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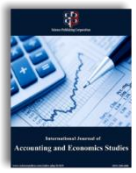

Structural Drivers Versus Short-Run Fluctuations: A Time-Varying Analysis of FDI Determinants In Selected Asian Economies

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Abstract

This study examines the determinants of foreign direct investment (FDI) in selected Asian economies (1970–2022) by comparing the influence of structural drivers with that of short-term fluctuations. Employing a comprehensive empirical framework—Fully Modified OLS (FMOLS), Dynamic OLS (DOLS), and Vector Error Correction Model (VECM)—we distinguish long-run equilibrium relationships from transient dynamics. The long-run estimates identify key structural drivers: economic growth exerts a strong positive effect, affirming the market-size hypothesis, whereas inflation and trade openness exhibit significant negative effects, pointing to the deterrents of macroeconomic instability and intense competitive pressures from liberalization, respectively. Conversely, short-run analysis reveals limited transient effects. The VECM indicates no short-run convergence to equilibrium, and Granger causality tests show that only trade openness has a significant short-run causal impact on FDI. This dichotomy is further elucidated by time-varying impulse response functions, which confirm that FDI reactions to macroeconomic shocks are asymmetric and period-specific. Notably, trade innovations generate the most substantial short-term gains, despite their negative long-term effects. Overall, the findings robustly demonstrate that FDI in the region is fundamentally anchored by long-term structural conditions—namely, stable prices, managed trade integration, and sustained economic expansion—while being only marginally influenced by short-run fluctuations.

Keywords: *Economic Growth; Foreign Direct Investment; Inflation; Long-Run Correction Mechanisms; Short-run Adjustments; Trade Openness.*

1. Introduction

Foreign direct investment (FDI) is a cornerstone of economic development, particularly in emerging and developing economies. It serves as a vital conduit for capital, technology, and managerial expertise, fostering productivity gains, industrial diversification, and deeper global integration. Nowhere has this been more evident than in Asia, where FDI has been instrumental in the region's remarkable economic transformation over the past five decades. However, the sustainability of these inflows is not guaranteed; it hinges on a complex interplay of economic forces that operate over different time horizons. A critical, yet underexplored, question is whether FDI in these dynamic economies is primarily driven by structural, long-run fundamentals or is more susceptible to short-run fluctuations. This study seeks to unravel this dichotomy by conducting a time-varying analysis of FDI determinants in selected Asian economies, explicitly contrasting the enduring influence of structural drivers with the transient nature of short-run shocks.

The existing literature identifies inflation, trade openness, and economic growth as central determinants, yet their dynamic interplay remains ambiguous. Inflation acts as a barometer of macroeconomic stability, directly impacting investor confidence and real returns (Aizenman & Lee, 2008). Trade openness can be a double-edged sword, facilitating access to global markets while potentially introducing competitive pressures that deter market-seeking investment (Blonigen, 2005). Economic growth, the quintessential indicator of market size and opportunity, is traditionally viewed as a primary attractor of capital. However, the empirical record is mixed, suggesting that the influence of these factors may not be uniform across time. Some studies affirm a positive link between trade and FDI (e.g., Asiedu, 2006; Markusen & Venables, 1998), while others point to substitutive effects (e.g., Antràs & Yeaple, 2014; Chakrabarti, 2003). Similarly, the presumed positive relationship between growth and FDI can be complicated by the inflationary pressures and institutional frictions that rapid growth may engender (Aizenman & Lee, 2008; Haque et al., 2022). This ambiguity underscores the necessity of an analytical framework capable of disentangling long-run equilibrium relationships from short-run causal dynamics.

Theoretically, this investigation is anchored in the eclectic paradigm (Dunning, 1981) and endogenous growth theories (Romer, 1990; Lucas, 1988), which provide a foundation for understanding how structural factors like market size and stability attract FDI. However, these theories often lack explicit mechanisms for the short-run, time-varying adjustments observed in real economies. While a substantial body of research has examined these variables in isolation, a significant gap persists in studies that jointly model their dynamic interactions within a unified framework that can distinguish between persistent structural drivers and ephemeral fluctuations. Many existing analyses

rely on static models or fail to adequately test for both long-run cointegration and short-run causality, leaving the temporal nature of these relationships inadequately explored.

This study addresses this gap by employing a comprehensive empirical strategy designed to separate the signal of long-run trends from the noise of short-run variations. We utilize a panel dataset for selected Asian economies from 1970 to 2022 and apply a suite of econometric techniques—including Fully Modified OLS (FMOLS), Dynamic OLS (DOLS), and a Vector Error Correction Model (VECM) complemented by impulse response functions. The FMOLS and DOLS estimators robustly identify long-run structural drivers (Kao & Chiang, 2000; Pedroni, 1999), while the VECM and impulse responses unveil the short-run fluctuations and map the time-varying impact of macroeconomic shocks on FDI (Lütkepohl, 2006). This methodological approach allows us to move beyond static correlations and answer the pivotal question of what fundamentally anchors FDI over the long term versus what causes its short-term deviations.

Furthermore, this research aligns with the United Nations Sustainable Development Goals, particularly SDG 8 (Decent Work and Economic Growth). By clarifying which policy levers have enduring effects on investment, as opposed to those that yield only temporary gains, the study provides an evidence-based roadmap for fostering sustainable, inclusive, and resilient economic growth.

