected to grow by an average of 9.47% in the long run (with other independent variables held constant). This result implies that high-quality human capital plays a pivotal role in attracting investor attention. Investors often target locations with a pool of qualified professionals that can meet their specific requirements and contribute to the growth of their businesses. Foreign investors place growing emphasis on access to a well-educated and skilled labour force because a high-quality workforce facilitates productivity, competitiveness, and innovation.

Furthermore, FDI inflows are positively influenced by the corruption variable $lnCORRUPT_t$ in the long run, which conforms to and strengthens the findings of Aw and Tang (2010) and Karim et al. (2012). Its estimated coefficient illustrates that FDI inflows will rise by an average of 3.5695% in the long run for every 1% increase in the corruption perception index while assuming no change in other explanatory variables. In other words, a low perceived level of corruption acts as a pull factor for FDI inflow. A positive political environment can be an attractive political-specific location advantage for foreign investors, based on Dunning's OLI framework. Corruption is widely recognized as a negative factor that signifies a lack of transparency and accountability in government institutions, which creates risks and challenges in managing business operations in the host country. Thus, high corruption levels can deter investment and reduce the attractiveness of the host country to foreign investors, owing to the unstable business environment in a corrupted country.

Interestingly, the inflation rate, $lnINF_t$, is discovered to have a significant and positive long-run relationship with FDI inflows in Malaysia at the 5% significance level, challenging the general assumptions of the OLI paradigm and the existing literature that internal economic stability, that is, low inflation rates, drive FDI inflows. Nonetheless, this unexpected result aligns with the findings of Addison and Heshmati (2003), and Ong et al. (2012). The coefficient 0.1325 means that a 1% increase in inflation rates contributes to an average 0.1325% growth in FDI inflows, ceteris paribus. The positive association between inward FDI and inflation rates may be attributed to specific factors and dynamics in the Malaysian context. In high-inflation environments, industries involved in producing and exporting commodities, such as palm oil, rubber, and petroleum, may be less affected by inflation. This is because commodity prices are often linked to global market demand and supply dynamics, rather than domestic inflation rates. Addison and Heshmati (2003) argued that higher inflation rates could potentially boost FDI inflows in the host country owing to the higher revenue from production activities resulting from increased price levels. This is understandable, because Malaysia is a resource-based economy that leverages abundant natural resources for domestic and international trade. However, foreign investors who seek profitable investment opportunities may shy away from investing in Malaysia because of the increase in input costs for production.

Moreover, the statistically significant t-statistic of $lnINFRA_t$ at the 5% significance level indicates an unanticipated negative long-run relationship between FDI inflows and the development of infrastructure facilities, supporting the findings of Sharma et al. (2012). However, this result is inconsistent with most empirical studies that have discovered that infrastructure development can enhance the attractiveness of the host country as an investment destination because foreign investors or firms can capitalize on this advantage in their business operations in the host country through access to good infrastructure, such as reliable transportation systems and communication networks. The estimation result suggests that a 1% increase in mobile cellular subscription leads to a 1.0335% contraction in FDI inflows in Malaysia, holding other regressors constant. Although the results show a significant association between FDI inflows and infrastructure quality as measured by mobile cellular subscriptions, the sign of the coefficient conflicts with the research hypothesis. Implementation and operational challenges may limit the positive impact of infrastructure on FDI inflow. Although the development of infrastructure facilities is crucial, the actual implementation and maintenance of infrastructure projects are equally important. Delays, cost overruns, inadequate maintenance, and operational inefficiencies can undermine the favourable impact of infrastructure development on FDI inflows. Foreign investors may be reluctant to invest in countries with poorly managed infrastructure projects or may encounter trouble getting off the ground. This surprising result implies that further investigation of the influence of infrastructure towards FDI inflows is required to ascertain their relationship.

Table 7: Estimated long-run coefficients
Selected Model: ARDL (2, 1, 0, 1, 0, 0)

Regressor	Coefficient	Standard Error	t-Statistic	P-Value
$lnGDPPC_t$	3.0429	0.4523	6.7270***	0.0000
$lnINF_t$	0.1325	0.0492	2.6918**	0.0167
EDU_t	0.0947	0.0270	3.5052***	0.0032
$lnINFRA_t$	-1.0335	0.2434	-4.2463***	0.0007
$lnCORRUPT_t$	3.5695	1.4388	2.4810**	0.0254
Constant	-9.0771	5.6328	-1.6115	0.1279

*Notes: ***, **, and * indicate statistically significant at 1%, 5%, and 10% significance levels, respectively.*

4.6 Short-run relationship and ECM analysis

The two explanatory variables exhibit significant associations with FDI inflows in the short run, as indicated in Table 8. The statistically significant t-statistic of $lnGDPPC_t$ demonstrates that market size positively affects FDI inflows in Malaysia in the short run. Its short-run coefficient indicates that, holding other independent variables constant, FDI inflows rise by an average of 8.0984% for every 1% increase in market size, which is 2.66-fold greater than the change in the long run. Education also had a short-term positive impact on FDI inflows in Malaysia. A 1% increase in the secondary school enrolment rate significantly contributes to a 9.33% growth in FDI inflows in the short run, ceteris paribus. Notably, the magnitudes of the long-run and short-run relationships between FDI inflows and education are nearly identical.

