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The Impact of Foreign Direct Investment, Trade Openness, Technological Innovation and Industrial Sector Performance on Economic Growth in Vietnam

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Abstract

This study employs an Autoregressive Distributed Lag (ARDL) model to assess the impact of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam during the period 1993-2023. The results show that, in the short run, foreign direct investment, trade openness, and industrial sector performance have positive impacts on economic growth, while technological innovation has a negative impact. In the long run, foreign direct investment and technological innovation positively affect economic growth, whereas trade openness and industrial sector performance have negative impacts. Based on these findings, the study suggests several policy implications: prioritizing the attraction of foreign investment projects that utilize modern technologies; promoting comparative advantages in international trade; diversifying export markets; restructuring production towards the development of high-tech industries; and fostering technological innovation to generate new technologies and knowledge, thereby supporting rapid and sustainable economic growth.

Keywords: *Economic Growth, Industrial Sector Performance, Foreign Direct Investment, Trade Openness, Technological Innovation.*

Introduction

In the context of globalization and increasing international economic integration, factors such as foreign direct investment (FDI), trade openness, technological innovation, and industrial sector performance have become increasingly important for promoting economic growth, particularly in developing countries like Vietnam. In recent years, Vietnam has successfully attracted substantial FDI and strengthened trade integration by participating in various bilateral and multilateral free trade agreements. Additionally, the country has promoted technology transfer and innovation as key components of its strategy for sustainable development and enhanced national competitiveness.

There have been several studies on economic growth in Vietnam. However, they have primarily focused on factors such as foreign direct investment (FDI), trade openness, human capital, institutional quality, and macroeconomic factors like exchange rates, unemployment, and inflation. Limited attention has been paid to the impact of technological innovation and industrial sector performance on economic growth, despite their significant roles in long-term economic growth in many economies around the world. To the best of our knowledge, this study is the first to evaluate the combined effects of FDI, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam.

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This study aims to evaluate the effects of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam. It seeks to provide empirical evidence that supports modern economic growth theory. The research methodology involves using time series data and Autoregressive Distributed Lag (ARDL) estimation techniques to analyze both the short run and long run impacts of these factors on economic growth. Additionally, the findings offer significant insights for shaping development policies that align with Vietnam's conditions and strategic goals in this new phase of development.

The structure of the study is organized as follows: Section 1: Introduction of the research problem; Section 2: Overview of related studies; Section 3: Description of the data sources and research methods; Section 4: Presentation of the empirical research results; Section 5: Conclusions and policy implications

Literature Review

Foreign Direct Investment (FDI) and Economic Growth

Numerous studies have explored the relationship between foreign direct investment (FDI) and economic growth. For instance, Hussain and Haque (2016) employed the Vector Error Correction Model (VECM) to analyze the impact of FDI and trade on economic growth in Bangladesh from 1973 to 2004. Their findings indicated that FDI has a positive and significant effect on economic growth. John (2016) used a multiple regression estimation technique to examine the effects of FDI on economic growth in Nigeria between 1981 and 2015. The study concluded that FDI positively and significantly influences the country's gross domestic product (GDP). Agrawal (2015) investigated the relationship between FDI and economic growth in five BRICS countries from 1989 to 2012 and identified a long run cointegration relationship between the two variables. Osuji (2015) assessed the relationship between FDI and economic growth in Nigeria from 1981 to 2013 using the Bounds test and the Autoregressive Distributed Lag (ARDL) model. The study found that while FDI had a marginally positive impact on growth in the short run, its effect in the long run was negative and statistically insignificant. Tang (2015) examined the impact of foreign capital inflows on the economic growth of European Union (EU) countries from 1987 to 2012. The study revealed that increases in both FDI and foreign portfolio investment (FPI) did not significantly contribute to economic growth. In another studies, Malik (2015) employed ordinary least squares (OLS) regression to find that FDI positively impacted economic growth in Pakistan during the period from 1995 to 2011. Nketiah et al. (2019) conducted a study on the relationship between foreign direct investment (FDI) and economic growth in Ghana during the period 1975–2017. The findings revealed that while FDI has an effect on GDP growth (annual %), the impact is not statistically significant..