2. Literature Review and Hypotheses Development

2.1. The effect of inflation on FDI

Inflation, for instance, plays a critical role in shaping the investment climate. Foreign investors prioritize cost-effective operations. Therefore, lower inflation is crucial for attracting FDI as it directly translates to reduced expenses and increased profit margins. Although Fry (1993) suggests a potential short-term benefit from moderate inflation through reduced borrowing costs, long-term FDI is driven by sustained low operational costs. Studies by Asiedu (2002, 2006) stress the importance of stable macroeconomic conditions, particularly low inflation, for attracting FDI in developing countries. However, inflation can deter foreign direct investment by creating economic uncertainty and destabilizing the business environment. Extensive research highlights the adverse effects of high inflation on FDI. High inflation erodes purchasing power and heightens risks for long-term investments due to unpredictable fluctuations in input costs (Blonigen, 2005). This uncertainty particularly deters risk-averse foreign firms seeking stable returns (Dunning, 1981). Moreover, inflation contributes to exchange rate volatility, complicating investment planning, and raises interest rates, increasing borrowing costs and potentially hindering capital-intensive projects (Cushman, 1985). Empirical studies further underscore the negative impact of inflation on FDI. Ghosh and Phillips (1998) argued that high inflation fosters an unpredictable economic environment, increasing risks for investors. Similarly, Onyeiwu and Shrestha (2004) found that inflation negatively affects FDI in African economies, where it often signals poor economic management. Numerous empirical studies confirm a negative and statistically significant relationship between inflation and FDI (Canh et al., 2020; Smith, 2021; Gao et al., 2021; Dekimpe & Heerde, 2023), emphasizing that inflation-driven macroeconomic instability leads to currency depreciation and diminished investor confidence. Recent research on Gulf and Asian economies reinforces these findings. Imran and Rashid (2023) highlight that inflation volatility in 50 developing economies significantly reduces FDI inflows. Likewise, Alharthi et al. (2024) demonstrate that macroeconomic instability, including high inflation, serves as a major deterrent to FDI in Gulf Cooperation Council (GCC) countries.

2.2. The effect of trade openness on FDI

Another key factor influencing FDI is trade. Trade openness is generally considered a significant driver of FDI. Liberal trade policies signal a welcoming environment for foreign businesses; thus, trade liberalization in developing countries is associated with increased FDI, highlighting the complementary relationship between trade and FDI (Goldberg & Klein, 1998; Albahouth & Tahir, 2024). Moreover, increased trade can attract FDI by providing access to larger markets and reducing trade barriers like tariffs and quotas (Markusen & Venables, 1998). Conversely, the relationship between trade and FDI is not always straightforward. Chakrabarti (2003) argued that excessive trade liberalization can lead to market saturation and heightened competition, potentially deterring new entrants. The impact of trade on FDI varies across different contexts. For instance, excessive trade openness without adequate supporting infrastructure and strong institutional quality can reduce a country's attractiveness to foreign investors (Tri et al., 2019; Ullah & Khan, 2017). Empirical evidence from Japan (Kimino et al., 2007) and India (Dua & Garg, 2015) suggests that trade openness can, in some cases, negatively affect FDI inflows. The relationship between trade costs and the type of FDI is also crucial. Lower trade costs facilitate vertical FDI, enabling firms to fragment production across countries to exploit cost advantages (Helpman, 1984). Meanwhile, higher trade costs may encourage horizontal FDI, where firms establish production facilities in multiple countries to serve local markets (Brainard, 1997). Trade and FDI can function as either complements or substitutes. High trade costs may incentivize FDI as a replacement for exports, while FDI itself can stimulate trade in intermediate goods, making the two complementary (Antràs & Yeaple, 2014). These findings suggest that, depending on the economic context, trade and FDI may act as substitutes rather than complements.

2.3. The effect of economic growth on FDI

Economic growth is widely considered a significant driver of foreign direct investment. A robustly growing economy signals a healthy, profitable market attracting foreign investors. Increased consumer purchasing power and demand, typical of growing economies, create fertile ground for investment (Chakrabarti, 2003). This aligns with the market size hypothesis, which posits that larger, expanding markets facilitate economies of scale, thereby encouraging higher investment levels (Markusen & Venables, 1998). Beyond market size, sustained economic growth fosters investor confidence. This is achieved by reflecting sound economic policies, political stability, and strong institutions, all of which mitigate perceived investment risks (Alfaro et al., 2004). Furthermore, growth often stimulates improvements in critical infrastructure and human capital. These enhancements lower operational costs and increase productivity, significantly enhancing a country's attractiveness for FDI (Asiedu, 2002; Noorbakhsh et al., 2001). However, empirical research provides a complex picture. While early research often demonstrated a positive correlation between higher GDP and increased FDI inflows (Wang & Swain, 1995; Campos & Kinoshita, 2003), more recent studies emphasize the importance of sustainable and balanced growth. Volatile rapid growth, while potentially attracting some investment, is generally perceived as less desirable than steady, predictable expansion (Siddikee & Rahman, 2020; Sijabat, 2023; Lee et al., 2024). This shift in focus highlights the growing recognition of long-term stability as a key determinant of FDI. Conversely, rapid economic growth can introduce substantial challenges that deter FDI. Singh (2010) argued that rapid growth can fuel inflationary pressures and asset bubbles, leading to increased business costs and market instability. Stiglitz (2000), Kose et al. (2011), and

Huang (2012) pointed out that rapid expansion necessitates stricter regulations to prevent market failures, potentially creating bureaucratic hurdles for foreign investors. Additionally, concerns about potential protectionist measures in fast-growing countries, as highlighted by Aizenman and Lee (2008) and Bekaert et al. (2005), introduced uncertainty. Finally, Haque et al. (2022) found that excessively rapid growth can generate macroeconomic imbalances, such as unsustainable current account deficits, which ultimately discourage FDI.

