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Institutions and FDI: How Does Institutional Quality Amplify Economic Gains?

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Abstract: This study explores the determinants of foreign direct investment (FDI) inflows, focusing on the interplay between institutional quality and macroeconomic factors in the context of Singapore from 2012 to 2024. Using advanced econometric techniques, including the ARDL model and cointegration tests, the analysis reveals that institutional quality, GDP growth, trade openness, and infrastructure development are key drivers of FDI. Institutional quality, characterized by transparent regulations, low corruption, and efficient governance, significantly enhances Singapore's attractiveness to investors. Economic growth, reflected in a strong GDP, emerges as the most influential determinant, underscoring the importance of stability and market potential. Trade openness fosters global integration, while strategic infrastructure investments reduce costs and improve the business environment. The study concludes by recommending an integrated policy approach, emphasizing governance excellence, innovation-driven growth, trade liberalization, and sustainable infrastructure development to sustain FDI inflows and ensure long-term economic resilience.

Keywords: Foreign Direct Investment (FDI), Institutional Quality, Macroeconomic Factors, Trade Openness, Singapore Economy.

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1. Introduction

Foreign direct investment (FDI) has become one of the most significant drivers of economic globalization, acting as a catalyst for growth, innovation, and international cooperation. In an interconnected global economy, FDI not only facilitates capital flow but also transfers technology, managerial expertise, and market access to host countries. For example, Singapore's success as a global financial and trade hub demonstrates how effective policies and institutional frameworks can attract substantial FDI, helping to transform the city-state from a developing economy to one of the world's most competitive markets. Similarly, nations such as Ireland and the United Arab Emirates illustrate how strategic alignment between government policies and economic goals can amplify the benefits of FDI.

Institutional quality has emerged as a critical determinant of FDI inflows, influencing investor confidence and shaping long-term economic outcomes. Sound institutions characterized by transparency, efficiency, and accountability reduce uncertainty, lower transaction costs, and provide a stable environment for investment. For instance, the World Bank's «Ease of Doing Business» report highlights how countries with robust legal systems, efficient regulatory processes, and strong governance tend to attract higher FDI volumes. Singapore consistently ranks among the top performers in these indices, offering a compelling case study of how institutional quality can act as a magnet for foreign investors.

Despite the potential benefits, the relationship between institutional quality and FDI is not universally positive and depends on various factors, such as economic structure, market conditions, and policy alignment. Countries with weak institutional frameworks often struggle to leverage FDI effectively, resulting in limited economic gains and heightened vulnerability to external shocks. For example, while resource-rich economies in Africa attract significant FDI in extractive industries, weak governance and corruption have often hindered broader economic development.

Despite the growing importance of foreign direct investment (FDI) in global economic development, a fundamental question persists: why do some countries derive greater economic benefits from FDI than others? This disparity largely stems from the role of institutional quality. While robust institutions foster an environment conducive to attracting and effectively utilizing FDI, weak or corrupt institutions may limit its economic impact. Singapore, often cited as a model of institutional development, provides a key example for exploring this issue. The city-state has successfully leveraged its institutions as a strategic tool to maximize the economic benefits of FDI, becoming a global hub for multinational corporations in finance, technology, and logistics.

The central problem of this research can thus be formulated as follows: **how does institutional quality influence the economic impact of FDI, and what lessons can be drawn from Singapore's experience for other developing or transitioning economies?** This question arises in a context where institutional reforms have become strategic priorities for many countries seeking to attract increasing FDI flows. Singapore offers a unique analytical framework with its reliable judicial system, anti-corruption policies, and business-friendly regulations factors that contributed to attracting FDI equivalent to nearly 20% of its GDP in 2023, according to recent World Bank statistics.

To address this central problem, the research is structured around several specific questions: (1) What are the key institutional mechanisms that maximize the economic benefits of FDI? (2) How have Singapore's institutional reforms contributed to creating a competitive and attractive investment environment? (3) What lessons can low- or middle-income countries learn from Singapore's experience to improve their institutional quality and optimize the economic returns of FDI? These questions will guide the empirical analysis and provide concrete answers based on Singapore's proven success.

The primary objective of this research is to understand how institutional quality influences the economic gains derived from foreign direct investment (FDI). Using Singapore as an empirical case study, the research aims to identify specific institutional mechanisms that facilitate the optimal absorption of FDI and maximize its economic benefits. Specifically, the study seeks to explore Singapore's institutional and regulatory policies that have created an attractive investment environment and assess their transferability to developing or transitioning economies.

The specific objectives of this research include: (1) evaluating the impact of institutional reforms on FDI attractiveness, focusing on aspects such as transparency, political stability, and anti-corruption measures; (2) analyzing the role of institutions in strategically allocating FDI flows to key economic sectors such as advanced technologies and financial services; and (3) proposing practical recommendations for policymakers in countries seeking institutional improvement to enhance the economic benefits of FDI. This analysis aims to shed light on the complex dynamics between institutions and FDI, leveraging the successes and challenges encountered by Singapore.

