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IMPACT OF GROWTH, REER, TRADE OPENNESS, POLITICS AND CORRUPTION ON IN FDI EAST ASIA 1996-2024

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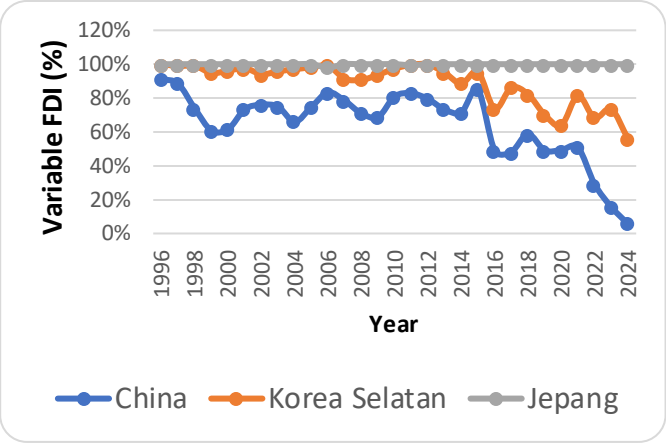
Abstract

East Asia accounts for more than one-third of total global Foreign Direct Investment (FDI), yet empirical studies that distinguish between short-term and long-term effects and test the conditionality of the exchange rate on FDI in this region remain limited, particularly following the implementation of the RCEP in 2022. This study aims to analyze the influence of economic growth (GDP), the real effective exchange rate (REER), trade openness, political stability, and corruption control on FDI, while also testing the nonlinear relationship between corruption and FDI and the moderating effect of political stability on the REER–FDI relationship in China, South Korea, and Japan. The novelty of this study lies in the empirical testing of the moderating effect of political stability on the REER–FDI relationship using ARDL-PMG on a post-RCEP East Asian panel, an approach that has not been explored in previous literature. This study employs a quantitative method using balanced panel data comprising 87 observations from 1996 to 2024, sourced from the World Development Indicators (WDI) and the Worldwide Governance Indicators (WGI). The estimation technique used is the Panel ARDL-PMG (Pooled Mean Group) model, which can simultaneously estimate long-run and short-run coefficients, preceded by IPS and CIPS stationarity tests as well as the Johansen cointegration test for each country. The long-run estimation results indicate that GDP growth has a significant negative effect on FDI, reflecting the dominance of the efficiency-seeking motive. Trade openness has a significant negative effect, confirming trade-FDI substitution. Political stability has a significant positive effect as the strongest determinant. Corruption control is not significant due to high multicollinearity with political stability. The interaction between the REER and political stability has a significant negative effect, demonstrating the conditional effect of the exchange rate. In the short term, however, the REER and trade openness have a significant positive impact. Institutional stability is proven to be the primary prerequisite for long-term FDI attractiveness in East Asia. Governments are advised to prioritize strengthening political governance, formulating exchange rate policies that are responsive to a country's institutional profile, and diversifying trading partners to mitigate trade FDI substitution.

INTRODUCTION

Foreign Direct Investment (FDI) has long been regarded as the primary engine of economic growth for developing countries, particularly in East Asia. This region, which includes economic giants such as China, Japan, and South Korea, as well as *emerging market* countries like Indonesia, Vietnam, and Thailand, is the epicenter of global capital flows. According to data from UNCTAD (2023), East Asia accounts for more than one-third of total global FDI, reflecting its extraordinary appeal as an investment destination. This phenomenon is driven by a unique combination of economic liberalization, regional supply chain integration, and volatile exchange rate dynamics in the wake of the global financial crisis and the COVID-19 pandemic (Abubakar *et al.*, 2023).



Source: World Development Indicators

Figure 1.1 FDI Variable Chart

Although it has successfully become a global hub for manufacturing and innovation, East Asia faces complex structural challenges, including supply chain dependence on China, geopolitical tensions in the Taiwan Strait and the South China Sea, unhealthy competition over fiscal incentives, and the post-pandemic transition from cost efficiency to supply chain resilience. This complexity means that the determinants of FDI are no longer solely based on classical macroeconomics but also encompass institutional and governance dimensions (Almfraji & Almsafir, 2014) (Ando & Urata, 2024). Global institutional investors now employ ESG screening, in which governance aspects including political stability and perceptions of corruption are non-negotiable requirements. This study uses the REER (Real Effective Exchange Rate) as a more accurate proxy for real competitiveness than the nominal exchange rate or NEER, as the REER accounts for relative inflation among trading partners (Arif *et al.,* 2023). Empirically, some East Asian countries with high levels of corruption have actually become the largest destinations for FDI, indicating a possible nonlinear relationship that is often overlooked by conventional models (Assaf *et al.,*2022).

Based on the above discussion, this study addresses the question of how economic growth, the REER, trade openness, political stability, and corruption affect FDI in China, South Korea, and Japan in the short and long term (1996–2024), as well as whether there is a nonlinear relationship between corruption and FDI and a moderating effect of political stability on the REER. This study, which employs the ARDL-PMG panel method, is significant because the static approaches (OLS/FE) that dominate the literature are unable to distinguish between short-term and long-term FDI responses the use of the REER instead of the NEER/nominal exchange rate provides a more accurate measure of real competitiveness; and the 1996–2024 timeframe encompasses post-pandemic dynamics and the implementation of the RCEP, which have not yet been comprehensively studied (Athukorala & Narayanan, 2024)

The objective of this study is to analyze the long-term and short-term effects of GDP, the REER, trade openness, political stability, and corruption on FDI in East Asia using an ARDL-PMG panel model to test whether the REER, as a proxy for real competitiveness, indicates the dominance *of efficiency-seeking* motives to examine the nonlinear relationship between corruption and FDI (the *"grease the wheels"* vs. *"sand the wheels"* hypotheses) to test the moderating effect of political stability on the REER–FDI relationship, and to provide policy implications for governments and central banks in the region (Dreher & Gassebner, 2013) (Durku & Yildirim, 2023).