2.4. Hypotheses development

This study empirically tests the distinction between long-run structural drivers and short-run fluctuations in Foreign Direct Investment (FDI) for selected Asian economies (1970–2022). Guided by this core research problem, the following null hypotheses are formulated for examination:

H_{01}:	Inflation has no significant long-run effect on FDI.
H_{02}:	Trade openness has no significant long-run effect on FDI.
H_{03}:	Economic growth has no significant long-run effect on FDI.
H_{04}:	The error correction term (ECT) is statistically insignificant, indicating no short-run adjustment toward the long-run equilibrium.
H_{05}:	Lagged changes in FDI do not significantly affect current FDI inflows in the short run.
H_{06}:	Short-run changes in trade openness do not significantly influence FDI inflows.
H_{07}:	Short-run changes in inflation do not significantly affect FDI inflows.
H_{08}:	Short-run changes in economic growth do not significantly affect FDI inflows.

In summary, while the existing literature has extensively examined the roles of inflation, trade openness, and economic growth as determinants of foreign direct investment, most studies analyze these relationships using static or single-equation frameworks that do not adequately distinguish between long-run structural effects and short-run fluctuations. Moreover, prior empirical work often treats the growth–FDI nexus as linear and time-invariant, overlooking the possibility of asymmetric and regime-dependent dynamics. This study extends the literature by jointly modeling long-run equilibrium relationships and short-run adjustment mechanisms within a unified panel framework that combines FMOLS, DOLS, and a VECM complemented by time-varying impulse response analysis. By explicitly contrasting structural drivers with transient dynamics across multiple Asian economies over a long historical horizon (1970–2022), the study provides new evidence on the temporal nature of FDI determinants, clarifies previously mixed findings in the literature, and offers a more nuanced understanding of how macroeconomic fundamentals anchor foreign investment over time.

3. Research Methodology

While the literature has extensively examined the macroeconomic determinants of foreign direct investment (FDI), a significant gap remains in simultaneously modeling their long-run structural influences and short-run fluctuating effects. Existing studies often rely on static frameworks that cannot disentangle persistent equilibrium relationships from transient dynamics, nor can they capture the time-varying nature of these interactions. To address this, the present study utilizes a comprehensive panel dataset of eight Asian economies (1970–2022) and employs a sequential econometric framework specifically designed to differentiate between structural drivers and short-run fluctuations.

To identify the long-run structural drivers, the study employs two robust cointegration estimators. The Fully Modified Ordinary Least Squares (FMOLS) method is used to obtain unbiased estimates of the long-run parameters, effectively correcting for endogeneity and serial correlation in the cointegrated system. Complementing this, the Dynamic Ordinary Least Squares (DOLS) estimator is applied, which incorporates leads and lags of the differenced regressors to further mitigate potential small-sample bias. The consistency of results from both FMOLS and DOLS provides robust evidence on the enduring, structural relationships between FDI and its determinants.

To analyze the short-run fluctuations and their time-varying properties, the study estimates a Panel Vector Error Correction Model (VECM). This framework is pivotal for our analysis as it jointly models short-run dynamics and long-run equilibrium. The Error Correction Term (ECT) quantifies the speed at which short-run deviations from the structural long-run equilibrium are corrected. Furthermore, the VECM's short-run Granger causality tests and associated Impulse Response Functions (IRFs) are critical. The IRFs, in particular, allow us to trace the time-varying impact of a shock to one variable (e.g., a sudden change in trade openness) on FDI over a future horizon, directly illustrating how short-run fluctuations propagate and dissipate.

Before estimation, the stationarity of the variables was confirmed using a battery of panel unit root tests, including the Levin, Lin & Chu, Breitung, Im, Pesaran & Shin, ADF-Fisher, and PP-Fisher tests. The analysis utilizes annual data spanning 1970–2022 for eight Asian economies—Indonesia, Malaysia, the Philippines, Singapore, Thailand, Japan, South Korea, and India—sourced from the World Bank's World Development Indicators (WDI). The variables employed are defined in Table 1 below.

Table 1: List of Variables

Symbol	Variables	Description	Frequency
FDI	Foreign direct investment	Foreign direct investment, net inflows (% of GDP)	Yearly
INF	Inflation	Inflation, consumer prices (annual %)	Yearly
TRD	Trade Openness	Merchandise trade (% of GDP)	Yearly
EG	Economic growth	GDP growth (annual %)	Yearly

Source: Data were obtained from World Development Indicators.

Although macroeconomic panel data frequently violate classical assumptions such as homoskedasticity and normality, the estimators employed in this study remain valid under fairly general conditions. FMOLS and DOLS are asymptotically consistent and robust to endogeneity and serial correlation, while VECM estimators rely on large-sample properties rather than distributional normality. To further safeguard inference, heteroskedasticity-robust and bootstrapped standard errors are applied throughout the analysis. Consequently, statistical significance and qualitative conclusions remain reliable despite non-ideal residual behavior.

4. Results and Discussion

This section presents the empirical findings in two stages. First, FMOLS and DOLS estimations are used to identify the long-run structural determinants of FDI. Second, the VECM framework examines short-run dynamics, adjustment behavior, and time-varying responses to macroeconomic shocks. This sequential structure allows a clear distinction between persistent equilibrium relationships and temporary fluctuations, thereby improving interpretability without sacrificing econometric rigor.

Table 2 reports the results of the panel unit root tests conducted for the dependent variable (FDI) and the independent variables (inflation, trade openness, and economic growth). The results indicate that at levels, FDI, inflation, and economic growth are stationary, whereas trade is non-stationary. However, after first differencing, all variables—D(FDI), D(INF), D(TRD), and D(EG)—become stationary, confirming that each series attains stationarity at the first difference. These results validate the appropriateness of proceeding with panel cointegration and VECM estimations, ensuring the robustness of the subsequent long-run and short-run dynamic analyses.

Table 2: Summary of Panel Unit Root Tests.