In Vietnam, a study conducted by Minh (2020) employed the Autoregressive Distributed Lag (ARDL) method to investigate the impact of foreign direct investment (FDI) on economic growth between 2000 and 2018. The findings revealed that FDI negatively affects economic growth both in the short and long term.

Trade Openness and Economic Growth

The relationship between trade openness and economic growth has been the focus of considerable theoretical and empirical research over the past three decades. However, there is still no consensus on the results regarding this relationship. In a study involving a sample of 82 countries, Chang et al. (2009) found a positive link between trade openness and economic

growth. Similarly, Hye et al. (2016) conducted research on China and concluded that trade openness positively impacts growth in both the short and long run. Asfaw (2017) examined the effects of trade liberalization on economic growth in a sample of 47 Sub-Saharan African countries, finding that trade openness fosters both economic growth and investment. Additionally, Brueckner and Lederman (2015) used an instrumental variables method with panel data from 41 Sub-Saharan African countries, also concluding that trade openness supports economic growth in both the short and long term

Rassekh (2007) found that low-income countries benefit more from international trade than high-income economies when examining the relationship between trade and economic growth in a study of 150 countries. Similarly, Dufrenot et al. (2010) utilized quantile regression to analyze the relationship between trade and growth in 75 developing countries. Their results indicated that in countries with low growth, the impact of trade openness on economic growth is greater than in countries with high growth. In contrast, Kim (2011) found that trade openness positively affects economic growth and real income in developed countries, but has a negative impact in developing countries. Musila and Yiheyis (2015) focused on Kenya and reported that trade openness positively influences investment, though it does not significantly affect economic growth. Similarly, Polat et al. (2015) concluded that trade openness hinders economic growth in South Africa. Lawal et al. (2016) employed the ARDL method and found that trade openness negatively impacts economic growth in the long run but positively impacts it in the short run in Nigeria.

In Vietnam, research conducted by Nguyen (2017) used the ARDL bound test method to assess the impact of trade openness on economic growth in Vietnam from 1986 to 2015. Their findings demonstrated that trade openness has no significant impact on short run growth but has a negative impact on long-term growth.

Technological Innovation and Economic Growth

The impact of technological innovation on economic growth has garnered significant attention from researchers in recent years. Acemoglu (2009) found that long run economic growth can be achieved through advancements in technology and improvements in labor productivity. Technological innovation is widely regarded as a crucial factor for economic growth (Hasan & Tucci, 2010). Chernyshev (2018) also emphasized the importance of technological innovation in enhancing economic growth. Maradana et al. (2017) examined the long-term relationship between technological innovation and GDP per capita in a study involving 19 European countries from 1989 to 2014, utilizing cointegration and Granger causality approaches. Their findings revealed a strong long-term association between technological innovation and GDP per capita in these countries. Wang and Xu (2021) utilized the OLS and WLS models to examine the impact of technological innovation on economic growth using data from China between 1990 and 2019. Their findings indicate that government financial expenditure on science and technological innovation has a significant positive effect on economic growth. Zayas-Márquez and Ávila-López (2022) identified a causal relationship between technological innovation and long-term economic growth in Chile and Mexico during the period from 1996 to 2015. In contrast, Jammeh (2022) found that technological innovation had a negative impact on economic growth in West African countries (ECOWAS) during the period from 2008 to 2020. Vuckovic (2016) employed multiple regression analysis to examine the impact of technological innovation on economic growth in emerging economies from 1991 to 2013. The study found no statistically significant relationship between technological innovation and economic growth. Similarly, Alp

et al. (2020) investigated the effect of technological innovation on economic growth using a sample of 20 developed and developing countries between 2000 and 2016, applying panel data regression techniques. The findings indicated that there was no strong relationship between technological innovation and economic growth during the study period. Hardi et al. (2024) utilized 21 indicators from the Global Innovation Index (GII) to assess the impact of innovation on economic growth in five Southeast Asian countries, including Indonesia, Thailand, Singapore, Malaysia, and Vietnam. Their results revealed that innovation tends to hinder rather than promote economic growth in these countries.