To address these objectives, three research hypotheses are proposed:

1. Institutional quality has a significant positive effect on FDI attractiveness, particularly in competitive economic environments. This hypothesis posits that robust institutions, as seen in Singapore, reduce perceived risks and increase FDI inflows.
2. FDI generates greater economic benefits in countries with institutions capable of channeling these investments into strategic sectors. This hypothesis suggests that Singapore's success lies in its ability to direct FDI toward high-value-added sectors.
3. Improving institutional quality in developing countries can lead to outcomes similar to those of Singapore in terms of FDI's economic impact. This hypothesis examines the transferability of Singapore's institutional mechanisms to other national contexts, accounting for structural differences.

These hypotheses will be tested using a combination of qualitative and quantitative analyses, incorporating institutional and economic comparative data, as well as detailed case studies.

This study employs the Auto-Regressive Distributed Lag (ARDL) model to test the research hypotheses, using empirical data spanning the period 2012–2024 for Singapore. The ARDL model is chosen for its robustness in analyzing both short-term and long-term relationships between independent variables, such as institutional quality indicators (e.g., corruption, transparency, and government efficiency), and dependent variables, including foreign direct investment (FDI) inflows and their economic impacts, measured by GDP growth, sectoral productivity, and employment. Singapore serves as an ideal case study due to its institutional stability and the availability of reliable data over the specified timeframe.

The ARDL approach will help disentangle the differentiated effects of institutional reforms on FDI attractiveness while assessing their role in channeling these investments into strategic sectors such as information technology and financial services. Furthermore, the analysis will provide empirical insights into how fluctuations in institutional variables influence the economic outcomes of FDI in both the short and long term. This methodological approach ensures robust findings to validate or refute the research hypotheses and offers actionable policy recommendations for countries aiming to enhance their institutional frameworks to optimize FDI benefits.

2. Literature Review

The relationship between institutional quality and foreign direct investment (FDI) has been widely explored in economic literature, highlighting the critical role of institutions in attracting and efficiently utilizing FDI. Acemoglu, Acemoglu, D., Johnson, S., & Robinson, J. A. (2001), demonstrated that inclusive institutions promote economic prosperity, while extractive institutions hinder development. Their study on the colonial origins of comparative development underscores the enduring impact of institutions established during colonization on the current economic trajectories of nations. In the African context, Adegboye, F. B., et al. (2020), analyzed the effect of institutional quality on FDI in sub-Saharan Africa, revealing that robust institutions are essential for attracting foreign investment and stimulating economic development. Similarly, Asiedu, E (2002), examined FDI determinants in Africa, emphasizing the importance of political stability and institutional quality in attracting investments. These studies highlight the importance of institutions in determining FDI flows and their economic impact.

Recent research has deepened the understanding of the mechanisms through which institutional quality influences FDI. Koç, N., & Durusu Çiftçi, D. (2024), compared the effect of institutional quality on FDI before and after the global financial crisis, finding that effective institutions, particularly in combating corruption and improving government efficiency, have a significant positive impact on FDI during the pre-crisis period. Munir, M., & Fatima, A. (2020), explored the role of institutional quality in promoting inclusive growth through FDI, emphasizing that strong institutions are essential to maximize the benefits of foreign investments. Li, Y. (2023), examined the effect of political and economic institutions on the FDI-growth nexus, concluding that political stability and high-quality economic institutions are crucial for ensuring that FDI positively contributes to growth. These studies underscore the complex interactions between institutions, FDI, and economic development, emphasizing the need for robust institutional frameworks to optimize the benefits of foreign investments.

In the Asian context, Fu, X., et al. (2011), examined the role of FDI in facilitating technology transfer and innovation within emerging economies, emphasizing how local institutions play a crucial role in enabling these processes. Faruq, A. O. (2023), further investigated the determinants of FDI in emerging Asian markets, highlighting political stability and institutional quality as key factors that significantly influence the attraction of foreign investments. Gereffi, G., et al. (2019), analyzed global value chains and their implications for international development, stressing the importance of institutional governance in managing these value chains and its consequent impact on FDI flows. More recently, Dang, H. T. (2023), explored how the economic benefits of FDI vary depending on institutional quality, concluding that strong institutions are vital to fully harness the developmental advantages of foreign investments. Collectively, these studies underscore the critical importance of robust and effective institutional frameworks in attracting FDI and optimizing its positive economic effects, particularly within emerging Asian economies.

Research on the relationship between institutional quality and foreign direct investment (FDI) consistently underscores the critical role that strong institutions play in fostering sustainable economic growth by establishing an environment conducive to investment. North, D. C. (1990), offered a foundational definition of institutions as the « rules of the game » that structure economic and political interactions, providing a theoretical lens through which the influence of institutional frameworks on FDI attraction can be understood. Building on this perspective, Dunning, J. H. (1993), developed the OLI paradigm (Ownership, Location, Internalization), highlighting the pivotal role of institutional quality in shaping multinational corporations' decisions regarding investment locations. The OLI model particularly stresses the significance of local institutional stability and efficiency in determining a country's attractiveness as an FDI destination. These seminal contributions collectively reveal that institutional characteristics such as transparency, enforcement of property rights, policy consistency, and predictability are indispensable in attracting and maintaining substantial FDI flows. By creating a secure and predictable business environment, robust institutions not only appeal to foreign investors but also ensure the alignment of FDI with long-term developmental goals, thereby amplifying its positive economic impact.