Series	Levi, Lin, and Chu t*	Breitung t - stat	Im, Pesaran, and Shin W - stat	ADF – Fisher Chi-square	PP – Fisher Chi-square	Conclusion
FDI	-3.94 (0.00)	-1.67 (0.05)	-3.82 (0.00)	45.01 (0.00)	85.68 (0.00)	Stationary
D(FDI)	-15.30 (0.00)	-8.88 (0.00)	-17.67 (0.00)	217.68 (0.00)	259.01 (0.00)	Stationary
INF	-13.08 (0.00)	-8.01 (0.00)	-11.20 (0.00)	134.35 (0.00)	96.39 (0.00)	Stationary
D(INF)	-20.39 (0.00)	-13.60 (0.00)	-19.58 (0.00)	249.03 (0.00)	297.05 (0.00)	Stationary
TRD	0.48 (0.68)	-0.43 (0.35)	0.11 (0.54)	12.97 (0.68)	13.16 (0.66)	Non-station-ary
D(TRD)	-7.06 (0.00)	-1.83 (0.03)	-10.18 (0.00)	119.03 (0.00)	194.37 (0.00)	Stationary
EG	-10.89 (0.00)	-8.88 (0.00)	-10.35 (0.00)	120.62 (0.00)	168.52 (0.00)	Stationary
D(EG)	-14.77 (0.00)	-4.95 (0.00)	-20.94 (0.00)	267.33 (0.00)	164.30 (0.00)	Stationary

Table 3 presents the estimated long-run coefficients derived from the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) cointegration regressions, which assess the impact of inflation (INF), trade openness (TRD), and economic growth (EG) on foreign direct investment (FDI) across eight Asian economies during the period 1970–2022. The FMOLS results reveal statistically significant long-run relationships between FDI and its macroeconomic determinants. The coefficient for inflation (–0.12; $p = 0.01$) suggests that a one-percentage-point increase in inflation leads to a 0.12-percentage-point decline in FDI inflows, reflecting the adverse impact of price instability on investor confidence. Similarly, trade openness exhibits a negative and significant coefficient (–0.04; $p = 0.00$), implying that increased trade activity is associated with reduced FDI inflows. Economic growth also demonstrates a negative and significant effect (–0.24; $p = 0.01$). The R^2 value of 0.65 indicates that approximately 65% of the variation in FDI is explained by the model, confirming a good model fit. The DOLS estimates are consistent with the FMOLS findings, reaffirming the robustness of the long-run relationships. Inflation (–0.13; $p = 0.02$), trade openness (–0.02; $p = 0.01$), and economic growth (–0.21; $p = 0.04$) all exhibit significant negative effects on FDI. The R^2 value of 0.78 and adjusted R^2 of 0.72 further suggest a strong explanatory capacity of the DOLS model.

Table 3: Long-Run Parameters of FMOLS and DMOLS

Variable	FMOLS Coefficient	t-statistic	Prob.
INF	-0.12	-2.49	0.01**
TRD	-0.04	-2.98	0.00**
EG	-0.24	2.81	0.01**
R-squared	0.65		
Adj. R-squared	0.64		
Variable	DMOLS Coefficient	t-statistic	Prob.
INF	-0.13	-2.37	0.02**
TRD	-0.02	-2.48	0.01**
EG	-0.21	2.08	0.04**
R-squared	0.78		
Adj. R-squared	0.72		

Note: ** refers significant result at 5 % levels.

The consistent negative coefficient of inflation across both estimators corroborates the view that macroeconomic instability discourages foreign investment. Inflationary pressures increase operational costs, reduce real returns, and elevate economic uncertainty, thereby deterring investors. This finding aligns with prior studies emphasizing the detrimental role of inflation on FDI inflows (Blonigen, 2005; Cushman, 1985; Onyeiwu & Shrestha, 2004; Imran & Rashid, 2023). It reinforces the argument that price stability remains a critical precondition for sustaining FDI (Asiedu, 2002, 2006; Alharthi et al., 2024). Thus, H_{01} is rejected. The negative relationship between trade openness and FDI challenges conventional theoretical expectations that greater international trade attracts investment by expanding market access (Goldberg & Klein, 1998; Markusen & Venables, 1998). Instead, the results suggest that excessive liberalization may increase competition and market saturation, thereby discouraging foreign entry. Similar empirical evidence from Japan (Kimino et al., 2007) and India (Dua & Garg, 2015) supports this substitutive relationship, where trade and FDI may act as alternatives rather than complements in the presence of low trade barriers (Antràs & Yeaple, 2014). Therefore, H_{02} is rejected. Finally, the inverse association between economic growth and FDI, though counterintuitive, is consistent with arguments that rapid growth may introduce macroeconomic imbalances, asset price distortions, and policy uncertainties that deter long-term investment (Stiglitz, 2000; Singh, 2010; Haque et al., 2022). In rapidly expanding economies, regulatory tightening, resource constraints, and inflationary pressures may raise business costs, thus reducing the appeal of FDI (Aizenman

& Lee, 2008; Huang, 2012). Hence, H_{03} is rejected. Thus, both FMOLS and DOLS estimations provide robust evidence that macroeconomic stability, prudent trade policies, and balanced growth management are essential for sustaining foreign investment inflows in emerging Asian economies.

While FMOLS and DOLS focus on average long-run relationships, the VECM explicitly models how short-run deviations evolve around the long-run equilibrium. The interpretation of the VECM therefore emphasizes adjustment dynamics, short-run causality, and impulse responses, rather than coefficient magnitudes alone. The Vector Error Correction Model (VECM) results presented in Table 4 confirm the presence of a long-run equilibrium relationship between foreign direct investment (FDI) and its key determinants—inflation, trade openness, and economic growth.

Table 4: Results of Long-Run Parameters of VECM.