Industrial Sector Performance and Economic Growth

Only a few studies have explored the relationship between industrial sector performance and economic growth. Mensah et al. (2016) utilized the Autoregressive Distributed Lag Model (ARDL) to examine this relationship between industrial sector performance and macroeconomic factors in Ghana from 1980 to 2013. Their findings revealed a cointegrating relationship between industrial output and macroeconomic factors. The study indicated that variables such as interest rates, inflation, unemployment, and government expenditure significantly impact industrial performance in Ghana. Consequently, it is recommended that the Ghanaian government stabilize the macroeconomic environment to foster industrial growth and development. On the other hand, (Ou, 2015) employed Ordinary Least Squares (OLS) regression to evaluate the effect of industrial development on economic growth in Nigeria during the period from 1973 to 2013. Their results showed that the influence of industrial output on economic growth was not statistically significant. The authors advised that the government and relevant agencies ensure political stability while implementing strategic policies to create a fair competitive environment for foreign investors. This approach would promote the establishment of industrial facilities in the manufacturing sector, thereby encouraging industrialization in Nigeria and strengthening economic growth. Eze and Ogiji (2014) employed the Error Correction Model (ECM) to examine the impact of fiscal policy on manufacturing sector output in Nigeria from 1990 to 2010. Their findings indicate a statistically significant negative relationship between government tax revenue and manufacturing sector output, while there is a statistically significant positive relationship between government expenditure and manufacturing sector output. The study recommends that the government adopt expansionary fiscal policies, as these are likely to enhance industrial production in Nigeria. Similarly, Riman et al. (2011) Akpan et al. (2012) utilized the Vector Error Correction Model (VECM) to analyze the long-term effects of industrial production and non-oil exports on economic growth in Nigeria from 1970 to 2006. Their results demonstrate a unidirectional causality from industrial output to economic growth. Furthermore, Their result further reveals that a 100 percent rise in industrial production in one lag period in the short run will lead to 76% rise in non-oil export production and a 7% rise in GDP in the current period. Bolaky (2011) also found a positive correlation between the level of industrialization and per capita income in developing countries. In a separate study, Chimobi (2010) estimated the relationship between economic growth, investment, and exports in Nigeria, arguing that increased industrial production is likely to promote investment, which in turn leads to enhanced output and stimulates domestic economic growth. Opoku and Yan (2019) applied the Generalized Method of Moments (GMM) to investigate the impact of industrialization on economic growth in 37 African countries between 1980 and 2014. Their findings suggest that industrialization is a significant driver of economic growth. Additionally, they discovered that trade openness amplifies the positive effects of industrialization on economic growth across African nations.

In the study by Attiah (2019) study, the role of the manufacturing and service sectors in economic growth in developing countries was examined. The findings indicated that the share of manufacturing in GDP is positively associated with economic growth, with this effect being more pronounced in poorer countries. However, no similar effect was observed for the service sector. In contrast, the study by Saba and Ngepah (2022) identified a negative correlation between industrial development and economic growth across 171 countries from 2000 to 2018. Ngọc (2024) utilized panel data estimation techniques, including the Mean Group (MG), Pooled Mean Group (PMG), and Dynamic Fixed Effects (DFE) methods to evaluate the impact of industrialization on economic growth in ASEAN countries between 1995 and 2022. The results indicated that industrialization has a positive effect on economic growth in ASEAN in the short run, but a negative effect in the long run.

In general, research findings on the effects of foreign direct investment (FDI), trade openness, technological innovation, and industrial sector performance on economic growth are generally inconsistent, leading to varied conclusions. Most studies focused on Vietnam primarily analyze the impact of FDI and trade openness on the country's economic growth, often overlooking the significant roles of technological innovation and industrial sector performance, which are important factors highlighted in various economic theories and supported by prior empirical research. Additionally, the processes of industrialization and technological innovation are occurring vigorously and have a crucial influence on long-term growth in many economies worldwide. To the best of our knowledge, this is the first study to evaluate the combined impact of FDI, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam.