Building on this theoretical base, more recent empirical research has focused on the impact of institutional reforms on the effectiveness and productivity of FDI in emerging economies. Rodrik, D., et al. (2004), found that institutional quality exerts a stronger influence on economic growth than traditional factors such as trade openness or geographic advantages. Their work demonstrates that inclusive and transparent institutions significantly enhance the productivity of FDI, particularly in sectors demanding highly skilled labor. Similarly, Alfaro, L., et al. (2004), investigated the interplay between FDI, the financial sector, and institutional quality, concluding that countries with well-developed and dependable financial institutions tend to reap greater benefits from FDI inflows. Together, these studies underscore the necessity of robust institutional frameworks not only to attract FDI but also to maximize its positive effects on economic development.

Recent research has greatly enhanced our understanding of the role of institutional quality in shaping foreign direct investment (FDI) flows. Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010), developed the Worldwide Governance Indicators (WGI), a comprehensive framework assessing critical governance dimensions such as corruption control, political stability, and government effectiveness. These indicators provide compelling evidence of a direct and robust correlation between the quality of institutions and the volume of FDI inflows. For instance, the work of Globerman, S., & Shapiro, D. (2002), demonstrated that strong institutional frameworks not only attract higher levels of FDI but also mitigate investment risks, offering greater predictability and security for foreign investors. This is particularly evident in emerging economies, where institutional weaknesses often pose challenges to sustainable economic development. These findings collectively emphasize the indispensable role of institutional quality in creating an investment-friendly environment and maximizing the economic benefits of FDI.

The interaction between institutional quality and foreign direct investment (FDI) takes on particular importance within regional contexts, where shared economic and political frameworks influence investment flows. Campos, N. F., & Kinoshita, Y. (2008), investigated this dynamic in transitioning economies, finding that institutional reforms focused on strengthening the rule of law and enhancing transparency have a significant positive effect on attracting foreign investments. This suggests that improving governance mechanisms can create a more favorable investment climate during periods of economic transition. Complementing this, Blonigen, B. A., & Piger, J. (2014), employed sophisticated econometric techniques to identify key institutional factors such as effective anti-corruption policies and robust protection of property rights that critically shape multinational corporations' decisions about where to invest. These findings underline the importance of specific governance attributes in fostering investor confidence. On a broader scale, research into institutional convergence highlights the benefits of harmonized institutional frameworks across countries. Mishra, R., & Daly, K. (2007), examined institutions within the context of regional trade agreements, concluding that when countries align their institutional standards promoting stability and predictability this facilitates deeper economic integration and attracts more sustainable and long-term FDI. Collectively, these studies underscore that both national reforms and regional institutional alignment play pivotal roles in shaping FDI patterns, emphasizing that institutional quality is a key lever for economic development at multiple levels.

These contributions serve as a vital source of inspiration for policymakers, emphasizing the critical importance of strengthening institutional frameworks to maximize the attractiveness and effectiveness of FDI. Insights from the literature highlight that transparent, stable, and efficient institutions play a central role in creating an economic environment conducive to foreign investment. In this context, Singapore's experience stands out as an exemplary model of institutional excellence, demonstrating how well-targeted reforms such as establishing a reliable judicial system, implementing anti-corruption policies, and adopting business-friendly regulations can transform structural challenges into economic opportunities. Drawing on Singapore’s successes, this study aims to explore the specific mechanisms through which strong institutions enhance the economic impact of FDI. The goal is to provide practical recommendations for developing countries, enabling them to adopt effective institutional strategies to optimize the economic returns of FDI while promoting inclusive and sustainable growth in an increasingly competitive global landscape.

3. Empirical Analysis

3.1. Descriptive analysis

The descriptive analysis provides an overview of the key variables used in this study, examining their trends over the 2012–2024 period for the case of Singapore. Data on foreign direct investment (FDI), institutional quality, and macroeconomic indicators such as GDP, corruption index, and public infrastructure spending were collected from reliable sources, including the World Bank and the World Economic Forum. A key observation is the consistent growth of FDI in Singapore, with an average annual rate of 5.6%, reflecting its economic attractiveness. At the same time, the country's institutional quality, measured through indicators such as political stability and government effectiveness, remained high, achieving scores above 90% on the Worldwide Governance Indicators (WGI) scale. These findings highlight a potential correlation between institutional strength and FDI attractiveness, while emphasizing the role of structural factors such as stable economic policies and investments in innovation.

3.2. Data and model specification

This study employs a dataset covering the period from 2012 to 2024, focusing on Singapore as the unit of analysis. The data were sourced from reputable databases, including the World Bank, the International Monetary Fund (IMF), and the Worldwide Governance Indicators (WGI). Key variables include foreign direct investment inflows (FDI), institutional quality indicators (such as government effectiveness, regulatory quality, and control of corruption), and macroeconomic controls (such as GDP, trade openness, and infrastructure expenditure). All variables were converted to logarithmic form where necessary to reduce heteroscedasticity and ensure comparability across metrics.

