

The Impact of Foreign Direct Investment, Innovation, and Institutions on Economic Growth in Vietnam

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ABSTRACT

This study was conducted to identify and evaluate the impact of foreign direct investment, innovation and institutions on Vietnam's economic growth. This study uses the Error Correction Vector Model (VECM) estimation method and Johansen integrated co-analysis to analyze the short- and long-term impacts of foreign direct investment, innovation and institutions on Vietnam's economic growth in the period 2002 – 2022. The quantitative findings indicate that, in both the short term and the long term, FDI exerts a negative impact on economic growth, while innovation and institutional quality positively contribute to economic growth in Vietnam.

Keywords: FDI, innovation, institutions, economic growth, Vietnam

INTRODUCTION

In the context of globalization and deepening international economic integration, sustainable economic growth has become a key goal of most countries, including Vietnam. Vietnam's economic growth and development over the past decades have shown that foreign direct investment (FDI), innovation and institutional quality play a key role in driving growth. However, the specific impact of these factors on economic growth is still unclear, both theoretically and practically.

Firstly, FDI is considered an important driving force to help Vietnam transform its economic structure, expand production, access advanced technology and participate more deeply in the global value chain. However, studies and practical data show that the spillover effect from FDI is still limited, especially in the field of technology transfer and improving the competitiveness of domestic enterprises. This raises questions about the extent and how FDI actually contributes to long-term economic growth.

Second, innovation is increasingly seen as a core factor for creating new productivity and competitive advantages. Vietnam has enacted many policies to encourage research, development (R&D) and innovative start-ups. However, the level of innovation is still low compared to many countries in the region. Therefore, it is necessary to clarify the impact of innovation on Vietnam's economic growth in the context of integration.

Third, institutions are considered the foundation for all economic activities. A transparent and effective institutional system will help allocate resources rationally, reduce transaction costs and encourage investment and innovation. Although Vietnam has made many important reforms in the field of economic institutions, there are still barriers in terms of administrative procedures, transparency and efficiency of state governance. This directly affects the quality of FDI, the ability to innovate and the results of economic growth.

For the above reasons, it is very urgent to study the impact of FDI, innovation and institutions on Vietnam's economic growth. The research results are not only scholarly significant in supplementing empirical evidence, but also highly practical, supporting policymakers in developing strategies for sustainable economic development and effective integration. The next part of the study is structured as follows: Part 2 presents an overview of the research literature on the relationship between foreign direct investment, innovation, institutions, and economic growth. Part 3 introduces the Conceptual Framework. Part 4 describes the research methodology. Part 4 discusses the results of the experimental estimates. The last part is the conclusion and policy implications.

LITERATURE REVIEW

The Relationship between FDI and economic growth

In empirical research, Triatmanto, B. (2023), using the Panel Vector Autoregression (PVAR) model, studied the impact of FDI on economic growth in selected ASEAN countries—Indonesia, Thailand, Vietnam, and the Philippines—during the period 2000–2020, and found a positive relationship between FDI and economic growth in all four countries. Most recently, Jiao, L. (2024) concluded that FDI plays a significant role in promoting economic growth in the United States during the period 1990–2022, based on FMOLS, Dynamic OLS (DOLS), and Canonical Cointegrating Regression (CCR) methods.

Some empirical studies suggest that FDI may exert a negative impact on economic growth under specific circumstances. Carkovic, M. and Levine, R. (2005) employed a panel data model using the Generalized Method of Moments (GMM) with a sample of 72 countries, and concluded that the impact of FDI on economic growth becomes insignificant or even negative when institutional quality is weak. Ang, J. B. (2009), using a Vector Error Correction Model (VECM), assessed the impact of FDI on Thailand's economy during 1970–2004 and found a negative effect of FDI on economic growth. Similarly, Bouchoucha, N. and Ali, W. (2019), investigating the conditional effect of FDI on economic growth in African countries between 1996 and 2016, emphasized that positive effects of FDI depend on the presence of strong institutional quality. Using the Pedroni panel cointegration test, they discovered a negative relationship between FDI and economic activity in these contexts.