Data Sources and Research Methods

Data Sources

The objective of this study is to examine the impact of foreign direct investment (FDI) and the performance of the industrial sector on economic growth in Vietnam since the country's integration into the regional and global economy. The study employs annual time series data for Vietnam from 1993 to 2023 (a total of 31 years), collected from the World Development Indicators (WDI) database published by the World Bank (WB).

Acronym	Variables	Measurement	References	Data Source
GDP	Economic growth	Annual GDP growth (%)	Osuji (2015); Nketiah et al. (2019); Saba and Ngepah (2022)	WDI
FDI	Net foreign direct investment	Net Foreign Direct Investment (% GDP)	Osuji (2015); John (2016); Hussain and Haque (2016).	WDI
TO	Trade openness	Total import and export turnover (% GDP)	Opoku & Yan (2019); Brueckner and Lederman (2015); Polat et al. (2015).	WDI

Acronym	Variables	Measurement	References	Data Source
TEC	Technological innovation	Natural logarithm of Total value of high-tech exports (million USD).	Zayas-Márquez and Ávila-López (2022); Jammeh (2022).	WDI
IND	Industrial sector performance	Industrial value added (including construction) (% GDP)	Riman et al. (2011); Akpan et al. (2012); Ou (2015); Opoku and Yan (2019); Saba & Ngepah (2021).	WDI

Table 1. Description and Measurement of Variables

Source: Author's synthesis.

Research Methodology

This study employs the Autoregressive Distributed Lag (ARDL) model for analysis, as proposed by Pesaran et al. (1996). The ARDL method offers several advantages:

1. It provides a statistically significant approach to testing cointegration, particularly when the sample size is small.

2. To identify the long run relationship between variables, the ARDL method estimates only one equation, rather than estimating a system of equations like other methodologies.

3. The regressors in the ARDL approach can have different optimal lags.

4. ARDL can be applied to integrated series of order I(0) or I(1).

5. The method allows for the assessment of both short run and long run impacts of one variable on another.

Given these advantages, the ARDL model is well-suited for evaluating the effects of Foreign Direct Investment (FDI), trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam.

According to Pesaran and Pesaran (1997), the ARDL estimation procedure is conducted in the following steps:

1. Test the stationarity of the time series data.

2. Determine the optimal lag order based on criteria such as Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC).

3. Conduct ARDL bound test to determine the long run relationship between the variables.

4. Estimate the ARDL model with the specified lags.

5. Assess the short-term and long-term impacts among the variables in the model.

6. Check the reliability and stability of the model.

Research Model

This study utilizes the neoclassical production function formulated by Solow (1956) and incorporates insights from endogenous growth theory, as proposed by Lucas Jr (1988) and Romer (1990). Based on research by Brueckner and Lederman (2015), Ou (2015), Opoku and Yan (2019), Saba and Ngepah (2022), and Zayas-Márquez and Ávila-López (2022), this study develops an econometric model to assess the impact of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth as follows:

$$GDP = f(FDI, TO, TEC, IND) \quad (1)$$

In the model described above, GDP is used as a proxy for economic growth and is expressed as a function of foreign direct investment (FDI), trade openness (TO), technological innovation (TEC), and industrial sector performance (IND). To estimate both the short run and long run impacts of FDI, TO, TEC, and IND on economic growth (GDP), we can rewrite equation (1) as follows:

$$\Delta GDP_t = \alpha + \sum_{i=1}^{n} \beta_i \Delta GDP_{t-I} + \sum_{i=0}^{n} \gamma_i \Delta FDI_{t-i} + \sum_{i=0}^{n} \delta_i \Delta TO_{t-i} + \sum_{i=0}^{n} \theta_i \Delta TEC_{t-i} + \sum_{i=0}^{n} \lambda_i \Delta IND_{t-i} + \omega GDP_{t-1} + \rho FDI_{t-1} + \varphi TO_{t-1} + \tau TEC_{t-1} + \phi IND_{t-1} + \varepsilon_t \quad (2)$$

Where: α is the intercept coefficient; β, γ, δ, θ, λ are short-term coefficients; ω, ρ, φ,τ, ϕ are long-term coefficients; ε_t is the white noise error term; Δ denotes stationary variables