Variable	VECM Coefficient	t-statistic	Prob.
INF	-2.63	7.27	0.00**
TRD	-0.13	5.28	0.00**
EG	5.35	7.95	0.00**

Note: ** refers significant result at 5 % levels.

INF has a negative coefficient of -2.63, indicating that a one percentage point increase in inflation leads to a decrease in FDI. This aligns with the literature emphasizing the destabilizing effect of high inflation on investment (Blonigen, 2005; Cushman, 1985). Previous studies (Onyeiwu & Shrestha, 2004; Imran & Rashid, 2023) argued that inflationary environments create uncertainty, increase business costs, and erode investor confidence. TRD also has a negative impact with a coefficient of -0.13. Although traditional views suggest that trade fosters FDI (Goldberg & Klein, 1998; Markusen & Venables, 1998), some studies (Chakrabarti, 2003; Dua & Garg, 2015) argued that excessive trade liberalization can discourage FDI due to heightened competition and market saturation. This finding reinforces the argument that, in some cases, trade openness and FDI act as substitutes rather than complements (Antràs & Yeaple, 2014). Meanwhile, EG has a strong positive effect with a coefficient of 5.35. This result aligns with the market size hypothesis (Markusen & Venables, 1998; Chakrabarti, 2003), which suggests that a growing economy attracts investors by expanding market opportunities. Empirical studies (Alfaro et al., 2004; Asiedu, 2002, 2006) highlight that sustained economic growth fosters investor confidence, improves infrastructure, and enhances labor productivity, making the economy more attractive for FDI. The statistical significance of inflation, trade openness, and economic growth, as confirmed by their t-values, reinforces their importance in explaining long-run FDI dynamics. Moreover, the results from the FMOLS and DOLS estimations, corroborated by the significant VECM long-run parameters, confirm that FDI is anchored by a stable, long-run equilibrium relationship with its macroeconomic determinants. This finding leads to the rejection of the null hypothesis of no cointegration and robustly identifies inflation, trade openness, and economic growth as fundamental structural drivers of foreign direct investment in the region.

At first glance, the negative long-run coefficient of economic growth obtained from the FMOLS and DOLS estimations appears to contrast with the positive long-run coefficient reported in the VECM. This apparent tension, however, reflects differences in model structure and interpretation rather than an econometric inconsistency. The FMOLS and DOLS estimators capture the average partial effect of economic growth on FDI across the panel, abstracting from dynamic feedback and adjustment mechanisms. In this context, the negative coefficient suggests that, on average, episodes of rapid growth may coincide with macroeconomic pressures—such as rising costs, regulatory tightening, or overheating—that dampen FDI inflows in the long run. By contrast, the VECM long-run coefficient reflects the equilibrium relationship embedded in the cointegrating vector, conditioning on joint interactions among all variables. The positive VECM coefficient, therefore, indicates that, once equilibrium adjustments and feedback effects are accounted for, sustained and balanced economic expansion ultimately enhances market size and investment attractiveness. Taken together, the results imply that growth-driven FDI effects are nonlinear and regime-dependent: growth may initially generate structural frictions captured by FMOLS/DOLS, while over longer horizons, stable and institutionally supported growth reinforces FDI through equilibrium channels.

It is important to acknowledge potential heterogeneity within the panel, which includes both advanced economies (Japan and Singapore) and emerging economies (Indonesia, Malaysia, the Philippines, Thailand, India, and South Korea). In advanced economies, FDI is more likely to be efficiency- or technology-seeking, making it less sensitive to short-run macroeconomic fluctuations. In contrast, emerging economies tend to attract market-seeking and cost-oriented FDI, which is more responsive to growth, inflation, and trade conditions. The pooled panel results should therefore be interpreted as average effects across heterogeneous country groups. Nevertheless, the consistency of signs across estimators suggests that the identified structural drivers are regionally robust. Future research may extend this analysis by conducting sub-sample estimations or interacting macroeconomic variables with development-level indicators to more explicitly model cross-country heterogeneity.

Table 5 reports the results of the Error Correction Term (ECT) derived from the Vector Error Correction Model (VECM), which captures both the short-run dynamics and the speed of adjustment toward long-run equilibrium following external shocks. The ECT coefficient reflects how deviations from the long-run relationship are corrected over time, providing insight into the system's convergence behavior.

Table 5: Error Correction and Short-Run Dynamics.

Variable	Coefficient	t-statistic	Conclusion
ECT(-1)	0.00	0.60	Not significant
D(FDI(-1))	-0.57	-11.27**	Significant
D(FDI(-2))	-0.34	-6.48**	Significant
D(INF(-1))	-0.02	-1.05	Not significant
D(INF(-2))	-0.01	-0.29	Not significant
D(TRD(-1))	0.04	3.60**	Significant
D(TRD(-2))	0.00	0.04	Not significant
D(EG(-1))	-0.02	-0.72	Not significant
D(EG(-2))	-0.04	-1.12	Not significant
C	0.11	1.03	
R-squared	0.27	F-statistic	16.18
Adj. R-squared	0.26		

Note: ** refers significant result at 5 % levels.

