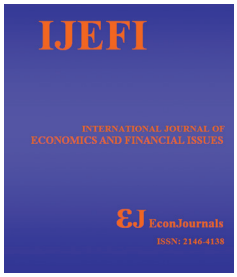

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Dynamic Interactions between FDI and Economic Growth in China: An ARDL Analysis

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ABSTRACT

The Chinese economy has benefited from foreign direct investment (FDI) by facilitating capital accumulation, technological transfer, industrial upgrading, and employment creation. However, the complexity of the relationship between FDI and economic growth persists, contributed by factors like global economic shifts, policy adjustments, and structural transformations. Thus, this study looked at the impact of FDI on influencing economic growth in China in terms of the short-term and long-term impacts. This study utilized the Autoregressive Distributed Lag or the ARDL model, covering data spanning from 1990 to 2023. This study responds to the need to fill the literature gap, including the absence of long-term dynamic analysis, limited empirical studies incorporating post-2020 data, and the neglect of asymmetric effects in the FDI-growth relationship. Empirical findings indicate that while FDI has historically driven economic expansion, its effectiveness varies across different economic stages, with potential crowding-out effects or dependency issues emerging over time. Moreover, recent geopolitical tensions, trade disruptions, and structural shifts in FDI composition have significantly altered its impact on GDP growth. The study concludes that optimizing FDI quality, fostering domestic enterprise competitiveness, and enhancing governance frameworks are essential for maximizing the positive effects of FDI in China, allowing China to grow its economy sustainably. The findings provide valuable insights for policymakers in designing effective foreign investment strategies that align with China's evolving economic landscape.

Keywords: Foreign Direct Investment, Economic Growth, ARDL Model, China, Structural Transformation, Policy Implications
JEL Classifications: F21, F23, O11, F43, O47

1. INTRODUCTION

Since 1990, China has experienced several stages in its foreign direct investment (FDI) activity, including rapid growth, fluctuations, and structural optimization. According to data, FDI inflows increased from $3.487 billion in 1990 to $171.782 billion in 2008 (Ministry of Commerce of China [MOFCOM], 2023), showing a significant upward trend. When China entered the World Trade Organization (WTO) in 2001, its FDI experienced substantial growth, with foreign enterprises widely entering

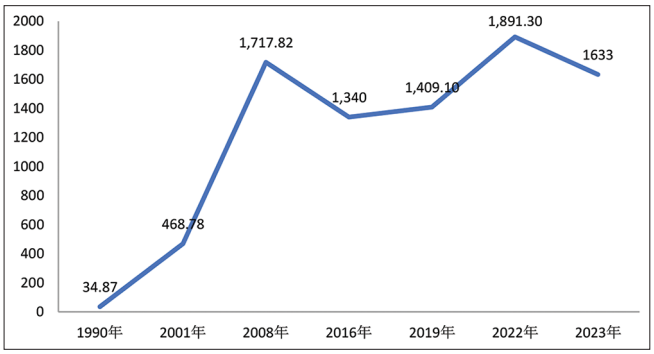
manufacturing, high-tech industries, and services, driving rapid economic expansion. However, the 2008 global financial crisis led to a slowdown in FDI growth, and by 2016, FDI declined to $134.0 billion, reflecting an adjustment in the structure of foreign capital inflows (National Bureau of Statistics of China [NBS], 2023).

As shown in Figure 1, after 2019, FDI rebounded to $140.91 billion, but its growth rate slowed due to global economic uncertainty and U.S.-China trade tensions (MOFCOM, 2023). In 2022, FDI reached a record high of $189.13 billion, reflecting the efficiencies of China in growing their business market and their prowess in generating major high-quality foreign investment. However, in 2023, FDI declined to $163.3 billion, indicating that global investment climate shifts, supply chain adjustments, and geopolitical factors have influenced FDI inflows into China (MOFCOM, 2023).

The ever-growing performance of FDI has contributed handsomely to economic growth in China, yet its dynamic effects remain complex. For instance, while FDI initially facilitated capital accumulation, industrial upgrading, and technology diffusion, it remains uncertain whether recent structural changes in FDI have altered China's economic growth model. Additionally, fluctuations in FDI may have significant implications for economic stability and regional development disparities. Thus, using a time-series model is crucial to look at the short-term and long-term dynamic relationships between FDI and China's economic growth, providing empirical evidence for policy formulation.

In short, this study looks to the dynamic behind the relationship between FDI and economic growth in China. China has been highly successful in drawing major FDIs, which has made important contributions to GDP growth, employment, technology spillovers, and industrial upgrading. In 2021, the share of foreign-funded enterprises in China's total industrial output value was close to 20%, demonstrating the far-reaching impact of FDI in China's economic system (Norehan et al., 2022b). Especially in electronic information technology and high-end manufacturing, the advanced technology and R&D capabilities of foreign-funded enterprises have enhanced the competitiveness of Chinese enterprises (Kaushal et al., 2024).

Figure 1: Trends in China's FDI data, 1990–2023



Source: Ministry of Commerce of the People's Republic of China (MOFCOM, 2023) and National Bureau of Statistics of China (NBS, 2023). Figure created by the author (L. J. Y.)