Empirical Results and Discussion

Descriptive Statistics

Variables	**GDP**	**FDI**	**TO**	**TEC**	**IND**
Unit	Percent (%)	Percent (%)	Percent (%)	Million USD	Percent (%)
Mean	6.6712	5.6146	128.6964	28500	35.3993
Std. Dev	1.5623	2.2217	31.1643	39200	3.2217
Minimum	2.5615	3.3904	66.2123	3010	28.76
Maximum	9.5405	11.9395	186.4682	123000	40.21
Skewness	-0.0697	0.2832	0.0372	0.0321	0.0248
Kurtosis	2.7108	3.0249	2.8414	2.8114	3,0227

Table 2. Descriptive Statistics of Variables

Source: Author's calculation.

Table 2 presents the descriptive statistics for each variable. The average GDP growth rate is 6.6712%, with a minimum of 2.5615% and a maximum of 9.5405%. The standard deviation is 1.5623%. Foreign Direct Investment (FDI) capital has an average value of 5.6146%, with the smallest value at 3.3904% and the largest at 11.9395%, resulting in a standard deviation of 2.2217%. The average trade openness is 128.6964%, with a minimum of 66.2123% and a maximum of 186.4682%. The standard deviation for trade openness is 31.1643%. Technological innovation has an average value of 28,500 million USD, with the smallest value at 3,010 million USD and the largest at 1,23000 million USD. The standard deviation for technological innovation is 39,200 million USD. Lastly, the efficiency of the industrial sector has an average

value of approximately 35.3993%, with a minimum of 28.76% and a maximum of 40.21%. The standard deviation is 3.2217%.

Table 2 also shows that the skewness of the GDP, TO, TEC, and IND variables is close to 0, indicating that their distributions are approximately normal. The skewness of the FDI variable is greater than 0, suggesting that its distribution is right-skewed. The kurtosis values for the FDI and IND variables are close to 3, indicating that their distributions are also approximately normal. In contrast, the kurtosis of the GDP, TO, and TEC variables is less than 3, implying that their distributions are flatter (less peaked) than the normal distribution. Overall, the variables in the dataset do not exhibit serious outlier problems, indicating that the data series is suitable for applying the ARDL model.

Unit Root Tests Results

Before conducting regression analysis on time series data, it is essential to ensure that the variables are stationary.

Variable	**Augmented Dickey-Fuller Test**		**Phillips-Perron Test**		**Conclusion**
	Statistics	**P- value**	**Statistics**	**P - value**	
Level					
GDP	-1.526	0.5204	-1.228	0.6615	Non-stationary
FDI	-2.175	0.2153	-2.203	0.2053	Non-stationary
TO	-1.037	0.7396	-1.002	0.7524	Non-stationary
TEC	-1.870	0.3465.	-1.912	0.3265	Non-stationary
IND	-1.962	0.3033	-1.983	0.2939	Non-stationary
First difference					
GDP	-3.632	0.0052	-3.654	0.0048	Stationary
FDI	-4.305	0.0000	-6.439	0.0000	Stationary
TO	-5.144	0.0000	-5.157	0.0000	Stationary
TEC	-5.128	0.0000	-5.129	0.0000	Stationary
IND	-4.758	0.0001	-4.816	0.0001	Stationary

Table 3. Phillips-Perron and Augmented Dickey-Fuller Unit Root Tests

Source: Author's calculation.

The results of the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests presented in Table 3 indicate that all variables are non-stationary in their levels. However, they become stationary at the first difference level, I(1), with a significance level of 1%. Therefore, the data series for the variables in this study are appropriate for analysis using the ARDL model

Selection of the Optimal Lag Order

Lag	FPE	AIC	HQIC	SBIC
0	43291	27.7027	27.7863	27.9931
1	460.668	23.0783	23.6635	25.1106
2	172.376	21.5853	22.6721	25.3596
3	3.90098	15.9932	17.5817	21.5095
4	2.2e-78*	-173.858*	-171.768*	-166.6*

Table 4. Result of the Optimal Lag Order Selection

Source: Author's calculation.