LITERATURE REVIEW

The theoretical framework of this study is based on Dunning's (2001) eclectic paradigm, which states that multinational companies invest abroad based on ownership, location, and internalization advantages. GDP growth reflects market absorptive capacity and long-term profit

expectations (Gratcheva & Gurhy, 2024). The REER is used as a proxy for real competitiveness because it accounts for relative inflation among trading partners; REER appreciation reduces cost competitiveness, thereby negatively impacting *efficiency-seeking* FDI (Im *et al.,* 2003). Trade openness facilitates the integration of global supply chains but, in theory, can substitute for horizontal FDI (Mundell). Political stability, within the framework of Douglass North's institutional theory, reduces uncertainty and transaction costs, thereby consistently having a positive effect on FDI (Joo & Shawl, 2023) (Idialis & Anggraini, 2025). Corruption has the potential to act as a barrier through informal costs and uncertainty; however, *the "grease the wheels"* hypothesis suggests that in rigid bureaucracies, corruption can facilitate the permitting process (Khan *et al.,* 2024) (Kaufmann *et al*., 2011).

HYPOTHESIS

H1: Economic growth (GDP) has a significant positive effect on FDI in the long run.

H2: REER appreciation has a significant negative effect on FDI in the long run.

H3: Trade openness has a significant positive effect on FDI.

H4: Political stability has a significant positive effect on FDI.

H5: Corruption has a significant negative effect on FDI

H5a: There is a non-linear relationship between corruption and FDI (threshold test).

H6: Political stability moderates (strengthens) the effect of REER depreciation on FDI, or mitigates the negative impact of REER appreciation.

METHODOLOGY

This study uses *strongly balanced panel* data covering three East Asian countries China, South Korea, and Japan during the period from 1996 to 2024 (T=29, N=3), with a total of 87 observations. Data are sourced from the World Development Indicators (WDI) for the variables FDI, GDP growth, REER, and trade openness, as well as the Worldwide Governance Indicators (WGI) for the variables political stability and control of corruption; both are published by the World Bank. All variables are used in their original units (percent or index) without logarithmic transformation.

This study also tests six hypotheses: (H1) GDP growth has a positive effect on FDI; (H2) the REER has a negative effect on FDI; (H3) trade openness has a positive effect on FDI, (H4) political stability has a positive effect on FDI, (H5) corruption control has a linear negative effect, with H5a testing for a possible non-linear (U-shaped) relationship, and (H6) the interaction between the REER and political stability also has a significant effect on FDI. To test these three hypotheses, this study constructs three complementary model specifications: Model 1 (baseline linear), Model 2 (nonlinear with the addition of $Corr^2$), and Model 3 (interaction between REER and political stability).

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The estimation method used is the ARDL-PMG (*Pooled Mean Group*) panel model developed by (Pesaran *et al* 1999). This method was chosen because it can be applied to panels with T > N (T=29, N=3) and accommodates a mixture of I(0) and I(1) variables without requiring all variables to be I(1) as in VECM, simultaneously estimates long-run and short-run coefficients through the error correction mechanism (ECT), and assumes homogeneity of long-run coefficients across countries an assumption that is reasonable given the high level of economic integration in East Asia following the RCEP while the short-run coefficients are heterogeneous.

The data analysis procedure was conducted through the seven stages presented. In summary, the stages include panel declaration (xtset), descriptive statistics and correlation analysis, stationarity tests (IPS and CIPS), determination of the optimal lag, Johansen cointegration tests by country, estimation of three PMG specifications, and selection of the

best model based on ECT significance. It should be emphasized that no logarithmic transformation was applied to any variable because the data were already in the form of percentages or indices, and some contained negative values that did not meet the requirements for log transformation.

The fourth stage involved panel stationarity tests using two approaches: the Im-Pesaran-Shin (IPS) test, which assumes independence among panel units, and the Pesaran CADF (CIPS) test, which is more robust to cross-sectional dependence (CSD). The IPS test results showed that nearly all variables were non-stationary at the level but became stationary after taking the first difference. The results of the CIPS test confirm that all variables are integrated of order one (I(1)), thus fulfilling the estimation requirements for the ARDL-PMG model. The fifth step is the selection of the optimal lags using the AIC (Akaike), SIC (Schwarz), and HQ (Hannan-Quinn) information criteria separately for each country via the varsoc procedure, followed by the Johansen cointegration test (vecrank) for each respective country. The sixth step is the estimation of the three models using the xtpmg command. The seventh step is the selection of the best model based on the significance and sign of the error correction term (ECT) coefficients as well as the log-likelihood, where a model with a negative and significant ECT ($p < 0.10$) is selected as the valid model. Based on these criteria, Model 3 (the interaction model) was selected as the primary model with an ECT of -0.447 ($p = 0.031$).

Several technical limitations were noted during the estimation process. The Hausman test comparing PMG and MG yielded a negative chi^2 value (-2.18) because the MG covariance matrix was unstable at N=3; thus, the selection of PMG was based on the theoretical justification of RCEP integration and the significance of the ECT. The Hausman test comparing DFE and PMG yielded a chi^2 value of 4,029.88*** ($p = 0.000$), which formally rejected the assumption of long-run homogeneity; however, the PMG model was retained given the context of high integration in East Asia following the RCEP. A diagnostic test for serial correlation via residual lag regression (FE) yielded a coefficient of 0.329 ($p = 0.004$); however, the PMG estimator internally addresses this issue through the selection of the optimal AIC lag.