The analysis of short-run fluctuations yields a clear demarcation from the long-run structural drivers. The short-run results derived from the VECM are evaluated against the stated null hypotheses (H_{04}–H_{08}). The estimated ECT coefficient (0.00) is statistically insignificant, supporting H_{04}, which posits that no short-run adjustment mechanism exists toward restoring the long-run equilibrium. This indicates that deviations from equilibrium are not corrected rapidly, reflecting the presence of structural rigidities, policy inertia, and institutional inefficiencies that delay the system's convergence following macroeconomic shocks. The lagged differences of FDI—D(FDI(-1)) and D(FDI(-2)) are both negative and statistically significant, with coefficients of –0.57 and –0.34, respectively. These results lead to the rejection of H_{05}, indicating that past FDI inflows exert a significant short-run feedback effect on current FDI levels. The negative coefficients imply that preceding investment surges temporarily constrain subsequent inflows, possibly due to adjustment cycles, reinvestment delays, or diminishing marginal returns (Alfaro et al., 2004; Asiedu, 2006). This dynamic suggests short-term capital reallocation behavior among investors as they adjust to recent investment patterns. By contrast, D(TRD(-1)) exhibits a positive and statistically significant coefficient (0.04), prompting the rejection of H_{06}. This result implies that short-run increases in trade openness significantly stimulate FDI inflows, reinforcing the trade–FDI complementarity hypothesis (Markusen & Venables, 1998; Goldberg & Klein, 1998). Enhanced trade activity likely improves market accessibility, information flow, and supply-chain linkages, encouraging multinational enterprises to invest in the region. Meanwhile, the short-run coefficients for inflation and economic growth are statistically insignificant, leading to the non-rejection of H_{07} and H_{08}, respectively. This indicates that temporary fluctuations in price levels and output growth have minimal immediate influence on FDI inflows. Their effects are more pronounced in the long-run equilibrium, as evidenced by the cointegration analysis, suggesting that investors respond more to sustained macroeconomic trends than to short-lived cyclical changes. The model's overall performance, with $R^2 = 0.27$ and an F-statistic of 16.18, suggests that short-run variations in FDI are only partially explained by trade dynamics and lagged investment behavior. The persistence of an insignificant ECT term implies that short-term shocks do not rapidly realign FDI flows toward equilibrium. Instead, the system's long-run stability remains anchored in fundamental macroeconomic drivers such as price stability, market expansion, and credible policy frameworks, which collectively enhance investor confidence over time. The overarching conclusion is one of a clear temporal dichotomy: short-run FDI is driven by a narrow set of transient factors, chiefly trade shocks and its own internal momentum, while its long-run path is definitively anchored by the structural drivers of inflation, growth, and trade openness, with the system exhibiting clear time-varying reactions to different types of macroeconomic shocks.

Ensuring the adequacy and reliability of the Vector Error Correction Model (VECM) requires a comprehensive assessment of its stability, residual behavior, and overall specification. Several diagnostic procedures were therefore undertaken to validate the robustness of the estimated model (see Table 6). The VEC residual serial correlation LM test yields a statistic of 13.63 with a probability value of 0.62, exceeding the 5% significance threshold. Thus, the null hypothesis of no serial correlation cannot be rejected. This result indicates that the model's lag structure is appropriately specified and that the residuals are not autocorrelated. The absence of serial correlation reinforces the adequacy of the chosen lag length and supports the model's ability to capture short-run adjustments accurately.

Table 6: Robustness Checks

Diagnostic Tests	Test statistic	Prob.
VEC residual serial correlation LM test	13.63	0.62
VEC residual heteroskedasticity test	1333.64	0.00
VEC residual normality test	23790.37	0.00

In contrast, the VEC residual heteroskedasticity test returns a statistic of 1333.64 with a probability value of 0.00, providing strong evidence of non-constant variance in the residuals. The presence of heteroskedasticity is not uncommon in macroeconomic and panel time-series data, particularly in multi-country samples spanning several decades, where structural changes, policy shifts, and volatility episodes are expected. The VEC residual normality test similarly rejects the null hypothesis of normally distributed errors, with a test statistic of 23,790.37 and a probability value of 0.00. Deviations from normality frequently occur in macroeconomic datasets due to extreme values, asymmetric distributions, and structural breaks. Although the heteroskedasticity and normality assumptions are violated, these issues do not compromise the consistency of the VECM estimators. To address potential inefficiencies in standard errors, the study employs heteroskedasticity-robust and bootstrapped standard errors throughout the analysis. This approach ensures that parameter significance remains reliable despite the presence of non-ideal residual properties. Importantly, the confirmed model stability and absence of serial correlation provide strong support for the overall validity and robustness of the VECM framework used in this study.

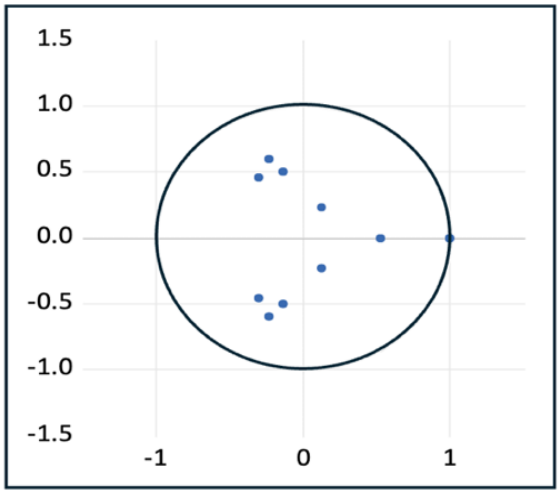

Fig. 1: Inverse Roots of AR Characteristic Polynomial.

Figure 1 displays the inverse roots of the AR characteristic polynomial. All roots lie inside or exactly on the unit circle, and none extend beyond its boundary. This indicates that the estimated VECM satisfies the stability condition, confirming that the system steadily converges toward its long-run equilibrium following short-term disturbances. In practical terms, the model does not exhibit explosive behavior, and

its dynamic structure is internally consistent. Hence, the stability results validate that the long-run and short-run coefficients reported earlier can be reliably interpreted within a dynamically stable framework.

Figure 2 illustrates the dynamic responses of Foreign Direct Investment (FDI) to one standard deviation (S.D.) structural shocks, inflation (INF), trade openness (TRD), and economic growth (EG), based on the Cholesky decomposition framework with 95% confidence intervals generated from 999 standard percentile bootstrap replications.