Table 4 presents the optimal lag of the ARDL model, which has stationary variables at the first difference I(1). Based on the FPE, AIC, HQIC, and SBIC criteria, the selected optimal lag is 4.

ARDL Bounds Testing

The study conducted an ARDL bound test to examine the long-run relationship between variables.

		F- statistics		t -statistics	
Statistic	**Significance level**	**[I_0]**	**[I_1]**	**[I_0]**	**[I_1]**
F = 6.502	1%	3.74	5.06	-3.43	-4.60
t = -4.658	2.5%	3.25	4.49	-3.13	-4.26
	5%	2.68	4.01	-2.86	-3.99
	10%	2.45	3.52	-2.57	-3.66

Table 5. ARDL Bounds Test for Cointegration

Source: Author's calculation.

The results of the Bound test in Table 5 show that the F-statistic (F = 6.502) exceeds all the upper bound critical values, and the t-statistic (t =-4.658) is less than all the upper bound critical values at the 1%, 2.5%, 5%, and 10% significance levels. Therefore, the ARDL model confirms the existence of cointegration among the variables.

ARDL Results

The results of the short run and long run relationship estimations using the ARDL model are presented in the following table:

GDP	ADJ	Long-run	Short-run
GDP_{t-1}	-1.9667** (0.015)		
FDI_{t-1}		0.8631 *** (0.001)	

TO_{t-1}		-0.1402** (0.025)	
TEC_{t-1}		0.0024*** (0.004)	
IND_{t-1}		-0.4709** (0.036)	
ΔGDP			0.6088** (0.042)
ΔFDI			1.1019* (0.088)
ΔFDI_{t-1}			1.1834** (0.048)
ΔFDI_{t-2}			1.1949** (0.028)
ΔFDI_{t-3}			1.1650* (0.072)
ΔTO			0.2534 (0.050)
ΔTO_{t-1}			0.2650** (0.026)
ΔTO_{t-2}			0.3756** (0.026)
ΔTO_{t-3}			0.2909** (0.041)
ΔTEC			-0.0030** (0.023)
ΔTEC_{t-1}			-0.0038*** (0.000)
ΔTEC_{t-2}			-0.0024*** (0.003)
ΔIND			1.1127** (0.035)
ΔIND_{t-1}			1.2505** (0.041)
ΔIND_{t-2}			1.1815* (0.066)
ΔIND_{t-3}			1.1597* (0.057)
constant			0.9524 ** (0.019)

Table 6. ARDL Model Estimation Results

Source: Author's estimation.

Note: *,**,***represent significance level at 10%, 5%, and 1% respectively. Numbers in parentheses indicate p-values.

To ensure the reliability of the estimates, the study conducted several autocorrelation tests, heteroscedasticity tests, residual normality tests, and model fit tests. The results indicated that the ARDL model provided reliable estimates (Table 7).

Test Hypothesis	Test	p-value	Conclusion
Autocorrelation	Breusch-Godfrey LM Test	0.2129	No autocorrelation
Heteroscedasticity	Breusch-Pagan Test	0.2416	No heteroscedasticity
Normality	Jarque-Bera Normality Test	0.2732	Residuals Normally Distributed
Specification	Ramsey RESET Test	0.2212	Model Correctly Specified

Table 7. Diagnostic tests Results

Source: Author's calculation.

The study further tests the stability of the model using the cumulative sum of residuals (Cusum) test and the cumulative sum of squares (Cusumsq) test. The results indicate that the ARDL model, which examines the impact of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam, is stable over time.

Test	Test statistic	Critical value	Conclusion
Cusum	0.97	1.96	Stable
Cusumsq	0.78	1.96	Stable

Table 8. The Model Stability Test Results

Source: Author's calculation.

Discussion of Research Results

The estimated results from the ARDL model indicate:

Foreign direct investment (FDI) has a positive impact on economic growth in both the short run and long run. In the short run, FDI has an immediate effect on economic growth, with significant impacts observed at lags of one, two, and three. This influence arises from FDI's role in supplementing domestic investment capital, facilitating technology transfer, and contributing to human capital development, all of which foster economic growth. Additionally, the increase in foreign direct investment leads to the creation of more job opportunities and enables international knowledge spillovers. These dynamics positively affect the technology transfer process, boost productivity, and further promote economic growth in the recipient country over both the short and long run. These findings are consistent with the studies of (Agrawal, 2015) and (John, 2016), but they contrast with the results of Osuji (2015) and Minh (2020).