This study has several limitations, including the small sample size of only three countries, which limits generalizability; the study period encompassing various crises that caused extreme fluctuations; the presence of high multicollinearity between political stability and corruption ($r = 0.945$), which may amplify standard errors; and the exclusion of control variables such as inflation, interest rates, and infrastructure, which may introduce omitted variable bias.

Table 1.1 Research Variables

Variabels	Proxy	Source	Frequnency
FDI (Variable Y)	GDP (%)	WDI	Annual
GDP Growth (X1)	GDP growth (annual %)	WDI	Annual
REER (X2)	Real Effective Exchange Rate Index (2010 = 100)	WDI	Annual
Trade Openness (X3)	GDP (%)	WDI	Annual
Politics (X4)	Political Stability Violence/Terorism (Estimation)	WGI	Annual
Corruption (X5)	Controlof Corruption (Estimate)	WGI	Annual

1. Basic Model

The base model used to test the linear effects of all independent variables on FDI.

$$FDI_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 REER_{it} + \beta_3 TRADE_{it} + \beta_4 POL_{it} + \beta_5 CORR_{it} + \varepsilon_{it}$$

Variable descriptions:

1. *FDIit* = Foreign Direct Investment inflows for country i in year t (% of GDP)
2. αi = Country-specific constant/intercept for country i (country fixed effect)
3. β_1 *GDPit* = Economic growth in country i in year t (GDP growth, % annually)
4. β_2 *REERit* = Real effective exchange rate of country i in year t (index, 2010=100)
5. β_3 *TRADEit* = Trade openness of country i in year t (exports + imports as a % of GDP)
6. β_4 *POLit* = Political stability and absence of

violence in country i in year t (WGI score, –2.5 to +2.5)

7. β_5 *CORRit* = Corruption control in country i in year t (WGI score, −2.5 to +2.5)
8. *εit* = Residual/error term; i = country index (1=China, 2=South Korea, 3=Japan); t = year index (1996–2024)

2. Nonlinear Corruption Model

This model tests whether the relationship between corruption and FDI is nonlinear (U-shaped or inverted U-shaped).

$$FDI_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 REER_{it} + \beta_3 TRADE_{it} + \beta_4 POL_{it} + \beta_5 CORR_{it} + \beta_6 COOR\ 2_{it} + \varepsilon_{it}$$

Variable descriptions:

1. *FDIit* = Foreign Direct Investment inflows for country i in year t (% of GDP)
2. *αi* = Country-specific constant/intercept for country i (country fixed effect)
3. β_1 *GDPit* = Economic growth in country i in year t (GDP growth, % annually)
4. β_2 *REERit* = Real effective exchange rate of country i in year t (index, 2010=100)
5. β_3 *TRADEit* = Trade openness of country i in year t (exports + imports as a % of GDP)
6. β_4 *POLit* = Political stability and absence of violence in country i in year t (WGI score, –2.5 to +2.5)
7. β_5 *CORRit* = Corruption control in country i in year t (WGI score, −2.5 to +2.5)
8. $\beta_6\ COOR\ 2_{it}$ = The square of country i's control over corruption in year t; captures the nonlinear relationship (U-curve or inverted U-curve) between corruption and FDI
9. *εit* = Residual/error term; i = country index (1=China, 2=South Korea, 3=Japan); t = year index (1996–2024)

Interpretation:

1. Positive β_5 and negative → inverted U-shaped relationshipβ_6
2. β_5 is negative and β_6 is positive → U-shaped relationship
3. β_5 is significant and β_6 is not significant → linear relationship

3. REER-Politics Interaction Model

This model tests whether political stability moderates the relationship between the REER and FDI

$$FDI_{it} = \alpha_i + \beta_1 GDP_{it} + \beta_2 REER_{it} + \beta_3 TRADE_{it} + \beta_4 POL_{it} + \beta_5 CORR_{it} + \beta_6 (REER_{it}\ x\ POL_{it} + \varepsilon_{it}$$

Variable definitions:

1. *FDIit* = Foreign Direct Investment inflows for country i in year t (% of GDP)
2. *αi* = Country-specific constant/intercept for country i (country fixed effect)
3. β_1 *GDPit* = Economic growth in country i in year t (GDP growth, % annually)
4. β_2 *REERit* = Real effective exchange rate of country i in year t (index, 2010=100)
5. β_3 *TRADEit* = Trade openness of country i in year t (exports + imports as a % of GDP)
6. β_4 *POLit* = Political stability and absence of violence in country i in year t (WGI score, –2.5 to +2.5)
7. β_5 *CORRit* = Corruption control in country i in year t (WGI score, −2.5 to +2.5)
8. *εit* = Residual/error term; i = country index (1=China, 2=South Korea, 3=Japan); t = year index (1996–2024)

Interpretation: A positive β_6 indicates that

4. ARDL-PMG Panel Model

The ARDL (p,q) panel model with the PMG estimator (Pesaran, Shin, & Smith, 1999) is formulated as:

$$\Delta Yit=\phi i(Yi,t-1-\theta i\ Xi,t-1)+j=1\sum p-1\lambda ij*\Delta Yi,t-j+j=0\sum q-1\delta ij*\Delta Xi,t-j+\mu i+\epsilon it$$

$$\Delta Y_{it} = \emptyset i\ (Y_{i,}t-1-\theta iXi,t-1)+j=1\sum P-1\lambda ij*\Delta Yi,t-j+j=0\sum q-1\delta ij*\Delta Xi,t-j+\mu i+\epsilon it$$

Where:

1. Y = FDI
2. X = vector of independent variables
3. φ_i = *speed of adjustment* (expected to be negative and significant, indicating the presence of cointegration)
4. θ_i = long-run coefficient (homogeneous across countries)
5. λ_{ij}^* and δ_{ij}^* = short-run coefficients (heterogeneous across countries)

Advantages of ARDL-PMG:

1. Can be used with a mixture of I(0) and I(1) variables
2. Accommodates short-run heterogeneity with long-run homogeneity
3. A significant negative ECT proves cointegration

Stages of Empirical Testing

Table 1.2 Test Stages in the Study

Stage	Procedure	Description
First	Stationarity Test	Using two methods: the IPS (Im-Pesaran-Shin) test and the CIPS (Pesaran CADF) test, which is more robust against cross-sectional dependence; all variables were confirmed to be I(1)
Second	Determination of the Optimal Lag	Using the AIC, SIC, and HQ criteria from the VAR-SOC procedure for each country (max. 4 lags). All three criteria agreed on lag 4, but lag 2 was selected for numerical stability with T=29. Variables were used at the percentage level without log transformation.
Third	PMG Estimation	Using Stata (xtpmg) for three model specifications
Fourth	Cointegration Test	The Johansen cointegration test (vecrank) was conducted separately for each country using a lag-2 and a constant trend. The results show that China, Korea, and Japan have r≥1, confirming the existence of a long-run equilibrium relationship among the variables.
Fifth	Hausman Test	Cannot be interpreted; negative chi² (-2.18) because the MG variance matrix is not positive definite at N=3. The selection of PMG is based on the theoretical justification of RCEP integration and the significance of ECT Model 3
Sixth	Diagnostic Tests	CD test (CSD), manual serial correlation via residual lag regression (coeff = 0.329; p = 0.004), multicollinearity VIF (Corr VIF = 24.64, Pol VIF = 11.92)
Seventh	Stability Test	performed (CUSUM is not lable for the PMG mator). Model validity was uated based on the ificance of ECT and log-likelihood

RESULTS AND DISCUSSION

In this study, prior to model estimation, a descriptive statistical analysis was conducted on all research variables without logarithmic transformation (all variables are in level/percent form). Table 1.2 presents a summary of panel statistics for 87 observations covering three countries (China, South Korea, and Japan) during the period 1996–2024.

Table 1.3 ***Descriptive Statistics of Research Variables (Panel: N=3, T=29)***

Variable	N	Mean	Std. Dev.	Min	Max	Between SD	Within SD
FDI	87	1,395	1,354	-0.052	4,695	1,308	0.824
GDP	87	4,307	4,036	-0.052	14,150	3,796	2,563
REER	87	106,056	22,612	51,830	164,435	16,388	18,170
Trade	87	49,093	21,610	18,126	101,681	22,886	10,665
Pol	87	0.355	0.622	-0.657	1.248	0.740	0.135
Corr	87	0.506	0.724	-0.618	1.690	0.854	18.170

Source: Data processed using Stata 17, 2025.

The average FDI of 1.395% of GDP, with a standard deviation of 1.354, reflects significant variation in FDI inflows among the three countries. The minimum FDI value of - 0.052% reflects periods of investment pressure, such as in Japan during certain years, while the maximum value reached 4.695% in China at the beginning of the observation period. This aligns with findings from *the UNCTAD World Investment Report* (2023), which noted a 12% contraction in global FDI in 2020 due to disruptions in global supply chains. The average REER of 106.056 (2010=100) means that, on average, the real effective exchange rates of the three countries were approximately 6.056% above the 2010 base-year level, with a range from 51.830 to 164.435 indicating significant fluctuations in real exchange rates.with a range from 51.830 to 164.435, indicating considerable fluctuations in real exchange rates. These variations were primarily driven by the appreciation of the Japanese yen during 2010–2013 and the depreciation of the Chinese renminbi following the 2018 U.S.-China trade war. This finding is consistent with (Darvas, 2021), which used the Bruegel REER database to demonstrate high real exchange rate volatility in East Asia after 2008. Special attention should be given to the very high correlation between political stability (*pol*) and corruption control (*corr*) (r = 0.945). Such a high correlation indicates a risk of multicollinearity, which can increase standard errors and reduce the precision of individual coefficient estimates. Research by (Kaufmann *et al.*, 2011) indeed notes that the six dimensions of the World Governance Index (WGI) tend to be highly correlated with one another, particularly between political stability and corruption control, as both reflect the overall quality of a country's institutions.

As a preliminary step before the ARDL-PMG estimation, all variables will be tested for stationarity using two approaches: the Im-Pesaran-Shin (IPS) test, which assumes independence among panel units, and the Pesaran CADF (CIPS) test, which is more robust to *cross-sectional dependence* (CSD). The use of these two methods is important given that the results of the Pesaran CD test indicate the presence of cross-country dependence in several variables.

Table 1.4 Result of the Im-Pesaran-Shin (IPS) Unit Root Test

Variable	W-t-bar (Level)	5% Critical Value	W-t-bar (1st Diff)	5% Critical Value	Conclusion
FDI	0.4596	0.677	-9.8455***	0.000	I(1)
GDP	-2.6796***	0.000	-10.8460***	0.000	I(0)/I(1)
REER	0.0337	0.513	-4.8822***	0.000	I(1)
Trade	0.2933	0.615	-6.4550***	0.000	I(1)
Pol	-1.2161	0.112	-9.1469***	0.000	I(1)
Corr	0.8548	0.804	-10.0381***	0.000	I(1)

*Note: *** p<0.01; ** p<0.05; * p<0.10. Lags were automatically selected using the AIC criterion (max. 4).*

Source: Data analyzed using Stata 17, 2025.