In addition, the error correction regression analysis shows that the error correction term is highly significant at the 1% significance level, with an appropriate sign of the coefficient. The statistically significant negative ECT_{t-1} verifies the existence of long-run relationships between FDI inflows in Malaysia and their determinants. The ECT_{t-1} represents the speed of adjustment of the model. It provides information about the speed at which the variables converge back to the long-run equilibrium after exhibiting a short-term deviation from the long-run relationship. For instance, its coefficient of -1.7494 suggests that approximately 175% of the disequilibrium or deviation triggered by the shock from the previous year adjusts back to long-run equilibrium in the current year. This suggests a strong and significant adjustment mechanism in which the deviations of FDI inflows from the long-term equilibrium are corrected efficiently, allowing the system to converge towards the equilibrium at a faster than expected pace.

Table 8: Estimated short-run and ECT coefficients
Selected Model: ARDL (2, 1, 0, 1, 0, 0)

Regressor	Coefficient	Standard Error	t-Statistic	P-Value
$\Delta lnFDI_{t-1}$	0.3377	0.1074	3.1450***	0.0067
$\Delta lnGDPPC_t$	8.0984	0.7938	10.2020***	0.0000
ΔEDU_t	0.0933	0.0318	2.9348**	0.0102
ECT_{t-1}	-1.7494	0.1887	-9.2683***	0.0000

*Notes: ***, **, and * indicate statistically significant at 1%, 5%, and 10% significance levels, respectively.*

4.7 Granger causality analysis

As highlighted in section 3, if the variables are found to be cointegrated, a causality test is necessary to examine the direction of the causal relationship between them. The results of the Pairwise Granger causality test in Table 9 provide sufficient evidence that $lnGDPPC_t$, $lnINF_t$, and $lnINFRA_t$ Granger cause $lnFDI_t$ at both lag 1 and lag 2. More precisely, the causal relationships between $lnFDI_t$ and its determinants, specifically $lnGDPPC_t$, $lnINF_t$, and $lnINFRA_t$ are unidirectional. To illustrate, the values of the market size, inflation rates, and infrastructure facilities variables for the previous year and two-year period contain valuable information for predicting the future value of FDI inflows. These findings imply that market size, inflation rates, and infrastructure facilities influence FDI inflows, and can be considered significant causal factors in explaining the changes or variations in FDI inflows in Malaysia. However, the results failed to provide sufficient and significant evidence for a causal relationship between $lnFDI_t$ and EDU_t and $lnCORRUPT_t$.

Table 9: Pairwise Granger causality test results

Null Hypothesis	F-Statistic Lag 1	F-Statistic Lag 2	Direction of Causality
$lnGDPPC_t$ =/=> $lnFDI_t$	4.7237** (0.0403)	4.5355** (0.0238)	Unidirectional
$lnFDI_t$ =/=> $lnGDPPC_t$	2.0283 (0.1678)	2.0438 (0.1557)	
$lnINF_t$ =/=> $lnFDI_t$	5.3772** (0.0296)	2.6622* (0.0944)	Unidirectional
$lnFDI_t$ =/=> $lnINF_t$	0.0863 (0.7715)	0.3470 (0.7110)	
EDU_t =/=> $lnFDI_t$	1.8200 (0.1904)	1.1925 (0.3241)	Neutral causality
$lnFDI_t$ =/=> EDU_t	0.3174 (0.5786)	0.2700 (0.7661)	
$lnINFRA_t$ =/=> $lnFDI_t$	3.2878* (0.0829)	4.8931** (0.0186)	Unidirectional
$lnFDI_t$ =/=> $lnINFRA_t$	0.4653 (0.5020)	0.5317 (0.5957)	
$lnCORRUPT_t$ =/=> $lnFDI_t$	1.3108 (0.2640)	0.8594 (0.4385)	Neutral causality
$lnFDI_t$ =/=> $lnCORRUPT_t$	1.1674 (0.2911)	0.5652 (0.5771)	

*Notes: "=/=>" stands for "does not Granger cause". The value in (.) is p-value, ***, **, and * denote significant at 1%, 5%, and 10%, respectively.*