Several empirical studies have suggested that FDI does not always exhibit a significant relationship with economic growth. Karimi, M. S. et al. (2009), using the Autoregressive Distributed Lag (ARDL) model and time-series data from 1970 to 2005 for Malaysia, also reported no statistically significant impact of FDI on economic growth. Similarly, Temiz, D. (2014), based on comprehensive empirical analysis, concluded that there was no significant relationship between FDI inflows and GDP growth in Turkey in either the short or long term.

The relationship between innovation and economic growth

Redding, S., and Van Reenen, J. (2004) employed a Vector Autoregression (VAR) model to analyze the impact of innovation on economic growth across European countries during the period 1974–1990. Their findings reveal that innovation has a significantly positive effect on economic growth in these countries. Similarly, Ulku, H. (2004) utilized the Generalized Method of Moments (GMM) regression model to examine data from 30 countries—comprising 20 OECD members and 10 non-OECD countries—over the period 1981–1997. The study concluded that innovation in both groups had a positive impact on GDP per capita, although it did not lead to permanent economic growth.

Several studies have adopted trademarks as proxies for innovation to evaluate their impact on economic growth, and have consistently found a positive relationship. For instance, Pece, A. et al. (2015) examined the relationship between innovation and economic growth in Central and Eastern European (CEE) countries—specifically Poland, the Czech Republic, and Hungary. Their research, using multivariate regression models with innovation indicators such as the number of patents, trademarks, and R&D expenditure, confirmed a long-term positive impact of innovation on economic growth. Similarly, Gyedu, A. et al. (2021) found that trademarks, along with R&D intensity and patent counts, had a significant effect on GDP per capita in G7 and BRICS countries.

An empirical study by Pala, O. (2019), based on data from 25 developing countries, analyzed indicators of innovation such as R&D expenditure and the number of R&D researchers. Using the Random Coefficient Model (RCM), the study concluded that there is a significant negative relationship between R&D expenditure and economic growth in certain countries, including China, Egypt, and Iran. Furthermore, the number of R&D researchers had a significantly negative impact on economic growth in countries such as Iran, Mexico, Tunisia, and Uzbekistan. In contrast, this variable showed a significantly positive effect on economic growth only in Ukraine, Turkey, Russia, and China.

In a study examining the influence of innovation activities on economic growth, Mladen, I. (2016) found no statistically significant relationship between innovation and economic growth in emerging markets.

The relationship between institutions and economic growth

Venard, B. (2013) demonstrated that institutions have a positive impact on economic growth across 120 countries. Some researchers analyzed good governance by using more than one indicator, such as in the study by Lahouij, H. (2017), who employed pooled time-series data from various countries during the period 2002–2014 and found that governance has a positive effect on economic growth. Dhaoui, E. (2021), using data from 15 Middle Eastern and North African countries during 2003–2018, showed that good governance contributes positively to sustainable economic growth. Onafowora, O. A. (2024), in a study on the impact of institutional quality on economic growth in Latin American and Caribbean (LAC) countries during the period 2000–2021, found that institutional quality has a positive effect on economic growth in these countries.

Although many studies have shown that institutions have a positive impact on economic growth, there are also studies indicating that institutions may exert a negative effect on economic growth. Di Vita, G. (2017) examined the impact of institutional quality on regional economic growth in Italy during the period 1995–2011. Using the Random Effects Model (REM) and quantile regression, the study found that the complexity of civil litigation regulations posed a barrier to regional GDP growth. Ngo, X. and Nguyen, H. (2020) concluded that institutional factors had a negative impact on economic growth in their study of 13 lower-middle-income Asian countries over the period 2000–2008, using the Generalized Method of Moments (GMM) regression approach.

In addition to studies showing either a positive or negative relationship between institutions and economic growth, there are also studies suggesting that the impact of institutions is not uniform and may vary between short-term and long-term periods. Kaufmann, D., Kraay, A., and Mastruzzi, M. (2009), using the ARDL model to analyze the impact of institutions on the economic development of European countries during the period 1974–1990, found that institutions had a positive effect on long-term economic growth, while the short-term impact remained unconfirmed. Acemoglu, D. (2009) similarly showed that institutions do not impact economic growth in certain specific cases, depending on the economic conditions and policy frameworks of each country.