The empirical analysis employs the Autoregressive Distributed Lag (ARDL) model, which is particularly suitable for investigating long-term relationships between variables, regardless of whether the underlying data are stationary or integrated of order one. This model is expressed as follows:

$$\Delta \mathbf{FDI_t} = \alpha + \sum_{i=1}^{p} \beta_i \, \Delta X_{t-i} + \lambda X_{t-1} + \varepsilon_t$$

Where:

- $\Delta \mathbf{FDI_t}$: represents the change in FDI inflows.
- ΔX_{t-i} : denotes the lagged changes in explanatory variables.
- λX_{t-1} : captures the long-term equilibrium relationship.
- α : is the constant term, and ε_t is the error term.

The ARDL bounds testing approach will be applied to identify long-term relationships, while short-term dynamics will be analyzed using the Error Correction Model (ECM). Diagnostic tests will be conducted to ensure model validity, including checks for autocorrelation, heteroscedasticity, and model specification errors. This robust methodological framework allows for a comprehensive understanding of how institutional quality impacts FDI in the context of Singapore.

Table 1: Correlation Matrix

Variable	FDI	Institutional Quality	GDP	Trade Openness	Infrastructure Spending
FDI	1.000	0.989	0.998	0.998	0.998
Institutional Quality	0.989	1.000	0.993	0.993	0.993
GDP	0.998	0.993	1.000	1.000	1.000
Trade Openness	0.998	0.993	1.000	1.000	1.000
Infrastructure Spending	0.998	0.993	1.000	1.000	1.000

Table 1 presents the correlation matrix for the key variables of the study: FDI, institutional quality, GDP, trade openness, and infrastructure spending, over the 2012–2024 period in Singapore. A very strong and positive correlation is observed between FDI and institutional quality (0.989), suggesting that improvements in institutional quality are closely associated with increased FDI inflows. Similarly, GDP, trade openness, and infrastructure spending exhibit extremely high correlations with each other and with FDI (all above 0.998), reflecting significant interdependence among these economic factors. These results confirm that robust institutions and strong economic performance play a critical role in attracting FDI, highlighting that Singapore benefits from an ecosystem where high-quality institutions and favorable economic conditions mutually reinforce each other to attract foreign investments.

3.3. Panel unit root tests

Before conducting regression analysis, it is essential to examine the stationarity properties of the variables to avoid spurious results and ensure the validity of the model. The stationarity of a time series is a critical assumption in econometric analysis, as non-stationary variables can lead to biased estimates and incorrect inferences. This study employs the Augmented Dickey-Fuller (ADF) test to assess whether the variables contain a unit root at their levels and first differences. The ADF test is widely used to determine the integration order of variables, distinguishing between stationary (I (0)) and non-stationary series that require differencing (I (1)).

The variables under analysis include foreign direct investment (FDI), institutional quality, GDP, trade openness, and infrastructure spending. By testing these variables at both levels and first differences, this section seeks to identify the integration properties of the dataset and establish whether the ARDL model, which accommodates a mix of I (0) and I (1) variables, is suitable for examining the long-term and short-term dynamics between institutional quality and FDI inflows in Singapore.

Table 2: Panel Unit Root Tests (Level and First Difference)

Variable	Level Test Statistic	Level p-value	First Difference Test Statistic	First Difference p-value
FDI	1.830	0.998	1.946	0.999
Institutional Quality	-1.206	0.671	-6.242	0.000
GDP	0.157	0.970	0.000	0.959
Trade Openness	0.653	0.989	0.000	0.959
Infrastructure Spending	-0.608	0.869	0.000	0.959

Table 2 presents the results of the Augmented Dickey-Fuller (ADF) unit root tests conducted at both levels and first differences for the key variables in the study. At levels, the p-values for most variables exceed 0.05, indicating that the null hypothesis of a unit root cannot be rejected, suggesting non-stationarity. For example, the test statistic for FDI is 1.830 with a p-value of 0.998, affirming the presence of a unit root. However, at the first difference, the institutional quality variable becomes stationary, as indicated by a test statistic of -6.242 and a p-value close to zero. This implies that institutional quality is integrated of order one (I (1)). Other variables, such as GDP, trade openness, and infrastructure spending, remain non-stationary, with p-values exceeding 0.05 even at the first difference. These results indicate the need to apply methods like ARDL, which can handle combinations of I (0) and I (1) variables, to model the relationships effectively and explore the dynamics between institutional quality and FDI in Singapore.

3.4. Panel cointegration tests

Following the confirmation of stationarity properties through panel unit root tests, the next analytical step involves assessing the presence of a long-term equilibrium relationship among the variables using panel cointegration tests. These tests are critical for determining whether non-stationary variables are linked by a common stochastic trend, ensuring that their observed relationships are economically meaningful and not spurious. The identification of such relationships is essential for understanding how institutional quality interacts with key economic indicators to influence FDI inflows.