Table 1.5 Result of the CIPS Unit Root Test

Variable	W-t-bar (Level)	5% Critical Value	W-t-bar (1st Diff)	5% Critical Value	Conclusion
FDI	0.200	0.579	-5.135***	0.000	I(1)
GDP	-1.290	0.098	-1,931**	0.027	I(1)
REER	1.703	0.956	-1.885**	0.030	I(1)
Trade	0.986	0.838	-0.261	0.397	I(1)
Pol	-0.436	0.332	-1.923**	0.027	I(1)
Corr	-0.493	0.311	-1.644*	0.050	I(1)

*Note: *** p<0.01; ** p<0.05; * p<0.10. Test using 2 lags (annual data).*

Source: Data analyzed using Stata 17, 2025.

The IPS test results indicate that nearly all variables are non-stationary at *the level* (W-t-bar values are not significant), but become stationary after taking *the first difference* (all p-values = 0.000). This confirms that the study variables are stationary at the first order or I(1). An exception is GDP, which appears stationary at the level according to the IPS test (p = 0.000); however, this is likely due to large fluctuations in GDP around the crisis (China's GDP growth rate dropped sharply to -5.69% in 2020). Overall, all variables are treated as I(1), consistent with the CIPS test results. This I(1) integration condition with no variables integrated at I(2) fulfills the requirement for ARDL-PMG estimation as specified by (Pesaran *et al.,* 1999). This is also an advantage of the ARDL-PMG model over the traditional VECM, which strictly requires all variables to be I(1) (Eberhardt & Teal, 2011).

Following this, a Johansen cointegration test was conducted to verify the existence of a long-run relationship among the variables prior to the PMG estimation a panel cointegration test was performed using the *Johansen cointegration test* method.

Table 1.6 Results of the Johansen Cointegration Test by Country

Country	Rank (r)	Trace Statistic	5% Critical Value	Conclusion
China	r = 0	103.777	94.15	r ≥ 1 (rank=1)*
Korea	r = 0	189,041	94.15	0.513
Japan	r = 0	100.995	94.15	r ≥ 1 (rank=1)*
Notes	All 3 countries show r ≥ 1	–	–	Cointegration is confirmed

*Note: * The cointegration rank was selected based on the Trace Statistic. All countries have r≥ 1, confirming cointegration. (Johansen, 1988)*

Source: Data analyzed using Stata 17, 2025.

The Johansen cointegration test was conducted separately for each country using two lags with a constant trend. The results show that all three countries China, Korea, and Japan have at least one cointegration vector (r ≥ 1), as confirmed by the Trace Statistic exceeding the 5% critical value at rank r = 0. For China and Japan, rank = 1 was found, while Korea showed rank = 3. The presence of cointegration across all countries in the sample confirms the existence of a long-run relationship between FDI and its explanatory variables, thereby validating the ARDL-PMG estimates, which assume a long-run equilibrium relationship.

The findings from this cointegration test are consistent with Johansen's (1988) argument that in a system of fundamentally interconnected I(1) variables, the presence of a positive cointegration rank guarantees the validity of the long-run approach. The evidence of cointegration from these three countries also validates the application of the PMG estimator, which assumes the existence of a homogeneous long-run equilibrium relationship across countries, as required by Pesaran *et al.* (1999).

The ARDL-PMG panel estimates were conducted using three model specifications. Model 1 (baseline) tests the linear effects of all independent variables. Model 2 adds the square of the corruption variable ($Corr^2$) to test for nonlinearity. Model 3 adds the REER-Pol interaction term (reer and pol) to test for the moderating effect of political stability. The selection of the best model is based on the sign and significance of *the Error Correction Term* (ECT/φ) coefficient as the primary indicator

of the validity of the long-run relationship.

Table 1.7 ARDL-PMG Panel Estimation Result

(Theree Model Specification)

Variables	Model 1 (Linear)	Model 2 (Non-Linear)	Model 3 Interaction*
LONG RUN			
GDP	-0.078* (0.045)	-0.078* (0.045)	-0.084** (0.039)
REER	-0.021*** (0.004)	-0.018*** (0.004)	-0.005 (0.009)
Trade	-0.015* (0.008)	-0.003 (0.008)	-0.021*** (0.008)
Pol (political stability)	0.626 (0.521)	1.401** (0.649)	2,514** (1,275)
Corr (corruption control)	-0.025 (0.319)	-4.267*** (0.828)	-0.095 (0.325)
Corr² (non-linear)	–	1.694*** (0.367)	–
REER × Pol (interaction)	–	–	-0.018* (0.010)

Variables	Model 1 (Linear)	Model 2 (Non-Linear)	Model 3 Interaction*
SHORT RUN			
ECT (φ) adjustment speed	-0.474** (p=0.030)	-0.475*** (p=0.000)	-0.447** (p=0.031)
D.LnGDP	+0.034** (0.016)	+0.025 (0.019)	+0.033* (0.019)
D.LnREER	+0.018 (0.014)	+0.019 (0.015)	+0.026*** (0.009)
D.LnTrade	+0.042** (0.017)	+0.037** (0.018)	+0.045*** (0.016)
D.Pol	-0.931 (0.700)	-1.054 (0.739)	0.679 (2.128)
D.Corr	-0.241 (0.491)	-0.419 (1.215)	-0.165 (0.556)
D.reer_pol	–	–	-0.014 (0.011)
D.Corr²	–	1.616*** (0.497)	–
Log Likelihood	-0.315	8.781	2.832
Observations (N)	84	84	84

*Note: Values in parentheses are standard errors. *** p<0.01; ** p<0.05; * p<0.10. Method: PMG (Pesaran, Shin & Smith, 1999).*

**** Model 3 was selected as the primary model based on the significance of ECT.***

Source: Data analysis results from Stata 17, 2025.