Although FDI has brought many economic benefits, it also faces many challenges. First, FDI is highly unbalanced in its regional distribution, mainly concentrated in coastal provinces such as Guangdong, Jiangsu, and Shanghai, exacerbating the development gap between the eastern and central-western regions (Norehan et al., 2020a). Second, FDI investment in energy-intensive industries has exacerbated environmental pollution, especially in regions with weak environmental regulation (Pata, 2021). In addition, the impact of FDI on China's governance system is also twofold. On the one hand, it promotes market transparency and regulatory optimization; on the other hand, it may lead to regulatory loopholes and corruption in resource-intensive industries (Emako et al., 2023; Ghazali et al., 2023).

Existing studies have mostly used cross-sectional data or shorter time series to analyze the relationship between FDI and economic growth (Norehan et al., 2022b; Kaushal et al., 2024) and have paid less attention to the dynamic role of FDI in different stages of economic development. China's FDI size and structure have experienced different stages of rapid growth, fluctuating adjustment, and structural upgrading between 1990 and 2023 (MOFCOM, 2023). The impact of FDI in growing China's economy was analyzed by looking at the short and long run using ARDL (Autoregressive Distributive Lag Model) to solve the problem of insufficient period found in past studies. In recent years, changes in the global economic environment (e.g., epidemics, global supply chain adjustments, and Sino-U.S. trade frictions) have had far-reaching effects on FDI, but the existing literature rarely uses the latest data (after 2020) to study the economic growth effects of FDI in this context. This study fills the gap of looking at data between 1990 to 2023 to provide a complete and timely empirical analysis.

The ARDL method effectively reveals how FDI affects GDP, capital formation, trade openness, governance quality, and environmental sustainability. This study can fill the literature by offering substantial empirical support that can aid the government of China to fully utilize FDI to create policies that advocate for sustainable and robust economic growth. When the dynamic effects of FDI can be understood better in terms of the short—and long-term perspective, it can help improve the quality of economic growth, narrow regional development gaps, and promote the positive effect that FDI has played in growing the economy in China sustainably.

2. LITERATURE REVIEW

2.1. Theory of Economic Growth

Economic growth is a key focus for policymakers aiming to achieve sustainable development, employment expansion, and higher living standards (Auxiliadora and Hamdaoui, 2024). It is often measured as changes in GDP and involves the reallocation of resources for higher productivity. Growth is influenced by labor, capital, and productivity, forming the long-term economic trajectory .

2.1.1. Endogenous growth theory

Developed by Romer (1986), Lucas (1988), and Rebelo (1991), the Endogenous Growth Theory critiques the Solow model and highlights human capital, knowledge, and innovation as key drivers of economic growth (Wijayanto, 2019). It argues that growth is internally driven, with human capital spillovers reducing diminishing returns to capital (Mulder et al., 2001). Unlike the neoclassical model, it integrates knowledge diffusion and technological advancements as central to sustained growth (Onyimadu, 2015).

2.1.2. FDI-led growth hypothesis

Rooted in neoclassical and endogenous growth theories, this hypothesis emphasizes FDI's role in technological progress and production efficiency (Romer, 1986). As globalization deepened, researchers recognized the impact on capital injection, technology transfer, and managerial expertise in developing economies (Lucas, 1988). Empirical studies by Borensztein, De Gregorio, and Lee (1998) confirm that FDI fosters growth more effectively in countries with a skilled labor force. FDI serves as a key channel for technology diffusion and industrial upgrading in host economies.

2.2. Empirical Review

The literature has long demonstrated that FDI can help in growing the economy by increasing enhancing productivity and generating technological spillovers. FDI creates vertical spillovers through foreign-domestic firm linkages and horizontal spillovers within industries (Javorcik, 2004). Both domestic investment (DI) and FDI expand productive capacity, while labor (LAB) and human capital (HC) improve workforce efficiency and economic dynamism (Chandio et al., 2019; Sarker and Khan, 2020). The Corruption index (GOV) can affect the investment climate, trade openness (TO) increases market efficiency, and social welfare (EPB) improves labor productivity . These variables interact to drive GDP growth, with FDI playing a pivotal role in influencing ESG implementation.

Empirical studies demonstrate that trade openness stimulates FDI inflows, which, in turn, drive economic growth (Ridzuan et al. 2018). De Mello (1999) confirms a significant relationship between FDI and GDP growth, supporting the FDI-led growth hypothesis. Miszztal (2010) also finds a positive correlation between FDI and economic expansion. Further studies using ARDL models reinforce these findings, as seen in research on Caribbean nations (Onafowora and Owoye, 2019), Pakistan (Chandio et al., 2019), and Bangladesh (Sarker and Khan, 2020).

Halizam et al. (2021) analyzed Malaysia's economic data (1970–2018) and found that FDI, DI, population (POP), and TO significantly enhance economic growth. Vujanović et al. (2021) also emphasize FDI's role in sustainable growth, citing its contribution to green technology adoption, labor productivity, and carbon reduction.

Regarding China, studies confirm that FDI has driven economic growth but also exacerbated environmental and social challenges, particularly carbon emissions (Norehan et al., 2022a; Kábrt & Brůna, 2022; Baek, & Choi, 2017). Research by Vennemo et al. (2008), Jiang et al. (2024) confirms the pollution haven and growth hypotheses in China, showing that while FDI boosts growth, it also raises concerns about environmental sustainability.