Trade openness has a positive impact on economic growth in the short run but a negative impact in the long run. In the short run, trade openness exerts both an immediate effect and significant effects at lags of one, two, and three. When trade openness increases, it allows the economy's resources to be allocated more efficiently based on comparative advantages in international trade, thereby promoting short-run growth. However, if the level of openness becomes too high, the economy may become more vulnerable to adverse external shocks, which can negatively

affect long-run economic growth. This finding is consistent with the results of Chang et al. (2009), Asfaw (2017), and Brueckner and Lederman (2015), Nguyen (2017) but contrasts with the findings of Musila and Yiheyis (2015), Polat et al. (2015), and Lawal et al. (2016).

Technological innovation has a negative impact on economic growth in the short run but a positive impact on economic growth in the long run. In the short run, technological innovation affects economic growth with a lag of one, two and an immediate impact. In the short run, increased investment in technological goods has not been effective and has not created momentum for economic growth. In the long run, increased investment in technological goods along with improvements in human resource quality and institutional quality will make the economy's resources more efficiently allocated, the economy's competitiveness and production capacity will increase, thereby positively affecting long run economic growth. These findings are consistent with the results of Jammeh (2022) and Zayas-Márquez and Ávila-López (2022), but they contrast with those of Alp et al. (2020), and Hardi et al. (2024).

Industrial sector performance has a positive impact on economic growth in the short run but a negative impact in the long run. This finding is consistent with the results of Bolaky (2011), Saba and Ngepah (2022), and Ngọc (2024), but contrasts with the findings of Ou (2015). In the short run, industrial sector efficiency exerts both an immediate effect and significant lagged effects at periods one, two, and three. When the economy’s resources are not fully utilized, increased industrial sector performance positively contributes to economic growth. However, once efficiency reaches a certain threshold, it may negatively affect growth due to the law of diminishing marginal productivity, increased pressure on resource consumption, and environmental pollution.

Conclusion, Policy Implications and Limitations

Conclusion

This study employs the Autoregressive Distributed Lag (ARDL) model to assess the impact of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth in Vietnam during the period 1993-2023. The results show that, in the short run, foreign direct investment, trade openness, and industrial sector performance have positive effects on economic growth, while technological innovation has a negative effect. In the long run, foreign direct investment and technological innovation positively contribute to growth, whereas trade openness and industrial sector performance have negative impacts on Vietnam’s economic growth.

Policy Implications

Vietnam needs to continue improving the investment environment and creating favorable conditions to attract foreign direct investment (FDI). It is essential to focus on attracting FDI projects that utilize high technology, new technology, and core technologies, while prioritizing investments from developed countries and large corporations that lead in technology application and transfer. This will help generate positive spillover effects in technology and strengthen connections with global production and supply chains. Vietnam should also leverage its comparative advantages in international trade by transforming its production structure toward the use of modern technology, thereby enhancing the performance of the industrial sector, creating highly competitive export products, establishing a strong position in the global supply chain, diversifying export markets, and avoiding over-reliance on a few major trading partners. In addition, Vietnam needs to increase investment in science and technology, and foster an

enabling environment for innovation to enhance technological capacity and master modern technologies. This will facilitate more effective utilization of economic resources, thereby promoting rapid and sustainable economic growth.

Limitations and Future Research Directions

This study focuses solely on examining the impact of foreign direct investment, trade openness, technological innovation, and industrial sector performance on economic growth, without considering other factors that may also affect economic growth, such as human capital, economic institutions, government spending, exchange rates, inflation, and so on. Additionally, this study exclusively employs ARDL estimation techniques, despite the existence of various other time series data estimation methods. Given these limitations, future studies could incorporate variables such as human capital, institutional quality, government spending, or macroeconomic factors like inflation and exchange rates into the model. Furthermore, they could explore the use of alternative time series estimation techniques and compare their results with those of this study.

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