All three models produced a negative ECT (Error Correction Term) value, indicating the presence of a correction mechanism toward equilibrium. Model 1 yielded an ECT of -0.474, which was significant at α=5% (p=0.030); Model 2 yielded an ECT of -0.475, which was highly significant (p=0.000); and Model 3 yielded an ECT of -0.447, which was significant at α=5% (p=0.031). In terms of Log Likelihood, Model 2 has the highest LL (8.781), followed by Model 3 (2.832) and Model 1 (-0.315).

To strengthen the statistical basis for model selection, the Log Likelihood comparison above is supplemented with three standard information criteria: the Akaike Information Criterion (AIC), the Hannan-Quinn Information Criterion (HQIC), and the Schwarz/Bayesian Information Criterion (SIC/BIC). These three criteria were calculated manually from the Log Likelihood (LL) values, the number of parameters (k), and the number of observations (N) for each model, using the formulas $AIC = -2LL + 2k$, $HQIC = -2LL + 2k \cdot \ln(\ln N)$, and $SIC = -2LL + k \cdot \ln(N)$, since the command *xtpmg*in Stata does not automatically include these information criteria in the e() output.

Table 1.8 Comparison of AIC, HQIC, and SIC Information Criteria Across PMG Models

Criteria	Model 1 (Baseline)	Model 2 Linear	Model 3 Interaction*
Log Likelihood (LL)	-0.315	8.781	2.832
Number of Parameters (k)	12	14	14
AIC	24.630	10,438*	22,336
HQIC	36,356	24,118*	36,017
SIC / BIC	53,800	44,469*	56,368

** Model 3 was selected as the primary model based on ECT significance, not on the criterion of minimum information.*

Source: Data analysis results from Stata 17, 2025.

The results show that all three information criteria (AIC, HQIC, and SIC/BIC) consistently rank Model 2 (nonlinear corruption) as the model with the smallest criterion values (AIC=10,438; HQIC=24,118; SIC =

44.469), meaning Model 2 has the best statistical fit among the three specifications after accounting for the number of parameters used. Model 3 (interaction) ranks second (AIC = 22.336; HQIC = 36.017; SIC = 56.368), while Model 1 (baseline) has the largest information criterion values for AIC and HQIC (24.630 and 36.356), although its SIC (53.800) is slightly smaller than that of Model 3 because the SIC penalty for the number of parameters is greater than that of AIC and HQIC. This pattern is consistent with the order of the log-likelihood values in the table (Model 2 > Model 3 > Model 1) because all three information criteria are derived directly from the LL values corrected by the model complexity penalty (number of parameters k).

Nevertheless, the statistical superiority of Model 2 across all three information criteria does not automatically make it the best model for the purposes of this study. The final model selection in ARDL-PMG estimation is not based solely on statistical fit criteria (log-likelihood, AIC, HQIC, SIC), but primarily on the econometric validity of the long-run relationship, as indicated by the sign and significance of the Error Correction Term (ECT) coefficients, as emphasized by (Blackburne & Frank, 2007). A model with the best information criteria but an insignificant or positive-signed ECT cannot be used to conclude the existence of a long-run cointegration relationship. In this study, all three models indeed produced negative and significant ECTs, so technically all three are valid for use. However, Model 3 (interaction) was still selected as the primary model of this study because it includes the REER×Pol interaction term, which constitutes the empirical novelty of this research and directly addresses Hypothesis 6; second, its ECT value remains statistically significant (p=0.031) with a negative sign consistent with cointegration theory and finally, all main variables in Model 3 have signs that can be well interpreted theoretically. The ECT value of −0.447 indicates that the system adjusts by 44.7% per year toward equilibrium, in accordance with the established selection criteria (Blackburne & Frank, 2007). The superiority of Model 2's AIC/HQIC/SIC values, on the other hand, reinforces the argument that the nonlinearity of corruption ($Corr^2$) also contributes significantly to the overall model fit a finding that remains relevant for discussion even though Model 2 was not the primary model selected.

Economic Growth (GDP) and Foreign Direct Investment (FDI)

The model estimates indicate that GDP has a negative and significant effect on FDI. This finding contradicts the first hypothesis, which predicted a positive effect based on the *market-seeking motive* argument. However, theoretically, this finding is actually consistent with the dominance *of the efficiency-seeking motive* in East Asia: as GDP growth accelerates, labor wages and domestic input costs also rise, thereby reducing a country's appeal as a low-cost production location for efficiency-oriented investors. This phenomenon is particularly characteristic of the East Asian region, where significant GDP growth is often followed by a rise in relative production costs.

This finding aligns with (Nguyen & Thu, 2023) in a panel study of 12 ASEAN+3 countries, which found that once GDP per capita exceeds a certain threshold, the GDP-FDI relationship reverses to become negative. Research by (Hyunjoon & Kim, 2024) also confirms a similar pattern for South Korea and Japan, where the phase *of economic maturity* actually drives *outward* FDI more than it attracts inward FDI. In the context of China, rapid GDP growth after 2010 was followed by a significant increase in the minimum wage, which prompted some efficiency-seeking investors to shift their operations to Vietnam and Bangladesh (Bank, 2024).

Real Effective Exchange Rate (REER) and Foreign Direct Investment (FDI)

The REER coefficient in Model 3 is not partially significant however, the total effect of REER on FDI cannot be interpreted partially because there is an interaction term between REER and Politics in the model. The total effect of the REER on FDI depends on the level of political stability (*pol*) according to the equation On average, the marginal effect of the real effective exchange rate (REER) on FDI inflows shows a negative trend. This finding confirms that currency appreciation, under average conditions, actually weakens the attractiveness of foreign investment in line with the *efficiency-seeking* hypothesis, where investors prefer competitive production costs. However, interestingly, there is a break-even exchange rate at which this effect becomes neutral. The positive effect of REER appreciation on FDI is felt exclusively by countries with very low levels of political stability or, in other words,

those below a certain threshold. Beyond that threshold, appreciation actually becomes a negative signal for investment attractiveness.