Table 1: Sources of data

Model	Description	Sources
Model of economic growth		
GDP	Real GDP per capita, constant (2015)	WDI
DI	Gross Fixed Capital Formation as % of GDP	WDI
LAB	Total labor force	WDI/NBS
HC	Secondary school enrolment rate	WDI
GOV	Corruption risk ratings	ICRG-PRS
FDI	FDI inflows as % of GDP	WDI
TO	Sum of export and import as % of GDP	WDI
EPB	Life expectancy at birth as total (years)	WDI

WDI refers to World Development Indicator 2023; ICRG-PRS signifies International Country Risk Guide by Political Risk Services; NBS refers to National Bureau of Statistics; IEA signifies International Energy Agency; IMF refers to International Monetary Fund

3. DATA MODEL CONSTRUCTION

3.1. Data and Source

The time span of this study is 33 years of Chinese economic data from 1990 to 2023. The sources of data are shown in Table 1. In this study, GDP is chosen as a function of key variables, including DI (income inequality), LAB (labor force), HC (human capital), GOV (government expenditure), FDI (foreign direct investment), TO (trade openness) and EPB (life expectancy at birth). Together, these variables drive China's economic growth. Specifically, FDI promotes economic development through capital injection, technology transfer, and industrial upgrading, while labour and human capital upgrading, government spending on infrastructure and public services. Then, when trade openness increases, it will help in growing the economy positively. Also, the life expectancy at birth (LEAB) seems to have an indirect effect in influencing labour force quality as this LEAB is an appropriate reflection on seeing social welfare and public health. Thus, the formula describes the multidimensional factors influencing China's GDP growth and highlights how FDI can assume a huge role in enhancing economic development. This research looked at the period of 33 years of Chinese economic data from 1990-2023, covering China's evolution through reform and opening up, globalization, structural transformation, and green development.

3.2. Research Methods

The ARDL (Autoregressive Distributed Lag) model was proposed by British econometricians Pesaran and Shin in 1995 and was extended by Pesaran, Shin, and Smith in 2001. The model is an autoregressive distributed lag model, which captures the relationship between the dependent variable and the dynamic relationship between the independent variables (Kurecic and Kokotovic, 2017). Due to the remarkable results of ARDL models in other fields, many scholars have applied them to environmental economics research to study the long-run and short-run relationships between the variables of interest (Pujiati et al., 2023a).

3.3. Procedures Analysis

Following the procedure stipulated in the analysis, the first step is testing the stationarities of the data. To test the stationarities of the data, two tests, the Dickey-Fuller (DF) and the Augmented Dickey-Fuller (ADF), were employed. For this study, determining the stationarities of the time series data is critical to pin down which estimation or regression tests to apply to generate the best result. In this thesis, the author adopted Autoregressive Distributed Lag (ARDL) estimation techniques to explain all proposed models' dynamic long-run and short-run elasticities (Ridzuan et al., 2017).

3.4. Model of Growth

The endogenous growth theory and the FDI-led growth hypothesis are used to explain Model 1. These theories can explain the role of variables in economic growth. The endogenous growth theory explains that several factors like human capital (HC), labor force (LAB), technological progress, and innovation are fundamental to grow the economy. This statement is especially prevalent when education and technological upgrades can expand the economy and increase productivity growth. Another hypothesis, the FDI-led growth hypothesis, posited that FDI can aid GDP growth through several ways, such as increasing capital inflows, encouraging technology transfer and industrial upgrading, and driving economic development by upgrading human capital and promoting trade openness (TO). Government spending in areas such as infrastructure and social security (GOV), coupled with a reduction in income inequality (DI) and improvements in social welfare (EPB), further enhance the economy's endogenous growth dynamics. Taken together, the two theories suggest that FDI can contribute to GDP in the long term in numerous ways through the interaction of external investment and internal development factors.

$$GDP = +\beta_1 DI_t + \beta_2 LAB_t + \beta_3 HC_t + \beta_4 GOV_t + \beta_5 FDI_t + \beta_6 TO_t + \beta_7 EPB_t + \varepsilon \quad (1)$$

In this model, the residual term symbolized as ε was inserted in the model to represent the ignored effects. This term was assigned as white noise. To measure elasticities, all variables were changed to log-linear specification. This change was carried out to ensure that the result can generate consistent and efficient findings in comparison to utilizing the linear model. Additionally, Chang, Fong, and Wan (2001) stated that the model is converted into natural logs in order to generate stationarity in the variance–covariance matrix. Based on the considerations above, the model was rewritten as:

$$LN\ GDP = LN + LN\beta_1 DI_t + LN\beta_2 LAB_t + LN\beta_3 HC_t + LN\beta_4 GOV_t + LN\beta_5 FDI_t + LN\beta_6 TO_t + LN\ EPB_t + LN\varepsilon \quad (2)$$