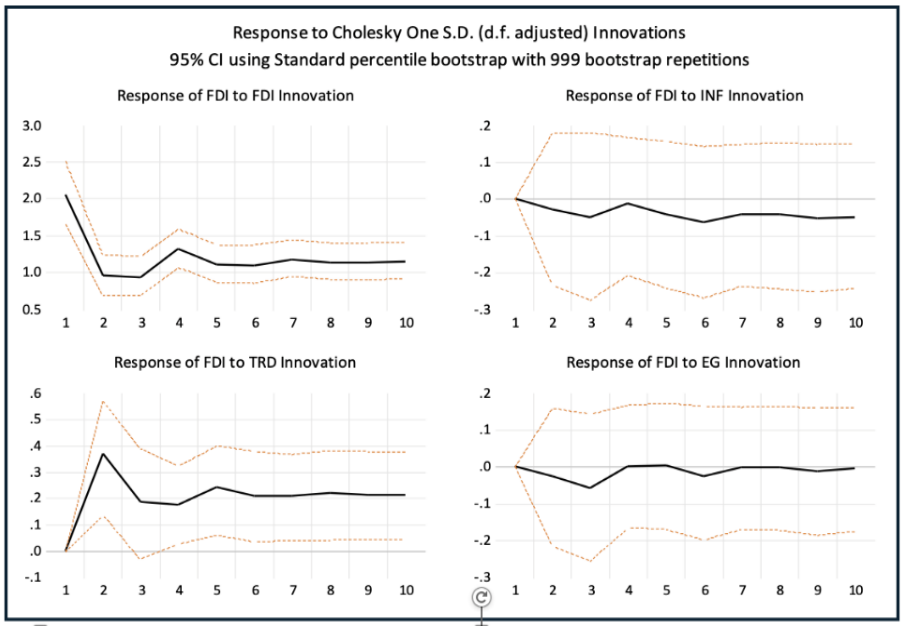

Fig. 2: Response to Cholesky One S.D. (D. F.) Innovations.

The results reveal notable asymmetries and persistence patterns across the different shocks, underscoring the complex transmission mechanisms influencing FDI dynamics in the examined economies. The response of FDI to its own innovation (Panel A) demonstrates a pronounced and immediate positive reaction in the first period, peaking around 2.0 units, followed by a gradual convergence toward equilibrium after approximately three periods. This suggests that FDI shocks are self-reinforcing in the short run, reflecting strong investor momentum and potential signaling effects in the investment environment. The eventual stabilization implies the presence of mean-reverting tendencies consistent with capital mobility adjustments over time. In contrast, the response of FDI to inflation shocks (Panel B) exhibits a weak and predominantly negative effect, with a marginal decline observed immediately following the shock and persisting across the forecast horizon. The bounded yet negative trajectory indicates that inflationary pressures exert a mild deterrent effect on foreign investment inflows, likely through increased uncertainty and erosion of real returns on investment. The response of FDI to trade openness shocks (Panel C) reveals a short-term positive impulse, peaking around the second period, before gradually stabilizing at a moderate level. This response pattern suggests that greater trade openness enhances investor confidence and facilitates cross-border capital movements in the short run. The subsequent flattening of the curve indicates that while trade liberalization can stimulate initial FDI inflows, its long-term effects may depend on complementary institutional and macroeconomic conditions. Lastly, the response of FDI to economic growth shocks (Panel D) shows an initially negligible effect, followed by a slightly positive but statistically insignificant response over time. This muted reaction implies that economic growth alone may not be sufficient to induce substantial FDI inflows unless accompanied by structural reforms and stable macroeconomic fundamentals. The narrow confidence bands further suggest limited dynamic feedback between FDI and growth in the short- to medium-term horizon. The impulse response results provide empirical support for the asymmetric and time-varying effects of macroeconomic innovations on FDI. The findings highlight the predominance of self-driven FDI dynamics and the relatively weaker influence of macroeconomic fundamentals, consistent with theories emphasizing investor expectations, market-specific characteristics, and institutional quality as key determinants of sustained foreign investment inflows.

To complement the dynamic interactions illustrated in the impulse response functions, the study employs the Vector Error Correction (VEC) Granger causality–block exogeneity Wald tests to assess the short-run predictive relationships between the macroeconomic variables. Table 7 reports the results for the dependent variable D(FDI), examining whether short-run fluctuations in inflation (INF), trade openness (TRD), and economic growth (EG) Granger-cause adjustments in foreign direct investment inflows.

Table 7: VEC Granger Causality-Block Exogeneity Wald Tests

Dependent variable: D(FDI)		
Excluded	Chi-squared	Prob.
D(INF)	1.11	0.58
D(TRD)	13.03	0.00
D(EG)	1.28	0.53
All	13.41	0.04

The causality results reveal a series of asymmetric transmission patterns that are broadly consistent with the behaviors observed in the impulse response functions. First, the test shows that inflation does not Granger-cause FDI in the short run ($\chi^2 = 1.11$, $p = 0.58$). This lack of statistical significance aligns with the weak and persistently negative impulse responses identified earlier, where inflation shocks generated only marginal declines in FDI throughout the forecast horizon. Together, these findings suggest that while inflationary pressures undermine the long-run investment climate, they do not induce immediate adjustments in foreign capital flows. Similarly, economic growth fails to exert a significant short-run causal influence on FDI ($\chi^2 = 1.28$, $p = 0.53$). The Granger causality outcome is consistent with the muted and statistically insignificant responses to EG innovations in the impulse response analysis, indicating that short-run fluctuations in output do not independently stimulate foreign investment. Instead, growth appears to matter primarily in the long-run equilibrium, likely