Conceptual Framework

To measure the economic status of a country, the productivity of one country is a key determinant (Mankiw, N.G, 2011). So, economic growth is an increase in productivity or the increased quantity of goods and services, compared from one period of time to another. Economic growth is measured through many different indicators. But the most common and popular are probably the core indicators such as: (1) Gross domestic product (GDP), (2) Gross national product (GNP), (3) Gross national income (GNI).

Foreign Direct Investment (FDI) involves companies making international investments to establish facilities and branches in other countries, with ownership and managerial control over these operations. The investor, who provides the capital, is also responsible for managing and directing the use of that capital. This form of investment allows foreign investors to contribute significant capital to production or service activities and directly participate in the management and administration of the invested entity (Do, D.B & Nguyen, T.L, 2008). FDI is mainly made from private capital, capital of companies aiming to gain higher profits through deploying production and business activities abroad (Do, D.B & Nguyen, T.L, 2008). Therefore, foreign direct investment can be considered as the investment capital of a foreign private company investing directly in another country for production, business, and services for the purpose of earning profits.

For a long time, many economists have studied and explored the factor of innovation, such as Adam, S (1776), David, R (1817), and Thomas, M (1798). According to the OECD (2005), innovation is the introduction of a new or significantly improved product, the implementation of a new technological process, a new marketing method, or a new organizational method in business activities, in workplace organization, or in external relations. According to OECD (2005), innovation is reflected by many indicators, including (1) patent applications index; (2) index of individuals participating in the R&D field; (3) R&D expenditure index; (4) total number of trademark applications. In particular, many studies have chosen the total number of trademark applications to assess the impact of innovation on economic growth. Trademark registration plays an important role in promoting economic growth, especially in the context of a global economy that is increasingly based on knowledge and innovation.

According to North, D (1990), the main role of institutions in a society is to provide a structure for daily life activities through guidelines for human interactions. Institutions are perceived and classified in various ways,

but generally, three key components are identified: formal institutions (codified, such as laws); informal institutions (uncodified, such as customs and behavioral norms); and enforcement mechanisms and sanctions (Kasper, W., & Streit, M. E., 1999). The new institutional economics theory is a theoretical model developed from the old institutional economics theory, emphasizing that institutions are a crucial factor for economic growth (North, D, 1990).

Methodology

The data used in this study are compiled from the World Bank Development Indicators Database (<https://data.worldbank.org/>) and the WIPO IP Statistics Data Center (<https://www3.wipo.int/ipstats/ips-search/trademark>) for the period from 2002 to 2022. Table 1 describes in detail the variables used in the model.

Table 1. Variables Used in the Research Model

Variable Name	Description	Source
LGDP	Logarithm of GDP per capita (USD)	The World Bank Development Indicators Database
LFDI	Logarithm of FDI (USD)	The World Bank Development Indicators Database
LRL	Logarithm of Rule of Law	The World Bank Development Indicators Database
LTM	Logarithm of Trademark Applications	WIPO IP Statistics Data Center

Source: Research Team (2025)

The study employs the Johansen cointegration analysis and the Vector Error Correction Model (VECM) estimation method to examine the short-run and long-run impacts of foreign direct investment, institutional environment, and innovation on economic growth in Vietnam. The research is conducted through the following steps:

Step 1: Descriptive statistics of variables

Step 2: Unit root testing of data series

The time series data used in this study are transformed into logarithmic form to ensure greater stationarity. Subsequently, the logarithmically transformed series are subjected to unit root testing using the Augmented Dickey-Fuller (ADF) test.

If the time series X_t is stationary, it is considered integrated of order zero, or $I(0)$. If the series is non-stationary, the ADF test is applied to the first-differenced series. If the first-differenced series is stationary, the original series is integrated of order one, or $I(1)$. If the first-differenced series remains non-stationary, the ADF test continues with the second-differenced series. If the second-differenced series is stationary, then the original series is integrated of order two, or $I(2)$.