Thus, the reconstruction of the ARDL model is powerful as it can look at both short-term and long-term dynamic relationships. This transformation allows this model to be used for time series data analysis. Equation 3 is reconstructed as follows:

$$\Delta LNGDP = \beta_0 + \theta_0 LNGDP_{t-1} + \theta_1 LNDI_{t-1} + \theta_2 LNLAB_{t-1} + \theta_3 LNHC_{t-1} + \theta_4 LNGOV_{t-1} + \theta_5 LNFDI_{t-1} + \theta_6 LNTO_{t-1} + \theta_7 LNEPB_{t-1} + \sum_{i=1}^{a} \alpha_i \Delta LNGDP_{t-i} + \sum_{i=1}^{a} \beta_i \Delta LNDI_{t-i} + \sum_{i=1}^{a} \gamma_i \Delta LNLAB_{t-i} + \sum_{i=1}^{a} \alpha_i \Delta LNHC_{t-i} + \sum_{i=1}^{a} \beta_i \Delta LNFDI_{t-i} + \sum_{i=1}^{a} \gamma_i \Delta LNTO_{t-i} + \sum_{i=1}^{a} \alpha_i \Delta LNEPB_{t-i} + \sum_{i=1}^{a} \beta_i \Delta LNFGOV_{t-i} + \vartheta t \quad (3)$$

4. RESULTS AND THEIR INTERPRETATION

4.1. Testing Unit Root Test

The smoothness of the variables must be ensured before the ARDL testing is carried out. This step is crucial to eliminate pseudoregression problems. Two tests, the Augmented Dickey-Fowler (ADF) unit root test and the Phillips-Perron (PP) unit root test to check the smoothness of the variables, and the results can be seen in Table 2.

From the results of the level value (I(0)) test, most of the variables did not reject the unit root hypothesis, i.e., they showed non-stationarity. However, one variable, LNGDP, was discovered to be stationary at the 5% significance level when the PP test was carried out. However, after first order differencing (I(1)) of the variables,

Table 2: Unit root test for China

Level I (0)	ADF unit root		PP unit root	
	Intercept	Intercept and trend	Intercept	Intercept and trend
LNGDP	−1.636 (2)	−0.391 (2)	−3.397 (4)**	0.337 (3)
LNDI	−3.267 (0)**	−2.828 (0)	−3.147 (3)**	−2.923 (2)
LNLAB	−1.001 (4)	−5.549 (3)***	−1.969 (6)	−1.918 (1)
LNHC	−2.522 (1)	−5.202 (0)***	−3.056 (6)	−5.300 (2)***
LNGOV	−0.724 (0)	−2.178 (0)	−0.690 (2)	−2.178 (0)
LNFDI	−0.034 (0)	−1.562 (0)	−0.034 (0)	−1.432 (4)
LNTO	−2.811 (1)*	−2.831 (1)	−3.189 (1)**	−3.185 (1)
LMEPB	−3.765 (0)**	−0.036 (0)	−4.956 (2)***	0.324 (1)
First difference I (1)	**ADF unit root**		**PP unit root**	
	Intercept	Intercept and trend	Intercept	Intercept and trend
LNGDP	−1.175 (1)	−1.991 (1)	−2.009 (2)	−3.986 (3)**
LNDI	−3.756 (0)***	−5.036 (1)***	−3.512 (16)**	−4.453 (16)***
LNLAB	−4.435 (3)***	−4.618 (8)***	−7.565 (0)***	−8.824 (4)***
LNHC	−8.980 (0)***	−9.347 (0)***	−10.365 (7)***	−18.375 (19)***
LNGOV	−5.614 (0)***	−5.526 (0)***	−5.628 (3)***	−5.544 (4)***
LNFDI	−2.068 (0)	−2.850 (0)	−1.755 (3)	−2.738 (3)
LNTO	−6.720 (0)***	−6.607 (0)***	−7.567 (5)***	−7.378 (5)***
LMEPB	−4.521 (0)***	−5.826 (1)***	−4.965 (4)***	−7.872 (0)***

1. ***, **, and * are 1%, 5%, and 10% significance levels, respectively. 2. The optimal lag length is selected automatically using the Schwarz Info Criteria (SIC) for the ADF test, and the bandwidth was selected by using the Newey–West and user−specified method for the PP unit root test

all variables rejected the unit root hypothesis under both ADF and PP tests, indicating that these variables became smooth after first order differencing. Therefore, in this study, the individual integer orders were found to be mixed in the I(1) process, and this result means that the conditions for the ARDL model have been fulfilled.

4.2. Testing the Presence of Long Run Cointegration Based on F-Statistic

The long-run cointegration relationship between the variables was tested using the Bounds Test (BT) method, introduced by Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). This test calculates the F-statistic for hypothesis testing.

Table 3 shows that the F-statistic of the model of this study is 4.2955. This value was found to be higher than the upper limit of the critical value of I(1) at the 10%, 5%, and 1% levels of significance (2.89, 3.21, and 3.9 respectively). Thus, the initial hypothesis that posits the absence of cointegration among the variables was rejected. The rejection of the hypothesis means that a long-run equilibrium relationship exists among the study variables. Thus, in the long run, several factors like domestic fixed capital formation (DI), foreign direct investment (FDI), labour force (LAB), human capital (HC), government governance (GOV), openness to the outside world (TO), and population health (EPB) are stably cointegrated with China's economic growth (GDP). This result can help in grounding a theoretical basis for any long-run and short-run dynamic analyses and supports the construction of an error correction model (ECM) that can be used to look at the adjustment mechanism after short-run deviations from long-run equilibrium.