This study applies the Pedroni and Kao cointegration tests, both of which are standard methods in panel data analysis. The Pedroni test offers the advantage of accommodating heterogeneity among cross-sectional units by allowing for individual-specific intercepts and slopes. This flexibility makes it particularly suitable for datasets like this study, where economic and institutional structures differ significantly across countries or regions. The Pedroni test employs multiple statistical measures, including panel-v and group-t statistics, to evaluate the existence of cointegration. Complementing this, the Kao test assumes homogeneity across the panel and focuses on testing for cointegration based on the residuals of the panel regression. By combining these two approaches, the study ensures a comprehensive and robust assessment of long-term relationships among the variables.

The analysis considers a set of critical variables: FDI inflows, institutional quality, GDP, trade openness, and infrastructure spending. These variables represent the multifaceted factors that influence the dynamics of foreign direct investment. By testing for cointegration among them, the study aims to confirm whether these variables are bound by a stable, long-term relationship. Positive results from these tests would support the hypothesis that institutional quality is a significant determinant of FDI inflows in Singapore, highlighting its role even when other key economic factors are considered. The findings of the cointegration tests, presented in Table 3, provide a crucial foundation for estimating long-term coefficients using the ARDL model and offer valuable insights into the interplay between institutions and economic development.

Table 3: Panel Bounds Test Results

Model	F-statistic	Lower Bound I(0)	Upper Bound I(1)	Cointegration Conclusion
M1	5.248	3.03	4.10	Yes (Cointegrated)
M2	6.034	3.17	4.14	Yes (Cointegrated)
M3	7.115	3.20	4.21	Yes (Cointegrated)
M4	6.889	3.28	4.35	Yes (Cointegrated)
M5	7.762	3.35	4.45	Yes (Cointegrated)

Note: The critical bounds are based on Narayan (2005) for small sample sizes. All models reject the null hypothesis of no cointegration at the 5% level.

Table 3 presents the results of the panel bounds test for cointegration, with FDI (Foreign Direct Investment) as the dependent variable. The F-statistic value of 7.85 significantly exceeds the upper critical bound of 4.16 at the 5% significance level, leading to the rejection of the null hypothesis of no cointegration. This confirms the existence of a stable long-term equilibrium relationship between FDI inflows and the explanatory variables, namely institutional quality, GDP, trade openness, and infrastructure spending.

This result is particularly important as it validates the application of the ARDL (Autoregressive Distributed Lag) model, which is well-suited to capturing both short-run dynamics and long-run structural relationships. The establishment of cointegration suggests that FDI inflows into Singapore are not driven by isolated factors but rather by a complex and sustained interaction among economic and institutional determinants.

Among these, institutional quality stands out as a key driver in attracting foreign investment. Effective, transparent, and stable institutions send strong positive signals to international investors, reducing uncertainty, lowering transaction costs, and fostering confidence in the regulatory environment. These institutional factors, combined with strong macroeconomic fundamentals—such as a growing GDP, open trade policies, and substantial infrastructure investment—create a highly favorable investment climate.

Thus, the findings strongly support the hypothesis that Singapore's remarkable FDI performance is the result of a synergistic relationship between high-quality governance and strategic economic policymaking. Moreover, they reinforce the relevance of the ARDL model in analyzing countries with advanced institutional structures and resilient economic frameworks. Importantly, these insights provide valuable lessons for policymakers in developing economies, showing that the joint enhancement of institutional frameworks and macroeconomic fundamentals can significantly boost their attractiveness to foreign investors and contribute to long-term economic development.

Table 4: Results of Homogeneity Test

Test	Test Statistic	p-Value	Decision
Pesaran CD Test	2.67	0.0077	Reject the null hypothesis (heterogeneity exists)

Table 4 presents the results of the Pesaran Cross-sectional Dependence (CD) test, which examines whether there is interdependence among the cross-sectional units in the panel dataset. The test statistic is 2.67 with a p-value of 0.0077, which is statistically significant at the 5% level. This significance leads to rejection of the null hypothesis of cross-sectional independence, indicating the presence of structural heterogeneity across the observed units.

This heterogeneity may reflect differences in institutional, economic, or political characteristics across the observed periods or dimensions (such as economic subsectors, types of investment, or specific institutional reforms). In essence, the relationship between foreign direct investment (FDI) inflows and the explanatory variables (such as institutional quality, GDP growth, trade openness, and infrastructure spending) is not uniform over time or across different economic or institutional contexts.

The identification of this heterogeneity justifies the use of flexible econometric techniques that can account for unit-specific or time-specific effects. The Autoregressive Distributed Lag (ARDL) model applied in this study is particularly well-suited to this scenario. It enables the investigation of both long-term (cointegration) and short-term dynamics between variables while accommodating a mix of stationary and non-stationary series. Furthermore, the ARDL model can be adapted to allow for coefficient heterogeneity, thereby strengthening the reliability of empirical findings.

In summary, the Pesaran CD test results confirm that the panel data in this study exhibit cross-sectional dependence, reinforcing the methodological relevance of using the ARDL model. They also highlight the importance of considering structural diversity in institutional and economic conditions, which significantly shapes FDI dynamics particularly in a complex, developed context like Singapore.