Step 3: Cointegration Test

The Johansen–Juselius approach is employed to test for cointegration relationships in order to identify long-run equilibrium relationships among variables in the model. The existence and number of cointegrating equations are determined through two test statistics: Maximum Eigenvalue Test λ_{max} and the Trace test λ_{trace} . If cointegration relationships exist among the data series, the VECM approach is deemed appropriate.

Step 4: Selection of Optimal Lag Length

The Akaike Information Criterion (AIC) is utilized to determine the optimal lag length (Nguyen et al., 2014; Nguyen et al., 2020; Ozcicek, O. & McMillin, W. D., 1996).

Step 5: Estimation of the VECM Model

When regressing models with time series variables, the requirement is that these series must be stationary. In case the series is not stationary, it is necessary to take differences until a stationary series is obtained. However, when regressing values after taking differences, long-term information in the relationships between variables may be missed. Therefore, when regressing models that have taken differences, there must be a residual E.

A key characteristic of this model is its ability to examine the impacts of shocks in one variable on others, especially macroeconomic variables. The Vector Error Correction Model is specified as follows:

$$\Delta X_t = \Pi X_{t-1} + \Gamma_1 \Delta X_{t-1} + \dots + \Gamma_{p-1} \Delta X_{t-p+1} + U_t$$

In which: ΔX_t is a vector consisting of n different variables.

Step 6: Diagnostic Testing

Based on the VECM estimation results, several diagnostic tests are conducted to evaluate the adequacy of the model, including: the Granger causality test, stability test of the model, Portmanteau test for autocorrelation, and White test for heteroskedasticity.

Step 7: Impulse Response Functions and Variance Decomposition Analysis

Impulse response functions are used to trace the effects of a shock in one variable on other variables in the system over time. This study investigates the dynamic impacts of shocks from foreign direct investment, innovation, and institutional quality on economic growth. Variance decomposition analysis is employed to quantify the proportion of the forecast error variance of economic growth that is attributable to innovations in each of the explanatory variables, thereby identifying their relative contribution to fluctuations in economic growth in Vietnam.

The empirical model investigating the impacts of foreign direct investment, innovation, and institutional quality on economic growth in Vietnam can be specified as follows:

$$LGDP_t = \alpha + \sum_{i=1}^k \beta LFDI_{t-i} + \sum_{i=1}^k \beta LRL_{t-i} + \sum_{i=1}^k \beta LTM_{t-i} + \varepsilon_t$$

In which: ε_t denotes the stochastic error term.

t represents the time variable in years, ranging from 2002 to 2022.

Results and Discussion

Descriptive statistics

Table 2 presents descriptive statistics of the variables used in the VECM model. Considering the asymmetry coefficient, the variables GDP, FDI, RL, TM all have positive values, indicating that these variables have a right-skewed distribution. The P-value of the Jarque-Bera test accepts the hypothesis that the variables are normally distributed.

Table 2. Descriptive statistics of the variables used

	LGDP	LFDI	LRL	LTM
Mean	3.223672	9.849953	0.775126	4.346405
Median	3.340490	9.949390	0.728797	4.399605
Maximum	3.621074	10.25285	1.027425	4.659250
Minimum	2.638300	9.146128	0.506503	3.853090
Std. Dev.	0.318500	0.375129	0.159733	0.226246

Skewness	-0.537298	-0.899600	0.145572	-0.710806
Kurtosis	1.900418	2.353272	1.769861	2.648527
Jarque-Bera	2.068360	3.198453	1.398256	1.876451
Probability	0.355518	0.202053	0.497019	0.391322
Sum	67.69712	206.8490	16.27765	91.27451
Sum Sq. Dev	2.028842	2.814434	0.510294	1.023748
Observations	21	21	21	21

Source: Results extracted from Eviews software

Test statistic

Results of ADF unit root test for stationarity of variables are presented in Table 3:

Table 3. Augmented Dickey-Fuller Unit Root Test on D(LGP,2)