4.3. Diagnostic Tests

Numerous diagnostic tests, such as heteroskedasticity, serial correlation, normality, and functional form tests, were carried out on the regression residuals to ensure the model's robustness and applicability. All of the results can be viewed in Table 4. The Lagrange multiplier (serial correlation), a test to identify autocorrelation in the residuals, has a P-value is 0.263, greater than the 5% significance level. This result indicates that the model is free from serious serial correlation problems. Secondly, the Ramsey RESET (Functional Form) test looks at the correct setup of the model. The P-value of this test was found to be 0.590, which failed to reject the initial hypothesis. Thus, this model has an appropriate functional form. For the Jarque-Bera normality test, the P-value was recorded at 0.895, denoting a normal distribution for the residuals. The final test, the heteroscedasticity based on the regression-fitted values, was recorded at P = 0.148, meaning that the model does not have a heteroscedasticity problem. Based on these diagnostic tests, this ARDL model has been proven to be statistically robust, capable of producing reliable estimation results to aid in policy analysis and interpretation.

Lastly, the stability of the regression coefficients over time was tested to check the robustness of the estimated model. For this purpose, two tests, the CUSUM (Cumulative Sum of Recursive Residuals) Test and the CUSUMSQ (Cumulative Sum of Squares of Recursive Residuals) were carried out. These tests, proposed by Brown et al. (1975), are crucial for detecting potential structural changes in the underlying relationships of the econometric model.

A stable model ensures that the relationships among variables remain consistent over the sample period, making the results more reliable for policy formulation and forecasting. Conversely, instability in the model would indicate structural breaks or changes in economic conditions, requiring further adjustments.

As shown in Figure 2, the result shows that for the CUSUM test, the curve remains within the critical limits of the 5% significance level. Thus, the parameters included in this model did not experience any significant structural changes during the period, indicating that the model was stable. For the CUSUMSQ test, although the result shows that at the later stage of the study, the cumulative sum of squares curve shows some increment, it remains in the range of the critical limits of the 5% significance level. This observation means that the variance of the error term remained relatively stable over the study period. Therefore, these two

Table 3: Detecting the presence of long run cointegration based on F stat for China

Model	LNGDP=F (LNDI, LNLAB, LNHC, LNGOV, LNFDI, LNTO, LNEPB)	F statistics	China
Max Lag (2,2)	Lag order 2, 2, 1, 0, 0, 2, 2, 0	4.295***	
Critical values for F stat		**Lower I (0)**	**Upper I (1)**
10%		1.92	2.89
5%		2.17	3.21
1%		2.73	3.9

1. #The critical values are based on Pesaran, M. H., Shin, Y., & Smith, R. J. (2001), case III: unrestricted intercept and no trend. 2. k is a number of variables, and it is equivalent to 7. 3. *** represents a 1% level of significance level

Table 4: Diagnostic tests for China

Model	(A) Serial Correlation [P-value]	(B) Functional Form [P-value]	(C) Normality [P-value]	(D) Heteroscedasticity [P-value]
China	1.360 [0.263]	0.304 [0.590]	0.220 [0.895]	1.728 [0.148]

1: **Represents 5% significance levels. 2: The diagnostic test performed as follows. (A): Lagrange multiplier test for residual serial correlation; (B): Ramsey's RESET test using the square of the fitted values; (C): Based on a test of skewness kurtosis of residuals; (D) Based on the regression of squared fitted values.

Table 5: Short-run elasticities and error correction model (based on present lag) for China

Variables	Coefficient	t-stat	Prob
$\Delta LNGDP_{(-1)}$	0.584	15.380	0.000***
$\Delta LNDI$	–0.041	–0.919	0.372
$\Delta LNDI_{(-1)}$	–0.164	–2.919	0.010***
$\Delta LNLAB$	0.869	7.762	0.000***
$\Delta LNFDI$	–0.013	–2.796	0.013**
$\Delta LNFDI_{(-1)}$	0.019	2.689	0.016**
$\Delta LNTO$	0.001	0.322	0.751
$\Delta LNTO_{(-1)}$	–0.015	–3.542	0.003***
$ECT_{(-1)}$*	–0.143	–7.699	0.000***

1: ***, ** and * are 1%, 5% and 10% of significance levels, respectively

stability tests together indicate that the ARDL model here is robust over the sample period, and the parameter estimates are reliable and can be used for policy analysis and economic interpretation.

4.4. Short-run Elasticities

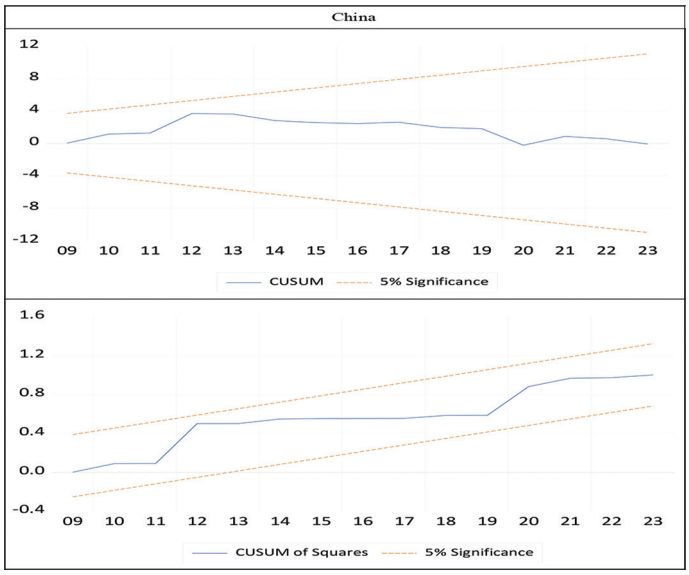
To analyse the dynamic impact of each variable on China's economic growth in the short run, the error correction model (ECM) was used to estimate the short-run elasticities, and the results are shown in Table 5. First of all, from the estimation result of the error correction term (ECT), its coefficient is −0.143000, which is significant at the 1% significance level (P = 0.0000), indicating that there is a short-run to long-run equilibrium regression mechanism in the model, that is, when the system deviates from the long-run equilibrium, the degree of deviation of about 14.3% in each period is adjusted back to the equilibrium, which further verifies that the long-run cointegration relationship exists in the model.