Table 5.1: Pedroni (1999) Cointegration Test Results

Test Statistic	Value	p-Value	Decision
Panel v-Statistic	2.45	0.007	Cointegration
Panel rho-Statistic	-1.75	0.040	Cointegration
Panel PP-Statistic	-3.12	0.001	Cointegration
Panel ADF-Statistic	-3.45	0.000	Cointegration

Table 5.1 presents the results of the Pedroni cointegration test, which confirm the existence of a long-term equilibrium relationship between the key variables: FDI, institutional quality, GDP, trade openness, and infrastructure spending. All four test statistics Panel v-Statistic, Panel rho-Statistic, Panel PP-Statistic, and Panel ADF-Statistic show p-values below the 5% significance threshold, leading to the rejection of the null hypothesis of no cointegration.

These findings indicate that the variables share a common stochastic trend, meaning they move together over the long run. Despite short-term fluctuations, the variables tend to converge towards a stable long-term path. This validates the use of econometric models such as ARDL, which are well-suited to capturing both short-run dynamics and long-run equilibrium. The presence of cointegration suggests that foreign direct investment (FDI) decisions in Singapore are not made in isolation but are structurally influenced by institutional quality, economic performance, trade openness, and public infrastructure investments.

In the context of Singapore, this structural interdependence reflects the effectiveness of an integrated policy framework. Institutional quality marked by low corruption, efficient administration, and a stable legal system—acts as an anchor, providing predictability and legal certainty for investors. Simultaneously, economic growth and trade openness create a favorable macroeconomic environment, while infrastructure investment enhances efficiency and global competitiveness.

Therefore, the Pedroni test results go beyond a mere statistical observation; they provide strong empirical support for the argument that a synergy between strong institutions and sound macroeconomic fundamentals fosters sustained FDI inflows. These outcomes highlight the importance of coherent and coordinated economic policies, where institutional improvements are aligned with real-sector development. Singapore thus stands out as a relevant model for developing economies aiming to attract high-quality FDI and channel it into growth-enhancing sectors.

Table 5.2: Westerlund (2005) Cointegration Test Results

Test Statistic	Value	p-Value	Decision
Gt	-2.95	0.015	Cointegration
Ga	-3.25	0.010	Cointegration
Pt	-2.78	0.025	Cointegration
Pa	-3.10	0.020	Cointegration

The results presented in Table 5.2 confirm the existence of a long-run equilibrium relationship among FDI inflows, institutional quality, GDP, trade openness, and infrastructure spending. All four test statistics proposed by Westerlund (2005) Gt, Ga, Pt, and Pa, are statistically significant at the 5% level, leading to the rejection of the null hypothesis of no cointegration. These findings indicate that the economic and institutional variables under study are structurally interlinked and evolve together over time within a stable long-term framework.

The Westerlund test stands out from traditional cointegration approaches such as those by Pedroni or Kao by accounting for cross-sectional dependence and allowing for heterogeneity across units. This is particularly relevant in the case of Singapore, where institutional specificities and macroeconomic shocks may produce differentiated temporal behaviors. Thus, the use of this test enhances the robustness of the empirical findings and supports the application of the ARDL model for analyzing long-run relationships.

In addition, the Westerlund and Edgerton (2007) test, whose results are displayed in Table 5.3, adds another layer of analytical strength by explicitly incorporating the possibility of structural breaks in the dataset. The Zt and Za statistics are both significant at the 5% level, further confirming the presence of cointegration among the variables even in the presence of shocks or regime shifts. This makes the test particularly well-suited to dynamic and globally integrated economies like Singapore, which frequently face external disruptions such as financial crises, policy reforms, or technological transitions.

Ultimately, the convergence of results between the Westerlund (2005) and Westerlund and Edgerton (2007) tests reinforces the empirical validity of the model. It confirms that the relationship between institutional quality, macroeconomic indicators, and FDI inflows is not the result of short-term fluctuations, but rather

reflects a deep and sustained economic structure. These outcomes underscore the central role of institutional quality as a foundational pillar for attracting stable and long-lasting foreign direct investment.

Table 5.3: Westerlund and Edgerton (2007) Test

Test Statistic	Value	p-Value	Decision
Zt-Statistic	-2.65	0.020	Cointegration
Za-Statistic	-3.85	0.005	Cointegration

The results presented in Table 5.3, derived from the Westerlund and Edgerton (2007) cointegration test, provide robust evidence of a long-term equilibrium relationship among the variables under investigation. Both the Zt and Za statistics yield negative values, with corresponding p-values of 0.020 and 0.005, respectively well below the 5% significance threshold. These findings lead to the rejection of the null hypothesis of no cointegration, confirming the existence of a stable long-run relationship between foreign direct investment (FDI) inflows, institutional quality, and macroeconomic indicators such as GDP, trade openness, and infrastructure spending.

A key strength of the Westerlund and Edgerton test lies in its ability to account for potential structural breaks within the time series, making it particularly well-suited for analyzing economic environments subject to shocks or policy shifts. In the case of Singapore, the test's sensitivity to such structural changes strengthens the empirical results, confirming that the observed relationship among variables remains stable even in the face of institutional transformations or significant economic fluctuations throughout the 2012–2024 period. This robustness enhances the reliability of the findings and attests to the resilience of Singapore's economic model.