Lag length	Lag length 0		Lag length 1		Lag length 2		Result
	t-statistics	p – value	t-statistics	p – value	t-statistics	p – value	
LFDI	-4.624211	0.0026					I(0)
LGDP	-0.599810	0.9674	-1.570682	0.4763	-8.539210	0.0000	I(2)
LRL	-1.720219	0.4065	-5.180437	0.0006			I(1)
LTM	-1.917046	0.3183	-4.434349	0.0028			I(1)

Source: Results extracted from Eviews software

To ensure that the use of the VECM model in the study is reliable and reasonable, the stationarity test is the first and also an important step. If the data series or its differences are not stationary, the VECM model cannot be used in this study. With the hypothesis that the series is not stationary, we perform the ADF test with the variables LFDI, LGDP, LRL and LTM as above, and we get the results in Table 3. The p-values of those variables (or after taking differences) are 0.0026; 0.0000; 0.0006; 0.0028, respectively. That is, we reject the hypothesis, so all of the above variables (or after taking differences) are stationary series. Thus, the data is suitable for analysis in the next steps.

Cointegration test and long-run relationship between variables

Based on the ADF test results, all the time series variables are selected as either stationary or stationary at first difference or second difference, i.e. I(0), I(1) or I(2). Therefore, these variables may be cointegrated and long-run relationships may exist between the variables. To test the long-run equilibrium relationships, cointegration analysis is performed by applying the Johansen cointegration method.

Table 4. Results of Unrestricted Cointegration Rank Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.713597	57.74629	55.24578	0.0296
At most 1	0.680123	33.98951	35.01090	0.0641
At most 2	0.415430	12.33298	18.39771	0.2850
At most 3	0.106158	2.132293	3.841465	0.1442
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.713597	23.75678	30.81507	0.2838
At most 1	0.680123	21.65654	24.25202	0.1062
At most 2	0.415430	10.20068	17.14769	0.3790
At most 3	0.106158	2.132293	3.841465	0.1442

Note: * is rejection of the null hypothesis at the 0.05 level. **MacKinnon-Haug-Michaelis (1999) p-value.

Source: Results extracted from Eviews software

The results of the trace test and maximum eigenvalue test have been presented in Table 4. While the trace test gives confirmation of the existence of at least 1 cointegrating equation in the long-run relationship. The number of cointegrating vectors for the above tests in Johansen's approach also shows the existence of a cointegrating vector between the variables. Therefore, based on Johansen's approach, it can be suggested that there is a long-run relationship between the variables. Table 5 below shows the standardized coefficients of the single cointegrating equation as proposed by Johansen's method.

Table 5. Normalized cointegrating coefficient

LGDP	LFDI (***)	LRL (***)	LTM (***)
1.000000	- 0.769038	0.693201	0.950522
	(0.12177)	(0.13584)	(0.21550)
	[- 6.3154]	[5.1037]	[4.4108]

Note: *** denotes 1% significance level, standard error in () & t-statistic in [].

Source: Results extracted from Eviews software

The long-run relationship between the variables is represented by the following equation.

$$\text{LGDP} = -0.769038 * \text{LFDI} + 0.693201 * \text{LRL} + 0.950522 * \text{LTM} + \varepsilon$$