Regarding short-term elasticity, the result of LNFDI shows that the short-term impact on China's economic growth was observed to be negative and significant. The one-period lagged coefficient was valued at -0.058318 (P = 0.0001). From this analysis, it can be seen that, in the short run, FDI could exhibit an inhibitory effect on GDP. This conclusion can be attributed to the initial capital outflow of FDI, market adaptability, and other factors. In contrast, the short-term impact of fixed capital formation (LNDI) on economic growth is positive and significant, as seen in the value of the one-period lagged coefficient at 0.273677 (P = 0.0023), indicating that in the short run, capital investment can affect GDP positively.

For labor force (LNLAB), the analysis shows that, in the short run, LNLAB has no significant effect. Another factor, human capital (LNHC), the analysis shows that it did not exhibit any significant effect and did not affect economic growth. However, the result of trade openness (LNTO) is more positive, as the analysis reveals that trade openness in the short-run exhibit would produce a positive impact, with the lagged one-period coefficient of 0.024135 (P = 0.0396). The result means that, in the short run, trade openness has a significant role in boosting economic growth. Life expectancy at birth (LNEPB) has a relatively large impact in the short run, at a coefficient valued at 1.441950 (P = 0.0681), which represents marginally significance at a 10% significance level, suggesting that the level of health of the population may play some role in short-run economic growth.

Further analysis of the first-order difference terms of the variables shows that the coefficient of D(LNLAB) is 0.869515 (P = 0.0044), which is significant at a 1% level, showing that short-term changes exhibited in the labour force can affect GDP. For the other first-order difference variables, D(LNDI) and D(LNFDI), the analysis reveals no significant effects. In summary, China's economic growth in the short run is mainly affected by capital investment, labour force changes, trade openness and health level, while FDI may have some negative effects initially, as seen in the short run result; however, the benefits can be enjoyed later as the long run analysis and the significance of the error correction term (ECT) suggests that the economic system will eventually return to equilibrium in the long-run.

Figure 2: CUSUM and CUSUM SQ for China



4.5. Long-Run Elasticities

In this paper, the extended endogenous growth model estimated the long-run elasticities, as seen in Table 6. First, the long-run coefficient of domestic fixed investment (LNDI) 's estimated value is 1.913, which is significant at a 5% level, with a P-value valued at 0.011. This indicates that capital investment has a significant long-run contribution to economic growth. Thus, a 1% increase in capital accumulation will increase GDP by about 1.91%.

However, the foreign direct investment (LNFDI) the long-run impact was found to be quite discouraging, and the coefficient was valued at −0.407, at the 1% significance level (P = 0.001). The analysis suggested that in the long run, FDI could exhibit a dampening effect on economic growth, possibly caused by FDI structure, insufficient technology spillovers, or market dependence. However, for trade openness (LNTO) in the long run, it was found to exhibit a positive effect on economic growth with an estimated coefficient of 0.168, which is marginally significant at 10% significance level (P = 0.094), suggesting that higher trade openness may promote economic growth in the long run.

With regard to population health factors, the long-run effect of life expectancy at birth (LNEPB) is significantly positive with a coefficient of 10.083 (P = 0.051), which is marginally significant at the 10% significance level, suggesting that improved health may

Table 6: Long run estimation based on extended endogenous growth model for China

Variables	Coefficient	t-stat	Prob.
LNDI	1.913**	2.859	0.011**
LNLAB	−0.987	−0.428	0.674
LNHC	0.522	0.482	0.636
LNGOV	0.029	0.855	0.405
LNFDI	−0.407***	−3.879	0.001***
LNTO	0.168*	1.783	0.094*
LNEPB	10.083*	2.114	0.051*
C	−16.832	−1.891	0.078*

1: ***, ** and * are 1%, 5% and 10% of significance levels, respectively

contribute to economic growth through improved quality of the labour force and increased productivity. In contrast, the long-run effects of labour force (LNLAB) and human capital (LNHC) are not significant, which may indicate that the quantity of labour is less directly contributing to economic growth at this stage, while human capital accumulation has not yet manifested a significant long-run effect on economic growth.

In the long run, capital formation and openness to the outside world are important factors driving China's economic growth, while the negative impact of FDI in the long run deserves further investigation. In addition, there is some support for the role of the level of health of the population in promoting economic growth, suggesting that improving the level of public health may be an effective policy direction for promoting economic growth in the long run.