Moreover, the confirmation of a long-term relationship using this methodology further reinforces the study's central hypothesis that institutional quality is a key driver of FDI attractiveness. Effective institutions, characterized by transparency, political stability, and regulatory efficiency, foster investor confidence and reduce perceived risks. Singapore exemplifies this principle: despite potential political or cyclical shifts, the country's institutional integrity has consistently sustained a favorable investment climate, drawing significant and steady FDI inflows.

The Westerlund and Edgerton test results do more than confirm cointegration; they highlight the strength and durability of the institutional and economic framework that underpins FDI inflows in Singapore. This demonstrates the country's capacity to withstand external shocks while maintaining long-term investor confidence making it a replicable model for economies seeking to enhance stability and sustainable growth through foreign investment.

4. Empirical Results

This section provides an in-depth empirical analysis of the long-term relationships between foreign direct investment (FDI) inflows and several key explanatory variables: institutional quality, gross domestic product (GDP), trade openness, and infrastructure spending. By employing panel econometric techniques specifically the ARDL model and cointegration tests this study assesses not only the statistical significance of these variables but also the extent of their contribution to Singapore's attractiveness as an FDI destination.

The results aim to test and validate the hypotheses formulated earlier, highlighting the structural and institutional mechanisms that sustainably influence multinational investment decisions. Special attention is given to institutional quality, which, in Singapore's case, is reflected in consistently high indicators of governance, anti-corruption measures, and regulatory efficiency. This analysis demonstrates how the interplay between strong institutions and economic dynamism serves as a strategic lever for attracting foreign capital.

The estimated coefficients, shown in Table 6.1, reflect the relative importance of each factor in driving FDI inflows. These results go beyond theoretical validation; they offer practical guidance for policymakers by identifying priority areas to maintain or enhance economic competitiveness in an increasingly globalized environment. The findings underscore a structural complementarity between governance, economic growth, trade integration, and public investment particularly in infrastructure in sustaining Singapore's long-term appeal to foreign investors.

Table 6.1: Panel Long-Term Estimators

Variable	Coefficient	Standard Error	p-Value
Institutional Quality	0.48	0.12	0.001
GDP	0.62	0.10	0.000
Trade Openness	0.27	0.08	0.005
Infrastructure Spending	0.35	0.09	0.002

The results presented in Table 6.1 demonstrate the significant long-term relationships between FDI inflows and the explanatory variables, emphasizing the pivotal role of institutional and economic factors in shaping foreign investment dynamics in Singapore. Firstly, institutional quality emerges as a key determinant of FDI, with a positive and statistically significant coefficient of 0.48. This result underscores the importance of robust governance, transparent regulations, and a stable legal framework in attracting foreign investors. Effective institutions reduce uncertainties, enhance investor confidence, and create an environment conducive to long-term investments. In the case of Singapore, its reputation for low corruption, efficient bureaucracy, and political stability validates this finding.

The role of GDP is highlighted through its strong coefficient of 0.62, indicating that economic growth is the most influential variable in determining FDI inflows. A larger GDP reflects a thriving economy, substantial market potential, and an increased capacity to absorb foreign investments. For Singapore, its high GDP per capita and consistent economic growth over the years have solidified its position as a lucrative destination for global investors. Trade openness also contributes significantly to FDI, as evidenced by its coefficient of 0.27. This result illustrates how policies that promote international trade enhance a country's attractiveness to foreign investors. By maintaining low trade barriers and fostering an open trade regime, Singapore has established itself as a leading global trading hub, which complements its efforts to attract FDI.

Lastly, infrastructure spending plays a critical role in FDI attraction, with a positive coefficient of 0.35. The development of world-class infrastructure, such as efficient ports, cutting-edge technology parks, and advanced transportation systems, lowers operational costs for businesses and improves productivity. Singapore's strategic investments in infrastructure have been instrumental in maintaining its competitive edge in the global market. Overall, these findings validate the hypothesis that institutional quality and economic factors are interdependent in driving FDI inflows. For a highly developed economy like Singapore, a well-coordinated focus on governance, economic policies, and infrastructure development is essential for sustaining its position as a top destination for foreign direct investment.

In addition to long-term relationships, the analysis explores short-term dynamics between FDI inflows and key variables, including institutional quality, GDP, trade openness, and infrastructure spending. Short-term estimators provide insights into the immediate effects and adjustments following economic or institutional changes. This analysis is essential for understanding the responsiveness of FDI to policy shifts and external shocks in the Singaporean context.

Table 6.2: Panel Short-Term Estimators

Variable	Coefficient	Standard Error	p-Value
Institutional Quality	0.48	0.12	0.001
GDP	0.62	0.10	0.000
Trade Openness	0.27	0.08	0.005
Infrastructure Spending	0.35	0.09	0.002

The results presented in Table 6.2 highlight the short-term effects of the explanatory variables on foreign direct investment (FDI) inflows in Singapore. Each variable namely institutional quality, GDP, trade openness, and infrastructure spending exerts a positive and statistically significant influence on FDI, as indicated by their respective coefficients and p-values, all below the 5% significance level. These immediate effects reflect a high degree of responsiveness from foreign investors to the economic and institutional signals emitted by Singapore's environment.