The results show that in the long term, all three variables of foreign direct investment, institutional environment and innovation are statistically significant for economic growth. Specifically, in the long term, foreign investment will have a negative impact on economic growth in Vietnam. This conclusion is consistent with the research of Carkovic, M. and Levine, R. (2005), Ang, J. B. (2009), Bouchoucha, N. and Ali, W. (2019). This result comes from the limitations of attracting FDI into Vietnam in recent years. Firstly, the level of connection and spillover of the FDI sector to the domestic investment sector is still low, attracting and transferring technology from the FDI sector to the domestic investment sector is not as expected, mainly processing and assembly, the localization rate in some industries is low, etc the added value per unit of product is not high. In fact, the supporting industry serving Vietnam's high-tech projects still has many limitations, domestic enterprises are small in scale and low technology level, so they cannot become satellites and links in the supply chain of multinational corporations. This limits the pervasiveness of FDI projects to the development of Vietnam's economic sectors. Secondly, the proportion of FDI attraction in fields is uneven. In general, most FDI projects in Vietnam focus on sectors that are less environmentally friendly, have large emission levels, low added value, and lack fundamental industries. Green FDI projects are less focused. Moreover, the quality of FDI is not high, investment projects have not participated deeply in the value chain, mainly outsourcing, light industry, medium and small project sizes. The reason is that the situation of focusing on immediate economic benefits and neglecting environmental protection is still quite common, especially in the process of appraisal, approval and implementation of FDI projects. Many localities have rolled out the red carpet to attract FDI projects at all costs, less selectively, and have even accepted FDI enterprises that exploit cheap resources with outdated technology, causing serious environmental pollution. Thirdly, there is still a situation of FDI enterprises transferring prices and evading taxes in Vietnam. Some transfer pricing tricks that foreign investors often use are raising the price of fixed assets when contributing investment capital. Multinational enterprises often charge higher prices than the market price for imported machinery and equipment to contribute investment capital in Vietnam. In addition, FDI enterprises can also raise the price of imported raw materials for production, leading to enterprises declaring losses and not paying corporate income tax in Vietnam; transfer pricing through the transfer of intangible assets, usually technology, technical know-how, copyrights, labels, techniques for management, administration and corporate governance; transfer pricing through the provision of services from overseas parent companies...

Meanwhile, in the long run, the institutional environment and innovation will have a positive impact on economic growth in Vietnam. This finding is shown in the study of Pece, A. et al. (2015), Gyedu, A. et al. (2021), Dhaoui, E. (2021), Onafowora, O. A. (2024). The long-run equilibrium coefficient shows that the value of economic growth is lower than the equilibrium value. That is, when a shock occurs, it will cause economic growth to deviate from the long-run equilibrium value. Therefore, in the next period, LGDP will need to adjust up by about 0.077040% deviation to reach the equilibrium position.

VECM model estimation results

Determine the optimal lag:

The study continues to search for the optimal lag for the model using the VAR lag Order Selection Criteria method, through testing the lag of 4 variables: D(LGDP,2), LFDI, D(LRL), D(LTM).

Table 6. VAR Lag Order Selection Criteria

Endogenous variables: D(LGDP,2) LFDI, D(LRL), D(LTM) Biến ngoại sinh: C						
Sample: 2002 2022				Number of observations:18		
Lag	LogL	LR	FPE	AIC	SC	HQ
0	69.72243	NA	7.92e-09	-7.302493	-7.104632	-7.275210
1	107.9290	55.18720*	7.13e-10*	-9.769884*	-8.780582*	-9.633473*

Note: *** indicates 1% significance level, * indicates 10% significance level

Source: Results extracted from Eviews software

The appropriate lag of the VECM model is selected based on the AIC criterion and other criteria with a significance level of 5%. Table 6 shows that the model has the optimal lag of the variables of order 1 with a significance level of 5%.

VECM Error Correction Estimates results:

Table 7. VECM Error Correction Estimates results

D(LGDP(-1),2)	LFDI(-1) (***)	D(LRL(-1)) (***)	D(LTM(-1)) (***)	C
1.000000	-0.068970	0.601276	0.956816	0.640986
	(0.02204)	(0.09166)	(0.11277)	
	[-3.12916]	[6.55982]	[8.48433]	

Note: *** denotes 1% significance level, * denotes 10% significance level and Standard error in () & t-statistic in [].

Source: Results extracted from Eviews software

From the results of VECM estimation in Table 7, the existence of co-integration vector represents the short-run equilibrium relationship between the variables in the model and is described by the following equation:

$$\text{LGDP} = 0.640986 - 0.068970 * \text{LFDI} + 0.601276 * \text{LRL} + 0.956816 * \text{LTM} + \varepsilon$$

The short-term model estimation results show that all three variables LFDI, LRL and LTM are statistically significant. Specifically, in the short term, FDI will have a negative impact on economic growth in Vietnam. This is also the opinion of Ang, J. B. (2009), Bouchoucha, N., Ali, W. (2019). Meanwhile, the institutional environment and innovation will have a positive impact on GDP economic growth in Vietnam. This research result is consistent with the research of Gyedu, A. et al. (2021), Pham Tien Manh (2023), Nguyen Viet Hong Anh (2023), Dhaoui, E. (2021), Onafowora, O. A. (2024).