5. CONCLUSION AND POLICY RECOMMENDATIONS

Using the ARDL model, this paper empirically analyses the dynamic relationship between FDI and China's economic growth. The results show that FDI has a negative impact on economic growth in both the short and long run, which is related to the low quality of FDI into China, insufficient technological spillovers, and the crowding-out effect of foreign-dominated industries on domestic enterprises. First, the FDI attracted by China is mainly concentrated in labor-intensive and low value-added manufacturing industries, while the proportion of FDI in high-technology industries and modern service industries is relatively low, resulting in a limited contribution of FDI to industrial upgrading and technological progress. Second, although foreign-funded enterprises have strong technological advantages, their core technologies are often kept closed, and it is difficult for local enterprises to obtain key technologies through imitation and cooperation. Thus, the technological spillover effect of FDI is relatively limited. In addition, due to the advantages of foreign-funded enterprises in terms of capital, brand, and supply chain management, the phenomenon of excessive market share of foreign-funded enterprises has appeared in some industries, creating a crowding-out effect on local enterprises and restricting the development space of local enterprises. However, domestic capital formation (DI) has made a significant contribution to economic growth in the long run, indicating that capital accumulation is still an important driving force for China's economic growth. Meanwhile, opening up to the outside world (TO) has a certain positive effect on economic growth, suggesting that the promoting effect of trade liberalisation on economic growth exists but is relatively small. In addition, the level of population health (EPB) has a positive impact on long-run economic growth, suggesting that improving health may be an important way to improve the quality and productivity of the labor force. However, the effects of the size of the labor force (LAB) and human capital (HC) on economic growth have not yet emerged, possibly indicating that the marginal effect of the size of the labour force has tended to decline, while the long-term growth effect of human capital has not yet been fully exploited.

In order to optimize the impact of FDI on China's economic growth, it is necessary to adjust the strategy of using foreign capital and improve the quality of investment. The government should promote the flow of FDI into high-end manufacturing, green technology, the digital economy, and other areas, strengthen the requirements for technology transfer, enhance the absorptive capacity of local enterprises, and strengthen the technology spillover effect. At the same time, it should support local enterprises to innovate through tax incentives, financing support, and other measures to enhance their competitiveness in the supply chain and high value-added industries and reduce the market-crushing effect of foreign enterprises. In addition, China should deepen trade openness, promote multilateral cooperation such as RCEP and CPTPP, optimize the business environment, promote the synergistic development of FDI and local enterprises, and enhance its positive impact on economic growth.

This paper empirically used the ARDL model to analyze the dynamic relationship between FDI and China's economic growth. In short, FDI has a negative impact on economic growth, and it was observed for the short-run and the long-run growth. The possible reasons that lead to this conclusion are low investment quality, minimum technological spillovers, and the displacement of local firms by foreign firms. In contrast, domestic investment (DI) is more positive as it contributes significantly to economic growth in the long run. Another factor, trade openness (TO), has a positive impact on economic growth, and the next factor, the health of the population (EPB), assumes a great role in long-term economic growth. Thus, the government should optimize the structure of FDI, direct the flow of foreign capital to high value-added industries, and promote technology transfer to improve FDI. Simultaneously, China must enhance the competitiveness of local enterprises through policy support to reduce the market-crushing foreign capital effect on local enterprises; in addition, deepen trade openness, optimize the business environment, and promote the synergistic development of FDI and local enterprises.

REFERENCES

Auxiliadora, Z., Hamdaoui, M., (2024), Does governance matter to ensure a significant effect of foreign direct investment on poverty reduction? Evidence from developing and emerging countries. Transnational Corporations Review, 16(2), 200058.

Baek, J., Choi, Y.J. (2017). Does foreign direct investment harm the environment in developing countries? Dynamic panel analysis of Latin American countries. Economies, 5(4), Article 39.

Brown, R.L., Durbin, J., Evans, J.M. (1975), Techniques for testing the constancy of regression relationships over time. Journal of the Royal Statistical Society: Series B (Methodological), 37(2), 149-192.

Borensztein, E., De Gregorio, J., Lee, J.W. (1998), How does foreign direct investment affect economic growth? Journal of International Economics, 45(1), 115–135.

Chen, F., Jiang, G. (2023), The impact of institutional quality on foreign direct investment: Empirical analysis based on mediating and moderating effects. Economic Research Ekonomska Istraživanja, 36(2), 474-495.

Chandio, A.A., Mirani, A.A., Shar, R.U. (2019). Does agricultural sector foreign direct investment promote economic growth of Pakistan? Evidence from cointegration and causality analysis. World Journal of Science, Technology and Sustainable Development, 16(4), 196-207.

De Mello, L.R. (1999), Foreign direct investment-led growth: Evidence from time series and panel data. Oxford Economic Papers, 51(1), 133–151

Emako, E., Nuru, S., Menza, M. (2023), Determinants of foreign direct investments inflows into developing countries. Transnational Corporations Review, 15(1), 72-85.

Ghazali, N.S., Mohd Daud, S.N., Ismail, N.H. (2023a), The impact of environmental, social, and governance (esg) on the economic growth of ASEAN-5 countries. International Journal of Research Granthaalayah, 11(6), 45-65.