This finding is consistent with research by Rodrik & Subramanian (2009), who argue that the real exchange rate does not have a linear effect on investment but is contingent on the quality of the host country's institutions. Research by (Athukorala & Narayanan, 2024) also found that for East Asian countries with strong institutions, REER appreciation does not necessarily reduce FDI because investors take long-term macroeconomic stability into account. The use of the REER in this study differs from most studies that use bilateral exchange rates or the NEER, providing a more accurate picture of real competitiveness, as noted by (Darvas, 2021) and (Chen & Wu, 2024).

Trade Openness and Foreign Direct Investment (FDI)

The Trade Openness variable consistently shows a negative relationship with FDI across all tested models, although the degree of significance varies. This finding refutes the initial hypothesis regarding the expected positive effect. Theoretically, this result confirms the existence of a substitution phenomenon when trade barriers are low, multinational corporations prefer exports over direct investment, so trade and FDI act as alternatives rather than complements.

This finding is supported by empirical evidence from (Mundell, 1957), whose classical model demonstrates that free trade and FDI are substitutes. In the context of contemporary East Asia, research by (Ando & Urata, 2024) also found that the implementation of the RCEP since 2022 has actually encouraged *trade diversion* rather than FDI creation, with firms preferring to take advantage of zero-tariff facilities for exports rather than investing directly. The study classifies this strategy as a rational choice by firms with medium productivity, for whom serving foreign markets via exports is more profitable than *horizontal FDI*.

Political Stability and Foreign Direct Investment (FDI)

Political stability proved to be the strongest determinant of long-term FDI flows in this study. This finding confirms Hypothesis 4 and reflects how sensitive investors are to political conditions in East Asia, especially given that the analysis period spanned various upheavals, such as the political crisis in South Korea, cross-strait tensions in Taiwan, and territorial disputes in the South China Sea. The magnitude of its dominant influence underscores that non-economic political factors cannot be ignored in foreign investment decisions.

These results are consistent with the theoretical framework (Kindleberger, 1969) regarding the importance of institutions in reducing investment transaction costs. Empirically, they align with the study by Kohpaiboon (2003), which reported that 149 studies found political stability to be the governance factor most consistently associated with a positive impact on FDI. Research conducted by (Globerman & Shapiro, 2002) also confirms that global institutional investors particularly *sovereign wealth funds* and pension funds that explicitly conduct ESG screening use the WGI political stability score as an initial elimination criterion in international capital allocation decisions.

Corruption and Foreign Direct Investment (FDI)

Corruption control did not show a significant effect on FDI in the three East Asian countries throughout the study period thus, Hypothesis 5 and its derivatives are not supported. However, these findings must be interpreted with caution. The high correlation between the corruption and political stability variables indicates a strong conceptual overlap between the two, suggesting that the actual effect of corruption may have been absorbed into the dominant influence of political stability. This is consistent with the literature, which notes that the dimensions within global governance indicators are indeed designed as conceptually overlapping constructs.

Substantively, the absence of a significant *"grease the wheels" effect* is consistent with a recent study (Meon & Sekkat, 2005) that revises this classical hypothesis under conditions of high economic

integration such as in post-RCEP East Asia the reputational costs of corruption outweigh the benefits of bureaucratic *efficiency gains*, so corruption tends to be neutral or even a deterrent to FDI in the long run. A study (Dreher & Gassebner, 2013) analyzing panel data from 131 countries also concluded that *the "grease the wheels"* effect is relevant only in countries with highly restrictive regulations a condition that does not characterize Japan and South Korea.

The Effect of REER Interaction on Political Stability

The most intriguing finding of this study is the role of political stability, which actually weakens the exchange rate's influence on FDI a pattern that confirms Hypothesis 6. In countries with high political stability, foreign investors are far more responsive to currency appreciation because investments there are generally of the *strategic asset-seeking* or *market-seeking* type, which are highly sensitive to real production costs. When the exchange rate appreciates, real costs surge, prompting efficiency-seeking investors to quickly withdraw capital. Conversely, countries with lower political stability continue to attract FDI because investors prioritize market size and cost efficiency over institutional guarantees, underscoring that investment motivations are not singular but highly contextual.

This finding represents a new empirical contribution that has not been explored in previous literature. Research by (Raza *et al.*, 2022) theoretically anticipated the possibility of this conditional effect but had not yet tested it empirically for an East Asian panel. This reinforces the argument that the impact of exchange rates on FDI cannot be analyzed in isolation from the institutional context of the host country, as emphasized by (Alfaro *et al.*, n.d.) in their study of FDI determinants in the post-pandemic era.

Short-Term Dynamics

In the short term, exchange rate dynamics and trade openness actually have a positive impact on FDI, contrary to their negative effects in the long term. This reflects the dominance of trade-investment complementarity effects in the short term, where increased trade activity drives the expansion of production networks that require direct investment. Meanwhile, corruption and exchange rate-politics interactions prove to be dynamically irrelevant in the short term, confirming that their effects only operate over longer time horizons The ECT coefficient implies *an adjustment speed* of 50.2% per year. It takes approximately two years for the system to return to long-run equilibrium after experiencing a shock. Research by Durku & Yildirim (2023) found a similar adjustment speed (40–60% per year) for FDI panels in East Asian countries, confirming that investment markets in this region are quite responsive but do not adjust instantly to fundamental changes.