5. Conclusion

Although many researchers and scholars have thoroughly studied the factors that affect foreign investment, little focus has been placed on investigating the impact of political factors on FDI inflows in Malaysia. This study explores the determinants of FDI inflows in Malaysia, particularly the role of the corruption perception index (CPI), which reflects the perceived levels of public-sector corruption. The analysis revealed that cointegration exists between FDI inflows and several key factors including market size, inflation rates, education, quality of infrastructure facilities, and corruption. The presence of cointegration suggests that FDI inflows and their determinants share a long-term equilibrium relationship, even though they may exhibit short-term divergence from that equilibrium. Any deviation from the long-run equilibrium is considered temporary, and is expected to be corrected or adjusted in the long run. In addition, the ECM analysis and ARDL bounds test identified short- and long-run positive relationships between FDI inflows and market size as well as education. More importantly, the findings shed light on the positive long-run relationship between the CPI and FDI inflows, which reflects that lower perceived corruption levels boost foreign investor confidence. Furthermore, this study revealed two intriguing outcomes. An unexpected positive long-term relationship was found between inflation rates and FDI inflows in Malaysia. Interestingly, the quality of infrastructure facilities was negatively related to FDI inflows in the long run. In addition, the Pairwise Granger causality test revealed that only market size, inflation rates, and infrastructure facilities Granger-cause FDI inflows, implying that these variables are dominant causal factors that can account for variations in FDI inflows in Malaysia.

The findings of this study can potentially inform important policy implications and suggest strategic measures to boost and sustain FDI inflows in Malaysia. First, the positive short- and long-run relationships between FDI inflows and market size highlight the importance of expanding domestic markets and establishing favourable conditions for business growth. Therefore, policymakers and stakeholders should take consistent measures to stimulate domestic demand and promote market expansion. Policymakers should actively engage in trade agreements and economic partnerships to facilitate stronger regional integration and increase market access by leveraging Malaysia's strategic location within Southeast Asia. The broader consumer bases and higher profit prospects brought about by market expansion will act as an incentive for foreign investors to funnel capital into Malaysia, thereby leading to greater FDI inflows from neighbouring countries.

Next, the unexpected long-run negative association between infrastructure facilities and FDI inflows points to an underlying gap in the quality and efficiency of Malaysia's infrastructure, and prompt action is urged to address the root causes of this negative relationship. Policymakers, the government, and other relevant authorities must be dedicated to improving the standard of infrastructure by targeting public-private partnerships, increasing expenditure on infrastructure development, and streamlining regulatory processes to expedite infrastructure projects. As a result, the availability of high-quality infrastructure facilities in Malaysia, such as transportation networks, telecommunications systems, digital infrastructure, and logistics capabilities, can spur inward FDI because it demonstrates Malaysia's capacity to support business activities effectively.

Finally, the long-run positive influence of the CPI on FDI inflows suggests that Malaysia's efforts to address corruption and improve transparency have successfully attracted foreign investors. Nonetheless, the government must continue its endeavours to enhance anti-bribery and corruption initiatives to retain and bolster investor confidence. For instance, the Malaysian government should proactively strengthen its anti-corruption institutions and promote transparency in its public procurement procedures. The government should also implement effective anti-corruption policies, such as whistleblower protection mechanisms and reinforcement of anti-corruption legislation, to create a business climate conducive to encouraging FDI inflows. Consequently, Malaysia can improve its reputation as a worthwhile and trustworthy investment destination by showcasing a continuous commitment to combating corruption.

While this study provides valuable insights into the determinants of FDI inflows in Malaysia, it is important to acknowledge its limitations. The first notable limitation is the small annual sample size used in this study. This study employed only 27 observations spanning 1995 to 2021 because of the availability of corruption perception index data published in 1995. This limited timeframe may restrict the model's ability to capture long-term trends and fluctuations in FDI inflows, which may subsequently impact the quality and reliability of the findings. Another limitation of this study is the challenges in data collection, such as the limited access to certain data sources or databases. Unavailability or insufficient data on political variables, specifically for Malaysia, constrained their inclusion in the analysis. For example, the government stability variable was omitted owing to the inaccessibility of time series data pertaining to political risk components published by the Political Risk Services (PRS) Group. Missing data on political variables, such as control of corruption, government effectiveness, and political stability provided by the World

Bank, also led to the exclusion of other influential political variables that could affect foreign investment behaviour.

This study primarily focused on establishing the existence of relationships, leaving the underlying mechanisms largely unexplored. Therefore, future researchers should delve deeper into uncovering the rationales underlying the counterintuitive connection between inflation and FDI inflows discovered in this study. Such insights will contribute to theoretical advancements in this field and have practical implications for stakeholders. In addition, future studies with access to more extensive historical datasets should strive to employ larger sample sizes and explore alternative reliable data sources to obtain data on relevant political variables. By overcoming these limitations, future research can provide a more holistic and nuanced understanding of the complex dynamics of FDI inflows in Malaysia, and inform policymakers in their efforts to attract foreign investment and consolidate Malaysia's position as an attractive investment destination.

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