Kaushal, L.A., Chauhan, A.S., Dwivedi, A., Bag, S. (2024), The governance factor: Mitigating carbon emissions through FDI and financial development in emerging Asian economies. Journal of Environmental Management, 367, 121740.

Kábrt, T., Brůna, K. (2022), Asymmetric effects of foreign capital on income inequality: The case of the Post-China 16 countries. Economic Analysis and Policy, 76, 613-626.

Kurečić, P., Kokotović, F. (2017). ARDL model testing the impact of FDI on GDP: The case of small developing countries. Economic and Social Development: Book of Proceedings, 3(1), 189-197.

Lucas, R.E., Jr. (1988), On the mechanics of economic development. Journal of Monetary Economics, 22(1), 3-42.

Mulder, P., De Groot, H.L., Hofkes, M.W. (2001), Evolutionary growth theory: Economic growth and technological change. Technological Forecasting & Social Change, 68(1), 151-171.

Ministry of Commerce of the People's Republic of China. (2023), Statistical Bulletin of FDI in China 2023 [Zhongguo Waizi Tongji Gongbao 2023]. Department of Foreign Investment Administration, MOFCOM. Available from: https://fdi.mofcom.gov.cn

Misztal, P. (2010), Foreign direct investments as a factor for economic growth in Romania. Review of Economic and Business Studies, 5, 39-53.

National Bureau of Statistics of China. (2023), China Statistical Yearbook 2023 [Zhongguo Tongji Nianjian 2023]. China Statistics Press. Available from: https://www.stats.gov.cn/sj/ndsj/2023/indexeh.htm

Norehan, M.A.H., Ridzuan, A.R., Ismail, S., Md Razak, M.I., Shaari, M.S. (2022a), Assessing the impact of information and communication technology and economic growth on oreign direct investment inflows in China and Malaysia. International Journal of Academic Research in Business and Social Sciences, 12(9), 434-447.

Norehan, M.A.H., Ridzuan, A.R., Ismail, S., Md Razak, M.I., Shaari, M.S. (2022b), The impact of FDI inflows and ICT development towards economic growth: Evidence for China and Malaysia. Business and Economic Research, 12(3), 43.

Onyimadu, C.O. (2015), An Overview of Endogenous Growth Models: Theory and Critique. International Journal of Physical and Social Sciences, 5(3), 498-514.

Onafowora, O., Owoye, O. (2019), Impact of foreign direct investment on economic growth in the Caribbean: An ARDL approach. Economia Internazionale International Economics, 72(1), 33-60.

Pata, U.K. (2021), Applying environmental Kuznets curve framework to assess the nexus of industry, globalization, and CO□ emission. Environmental Technology Innovation, 21, 101377.

Pesaran, M. H., Shin, Y., Smith, R. J. (2001), Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289-326.

Pesaran, M. H., Shin, Y. (1995), An autoregressive distributed lag modelling approach to cointegration analysis. In S. Strom (Ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium. UK: Cambridge University Press. pp. 371-413.

Pujiati, A., Yanto, H., Dwi Handayani, B., Ridzuan, A.R., Borhan, H., Shaari, M.S. (2023a), The detrimental effects of dirty energy, foreign investment, and corruption on environmental quality: New evidence from Indonesia. Frontiers in Environmental Science, 10, 1074172.

Romer, P. M. (1986), Increasing returns and long-run growth. Journal of Political Economy, 94(5), 1002-1037.

Rebelo, S. (1991). Long-run policy analysis and long-run growth. Journal of Political Economy, 99(3), 500-521.

Pujiati, A., Yanto, H., Dwi Handayani, B., Ridzuan, A.R., Borhan, H., Shaari, M.S. (2023a), The detrimental effects of dirty energy, foreign investment, and corruption on environmental quality: New evidence from Indonesia. Frontiers in Environmental Science, 10, 1074172.

Ridzuan, A.R., Ismail, N.W., Che Hamat, A.F. (2017), Foreign direct investment and trade openness: Do they lead to sustainable economic growth in Malaysia? International Journal of Economics and Financial Issues, 7(3), 1-10.

Ridzuan, A.R., Ismail, N.A., Che Hamat, A.F. (2018), Foreign direct investment and trade openness: Do they lead to sustainable development in Malaysia? Journal of Sustainability Science and Management, 4, 79-97.

Sarker, B., Khan, F. (2020), Nexus between foreign direct investment and economic growth in Bangladesh: An augmented autoregressive distributed lag bounds testing approach. Financial Innovation, 6(1), 1-18.

Wijayanto, B. (2019), Teori pertumbuhan endogenous (Endogenous Growth Theory). SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3317961

Vennemo, H., Aunan, K., He, J., Hu, T., Li, S., Rypdal, K. (2008), Environmental impacts of China's WTO-accession. Ecological Economics, 64(4), 893-911.

Vujanović, N., Stojčić, N., Hashi, I. (2021), FDI spillovers and firm productivity during crisis: Empirical evidence from transition economies. Economic Systems, 45(2), 100865.

Yang, X., Li, Z., Qiu, Z., Wang, J., Liu, B. (2024), ESG performance and corporate technology innovation: Evidence from China. Technological Forecasting and Social Change, 206, 123520.

Zeng, S., Zhou, Y. (2021), Foreign direct investment's impact on China's economic growth, technological innovation and pollution. International Journal of Environmental Research and Public Health, 18(6), 2839.