through its role in shaping structural conditions such as productivity, infrastructure, and market expansion. In contrast, trade openness displays a strong and statistically significant short-run causal effect on FDI ($\chi^2 = 13.03$, $p = 0.00$). This finding reinforces the positive short-term impulse responses observed earlier, where increases in TRD were associated with immediate boosts in FDI before stabilizing over the medium term. The combined evidence suggests that trade-related shocks—such as liberalization measures or improvements in cross-border connectivity—carry substantial informational content for foreign investors and can trigger swift adjustments in capital flows. When the three macroeconomic variables are evaluated jointly, the Wald test indicates that INF, TRD, and EG collectively Granger-cause changes in FDI ($\chi^2 = 13.41$, $p = 0.04$). This joint significance implies that although inflation and economic growth do not individually influence FDI in the short run, their simultaneous fluctuations, together with trade dynamics, exert meaningful predictive power. Such results highlight the complex and interdependent nature of short-run FDI adjustments, where multiple macroeconomic conditions interact to shape investor behavior. Overall, the causality analysis complements the impulse response evidence by demonstrating that short-run FDI movements are driven more by external trade dynamics than by immediate changes in domestic macroeconomic fundamentals. Trade openness emerges as the principal short-run determinant (also consistent with Table 5 results), while the effects of inflation and economic growth are weaker, indirect, or confined to longer-term adjustments. These findings underscore the importance of sustained trade integration and policy stability in fostering a favorable investment environment across the examined Asian economies.

Beyond its empirical contributions, this study offers a clear theoretical advancement by providing dynamic validation of the eclectic (OLI) paradigm and related growth-based investment theories. While the eclectic paradigm emphasizes ownership, location, and internalization advantages as long-run determinants of FDI, it is often tested within static or time-invariant frameworks. The present findings demonstrate that location-specific advantages—captured by macroeconomic stability, growth quality, and trade structure—operate differently across time horizons. Long-run cointegration results confirm the primacy of structural location factors, consistent with the OLI framework, whereas the VECM and impulse response analysis reveal that short-run FDI movements are governed by transitory trade shocks rather than immediate changes in growth or inflation. This temporal asymmetry refines existing theory by showing that the mechanisms emphasized by the eclectic paradigm are fundamentally long-run in nature, while short-run FDI dynamics reflect adjustment behavior, expectations, and market timing. In this sense, the study bridges static FDI theory with dynamic macroeconomic adjustment, extending the theoretical literature toward a time-sensitive interpretation of investment location decisions.

5. Conclusion and Policy Implications

This study examined the determinants of foreign direct investment in selected Asian economies by explicitly distinguishing between long-run structural drivers and short-run fluctuations. Using a unified empirical framework that combines FMOLS, DOLS, and a Vector Error Correction Model with time-varying impulse responses, the analysis demonstrates that FDI inflows are fundamentally anchored by long-run macroeconomic conditions rather than by short-term cyclical movements.

The long-run results confirm that macroeconomic stability and growth quality are central to sustaining foreign investment. Inflation and trade openness emerge as structural deterrents when they generate uncertainty or excessive competitive pressures, while economic growth supports FDI only when it is balanced and institutionally supported. In contrast, the short-run dynamics reveal limited adjustment behavior, with trade-related shocks representing the primary source of temporary FDI responses. Neither inflation nor economic growth exerts a meaningful short-run influence, underscoring the weak role of transitory macroeconomic fluctuations in shaping investment decisions.

Taken together, these findings contribute to the FDI literature by offering dynamic validation of established investment theories, particularly the eclectic paradigm, and by demonstrating that its core mechanisms operate predominantly over long horizons. The evidence suggests that sustainable FDI attraction is not achieved through short-term stimulus, but through persistent improvements in macroeconomic stability, strategic trade integration, and institutional quality. While the analysis focuses on core macroeconomic variables, future research may extend this framework by incorporating institutional and governance indicators or by exploring time-varying parameter models to capture evolving investment regimes.

5.1. Policy implications

Derived from these findings, policy recommendations must explicitly account for the distinct time horizons governing foreign direct investment dynamics. To strengthen long-run structural attractiveness, policymakers should prioritize stability-oriented reforms that anchor investor confidence over time. Central to this effort is the maintenance of low and predictable inflation through credible monetary and fiscal frameworks, as macroeconomic instability persistently undermines long-term investment commitments. In addition, trade policy should be strategically managed rather than indiscriminately liberalized. While openness can facilitate market access, excessive liberalization may intensify competition and erode domestic value creation, thereby discouraging sustained FDI inflows. Policymakers should therefore emphasize trade integration that supports domestic industries, strengthens value-chain participation, and builds competitive advantage.

Equally important is the pursuit of high-quality and sustainable economic growth. The findings suggest that growth attracts FDI most effectively when it is supported by strong institutions, adequate infrastructure, and regulatory predictability. Rapid or volatile expansion, by contrast, may generate cost pressures, policy uncertainty, and macroeconomic imbalances that weaken investment appeal. In the short run, the scope for policy intervention is more limited and tactical. Trade-related measures—such as targeted agreements, facilitation reforms, or temporary incentives—can generate immediate positive responses in FDI inflows, but these effects are inherently transitory and unlikely to persist without reinforcement from strong structural fundamentals.

Overall, the results underscore that sustainable FDI attraction is not driven by short-term macroeconomic stimulus, but by a long-term policy orientation centered on macroeconomic stability, strategic openness, and institutionally supported growth. While the analysis focuses on core macroeconomic variables, future research may extend these policy insights by incorporating institutional quality, governance, and infrastructure to better capture country-specific heterogeneity. Additionally, sub-period or time-varying analyses could further inform policymakers on how structural reforms interact with evolving global and regional investment conditions.

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Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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