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- Granger test:

Table 8. VEC Granger causality test results

Dependent variable: D(LGDP,3)		
Excluded	Chi-sq	Prob.
D(LFDI) (*)	3.533936	0.0601
D(LRL,2) (*)	3.402569	0.0651
D(LTM,2)	0.078273	0.7797
Dependent variable: D(LFDI)		
Excluded	Chi-sq	Prob.

D(LGDP,3)	0.789588	0.3742
D(LRL,2)	1.09005	0.2965
D(LTM,2)	0.001497	0.9691
Dependent variable: D(LRL,2)		
Excluded	Chi-sq	Prob.
D(LGDP,3)	1.399381	0.2368
D(LFDI) (***)	12.40927	0.0004
D(LTM,2) (*)	2.756171	0.0969
Dependent variable: D(LTM,2)		
Excluded	Chi-sq	Prob.
D(LGDP,3) (**)	4.187304	0.0407
D(LFDI)	0.135750	0.7125
D(LRL,2)	0.217238	0.6412

Source: Results extracted from Eviews software

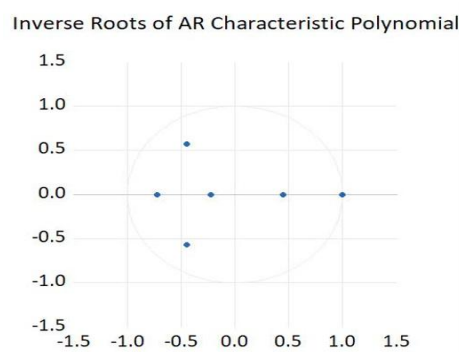
The Granger causality test results in Table 8 show that when FDI is the dependent variable, there is no relationship in the short-run impact on FDI, but to some extent, during the long-run convergence process, the dynamic adjustment from short-run divergence to long-run equilibrium is considered statistically significant, but when considering the short-run causality, there is no statistical significance.

However, when considering the short-run for GDP, RL and TM variables, it can be seen that there is a causal relationship between all variables, to a greater or lesser extent.

Testing the stability of model:

The inverse root test of the AR-specific polynomial shows that, in Fig 1, the particular values are all in the circle at. This implies that the VECM model is stable and that the estimated results are reliable.

Fig 1. Inverse Roots of AR Characteristic Polynomial



Source: Results extracted from Eviews software

Check the VEC Residual Portmanteau Tests for Autocorrelations

Table 9. Portmanteau Tests for Autocorrelations

VEC Residual Portmanteau Tests for Autocorrelations					
Null Hypothesis: No residual autocorrelations up to lag h Sample: 2002-2022 Number of observations: 17					
Lags	Q statistic	Probability*	Adjusted Q statistic	Probability*	Df
1	15.11824	NA*	16.06313	NA*	NA*
2	22.76363	0.7448	24.72791	0.6426	28
3	41.44372	0.5818	47.41088	0.3353	44
4	52.15970	0.7542	61.42408	0.4247	60

Note: The test is only valid for lags greater than the VECM lag.

The results of the residual autocorrelation test of the regression model using the Portmanteau Tests method and the autocorrelation diagram in Table 9 show that there is no autocorrelation in the model with a statistical significance level of 1%.

VEC Residual Heteroskedasticity Tests:

Table 10. VEC Residual Heteroskedasticity Tests

VEC Residual Heteroskedasticity Tests (Levels and Squares)		
Sample: 2002 2022		Included observations: 18
Joint test:		
Chi-sq	df	Prob.
102.2969	100	0.4175

Source: Results extracted from Eviews software

The results of the White test for heteroscedasticity from Table 10 show that there is no heteroscedasticity in the regression model with a statistical significance level of 1%.