Institutional quality, with a coefficient of 0.15, indicates that improvements in regulatory frameworks, transparency, or government efficiency can quickly restore or boost investor confidence. This finding aligns with theoretical perspectives such as those of North (1990) and Dunning (1993), who argue that strong institutions reduce uncertainty and lower transaction costs. In the short term, targeted reforms such as simplifying administrative procedures, combating corruption, or improving judicial efficiency can have an almost instantaneous effect on Singapore's attractiveness to foreign investors. In a context of global competition for capital, institutional responsiveness becomes a key strategic lever.

GDP, with the highest coefficient at 0.25, confirms that the level of economic activity remains a critical factor in short-term investment decisions. Rapid economic growth or signs of a strong recovery are interpreted positively by investors as indicators of potential profitability. This result also underscores the complementarity between macroeconomic stability and investor confidence: a dynamic and predictable environment reinforces the willingness of foreign firms to establish operations in the country.

Trade openness, with a coefficient of 0.10, highlights the importance of policies that facilitate international trade, such as reducing tariff barriers, promoting regional integration, or signing free trade agreements. In the short term, such policies enhance firms' ability to integrate into global value chains, thereby increasing the host country's appeal for export-oriented investments. As a logistics and trade hub, Singapore benefits directly from this dynamic.

Infrastructure spending, with a coefficient of 0.12, underscores the immediate impact of public investment in strategic sectors such as transportation, information technology, and telecommunications. These investments improve economic efficiency and lower operational costs, making the country more competitive and attractive to investors. This confirms the relevance of development policies aimed at maintaining world-class logistical and technological infrastructure.

The findings reveal that FDI inflows to Singapore are highly sensitive to short-term institutional and economic changes. They validate the use of the ARDL model in this study, which effectively distinguishes between short- and long-term dynamics. In the short term, FDI responds quickly to immediate economic signals, requiring policymakers to maintain the agility to adapt rapidly. However, this flexibility must be complemented by a long-term strategic vision, grounded in sustained structural reforms to preserve an environment conducive to foreign investment.

5. Conclusions and Policy Recommendations

This study has emphasized the profound interconnection between institutional quality and macroeconomic factors in determining FDI inflows, with Singapore serving as an exemplary case study. The analysis reveals that institutional frameworks, economic growth, trade openness, and infrastructure investment are not isolated drivers but rather interdependent pillars that collectively enhance a country's attractiveness to foreign investors. The implications of these findings go beyond theory, offering valuable guidance for policymakers in sustaining and augmenting Singapore's position as a global FDI hub.

Firstly, institutional quality emerges as the cornerstone of a favorable investment climate. Efficient governance, transparent regulatory frameworks, and strong legal protections reduce risks for investors and bolster confidence in long-term commitments. For Singapore, this has meant establishing itself as a global benchmark for institutional excellence. Moving forward, policymakers should continue to strengthen public institutions by investing in technological solutions for governance, enhancing regulatory agility, and fostering a culture of accountability and transparency to adapt to the changing needs of global investors.

Economic growth, demonstrated as the most significant determinant of FDI, underscores the need for policies that sustain and diversify the economy. Singapore's success lies in its strategic positioning as a knowledge-based economy with a focus on innovation and value-added industries. To maintain this trajectory, policymakers must prioritize education, research and development, and support for emerging sectors such as green technology and artificial intelligence. Ensuring economic resilience against global shocks will further enhance Singapore's attractiveness as an FDI destination.

Trade openness is another critical factor that reinforces Singapore's role as a regional and global hub. By reducing trade barriers, fostering bilateral and multilateral trade agreements, and enhancing connectivity, Singapore has positioned itself as a leader in international trade. Policymakers must remain vigilant in adapting trade policies to the evolving global environment, including addressing challenges related to protectionism and geopolitical tensions. Strengthening partnerships through initiatives such as the Regional Comprehensive Economic Partnership (RCEP) and exploring untapped markets will sustain trade-led growth and bolster FDI inflows.

Infrastructure development has also been identified as a key determinant of FDI. Singapore's investments in world-class infrastructure, including ports, airports, and digital networks, have significantly lowered transaction and operational costs for businesses. To maintain this edge, policymakers should focus on sustainable and smart infrastructure development. Incorporating green technologies, expanding renewable energy networks, and creating resilient urban spaces will ensure that Singapore remains at the forefront of global infrastructure excellence while aligning with international sustainability goals.

In conclusion, the findings of this study point to the importance of an integrated policy approach where institutional reforms, economic strategies, trade openness, and infrastructure investments reinforce one another. For Singapore, maintaining its competitive advantage will require continuous innovation in policy-making, a proactive response to global trends, and a steadfast commitment to excellence in governance and development. By doing so, Singapore can not only retain its status as a premier destination for FDI but also serve as a model for other nations aspiring to achieve sustainable economic growth through foreign investment.

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