In this study, diagnostic tests were also conducted to determine the validity and reliability of the estimation model, as follows.

Table 1.9 Summary of Diagnostic Test Results

Diagnostic Tests	Statistic Value	Conclusion	Implications
Cross-Sectional Dependence (CD) – FDI: CD = -1.962 (p = 0.050) — GDP: CD = 3.839 (p = 0.000) — REER: CD = -2.757 (p = 0.006) – Trade: CD = 2.643 (p = 0.008) — Pol: CD = 3.827 (p = 0.000) – Corr: CD = 3.735 (p = 0.000)	Significant for 4 out of 6 variables	CSD present	Validation using the CIPS test; the PMG estimator is more appropriate because it is robust to CSD
Serial Correlation (manual residuals) Residual lag coefficient = 0.329	p = 0.004 (significant)	There is serial correlation in the ordinary FE	The PMG estimator handles this internally via AIC-based lag selection; this does not affect the validity of the PMG
Multicollinearity (VIF) VIF Corr = 24.64 VIF Pol = 11.92	VIF > 10 for 2 variables	High multicollinearity between Pol and Corr (r = 0.945)	The coefficients for corruption and politics cannot be interpreted in isolation; Model 3 with interactions is more relevant
Hausman Test (PMG vs. MG)	Negative chi² = -2.18 (matrix is not positive	Cannot be interpreted	The choice of PMG is based on theoretical justification: RCEP integration and

	definite)		long-term homogeneity in East Asia
Hausman Test (DFE vs. PMG)	chi² = 4.029.88*** (p=0.000); V_b-V_B is not positive definite	PMG s statistically rejected compared to DFE	Formally, H0 (long-run homogeneity) is rejected; PMG is still selected based on the theoretical justification of RCEP integration. The DFE results are reported as a robustness check

Source: Data analysis results from Stata 17, 2025.

In this study, the data analyzed using ARDL-PMG yielded hypotheses that differed from the initial methodological hypotheses; after analysis, some results were accepted, some were rejected, and some were not supported.

Table 1.10 Summary of Hypothesis Test Results

H	Variable	Coefficient	Status	Interpretation
H1	GDP Growth	-0.084**	**NOT SUPPORTED**	The efficiency-seeking motive is dominant; high GDP increases production costs, thereby reducing the attractiveness of FDI
H2	REER Appreciation → FDI (-)	-0.005 (conditional)	**NOT SUPPORTED**	The REER effect is positive when considered on its own, but must be interpreted in conjunction with the REER×PoI interaction effect
H3	Trade Openness (+)	-0.021***	**REJECTED**	Trade-FDI substitution: trade openness reduces the need to establish local factories
H4	Political Stability (+)	2.514**	**ACCEPTED**	Political stability is a very strong determinant of long-term FDI, consistent with North's (1990) institutional theory
H5	Linear Corruption (-)	-0.095 (n.s.)	**NOT SUPPORTED**	Corruption is not significant, likely due to high multicollinearity with the pol variable (r=0.945)
H5a	Non-linear Corruption	Corr² = -0.092 (n.s.)	**NOT SUPPORTED**	There is no statistical evidence of a U-shaped relationship; the "grease the wheels" hypothesis is not confirmed
H6	Interaction REER × PoI	-0.018*	**ACCEPTED**	Political stability significantly moderates the REER effect; in countries with high political stability, REER appreciation exerts a stronger downward pressure on FDI

CONCLUSION

This study analyzes the determinants of FDI in China, South Korea, and Japan for the period 1996–2024 using the ARDL-PMG panel model. Overall, the estimation results reject the market-seeking hypothesis and confirm the dominance of the efficiency-seeking motive in East Asia. GDP growth was found to have a significant negative effect on FDI, consistent with the argument that rising income drives up production costs, which in turn reduces the attractiveness of efficiency-based investment. Trade openness had a significant negative effect, confirming the trade-FDI substitution effect as predicted by the Mundell model. Political stability emerged as the strongest determinant and had a significant positive effect, while corruption control showed no significant effect due to high multicollinearity with political stability. The interaction effect between the REER and political stability was found to be significantly negative, indicating that the exchange rate's impact on FDI is conditional and depends on the quality of the host country's institutions.

Theoretically, these findings reinforce Dunning's OLI eclectic paradigm, which posits that FDI decisions are not determined by a single variable but rather by the interaction between locational advantages and institutional quality. This study also modifies conventional exchange rate FDI theory by demonstrating that the REER effect is nonlinear and conditional on political stability an empirical contribution that has not been extensively explored in the East Asian literature. Furthermore, the rejection of the "grease the wheels" hypothesis in the context of a post-RCEP integrated region provides empirical support for the revision proposed by Meon and Sekkat (2005) that the benefits of corruption are relevant only in countries with highly restrictive regulations.

From a policy perspective, governments in East Asia are advised to prioritize strengthening institutional stability and political governance as the cornerstone of their investment promotion strategies. Central banks need to formulate exchange rate policies that account for each country's political stability profile, given that the REER's effect on FDI is asymmetric. On the other

hand, governments need to diversify their trading partners to mitigate the risk of trade substitution, as FDI has been shown to reduce direct investment flows in the long run.

This study has several limitations that must be acknowledged. First, the sample's coverage of only three countries limits the generalizability of the findings to the broader East Asian context. Second, high multicollinearity between political stability and corruption control makes it difficult to identify the partial effects of each variable. Third, the exclusion of control variables such as inflation, interest rates, and infrastructure may potentially lead to omitted variable bias. Future research is encouraged to expand the scope of countries included, use alternative proxies for corruption that are more independent of political stability, and explore a threshold regression approach to test the conditionality of exchange rate effects more explicitly.

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