Shock transmission and variance decomposition mechanisms:

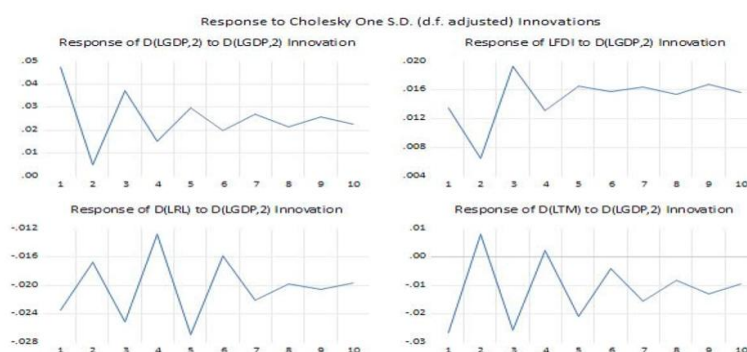
Table 11. Variance Decomposition using Cholesky (d.f.adjusted) Factors

Variance Decomposition of D(LGDP,2):					
Period	S.E.	D(LGDP,2)	LFDI	D(LRL)	D(LTM)
1	0.047386	100.0000	0.000000	0.000000	0.000000
2	0.052639	81.88558	0.000271	2.246718	15.86743

3	0.064595	87.63265	0.008100	1.814934	10.54432
4	0.067954	84.16761	0.117728	3.156423	12.55824
5	0.074655	85.40273	0.334681	2.649462	11.61312
6	0.077857	85.02693	0.501626	2.804528	11.66691
7	0.082861	85.75694	0.503711	2.515484	11.22386
8	0.086144	85.46336	0.471858	2.461601	11.60318
9	0.090229	86.11321	0.430109	2.292917	11.16376
10	0.093513	85.97979	0.400441	2.256566	11.36320

Source: Results extracted from Eviews software

Fig. 2. Decomposition of GDP economic growth variance



Source: Results extracted from Eviews software

Table 11 and Fig.2 present the results of the shock transmission mechanism and variance decomposition of economic growth in Vietnam. Accordingly, the change in economic growth in Vietnam fluctuates throughout the study period. In the long run, economic growth in Vietnam is still affected overall but does not change as much as in the short run. In the second year, the variance of economic growth is decomposed to a small part in foreign direct investment, institutional environment and innovation has increased. In the short run, innovation has the highest explanatory power among the three factors to economic growth in Vietnam. Meanwhile, FDI and institutional environment have an influence but not a large one. In short, the fluctuation of GDP economic growth in the short run is mainly due to the fluctuation in the noise of this variable, followed by the fluctuation of innovation.

CONCLUSION

This research aims to analyze the impacts of FDI, institutional environment, and innovation on economic growth in Vietnam, and to propose a number of policy recommendations to foster economic growth in the forthcoming period. The quantitative findings indicate that, in both the short term and the long term, FDI exerts a negative impact on economic growth, while innovation and institutional quality positively contribute to economic growth in Vietnam. Based on these findings, the study puts forward several recommendations to enhance economic growth in Vietnam in the coming time, as follows:

Firstly, to enhance the efficiency of in-depth FDI attraction. In particular, the government needs to aim to attract green FDI. The Government needs to develop outstanding and competitive preferential policies, create favorable business conditions to attract large projects, national keys, high-tech projects, etc., attract strategic investors and multinational corporations to invest. In particular, the government needs to screen FDI projects to attract green FDI. In particular, the Government needs to actively attract and cooperate in attracting foreign investment selectively, taking quality, efficiency, technology and environmental protection as the main evaluation criteria. Priority is given to projects with advanced technology, new technology, high technology, clean technology, modern management, high added value, spillover impact, connecting global production and supply chains. The Government needs to upgrade environmental standards as a basis for not accepting projects that do not encourage investment (for example, textile and dyeing using old technology, etc.). At the same time, it is necessary to strictly prohibit attracting and approving

projects that do not meet standards and not to extend or expand operations for projects that use low technology and do not meet technological and environmental standards

Second, promote innovation in Vietnam strongly. The Government needs to promote the national innovative start-up ecosystem and strengthen the cohesion and cooperation between universities, research institutes and businesses to promote the commercialization of research results in production and business; Connecting domestic and foreign innovation networks, promoting the role of the system of national innovation centers, linking with localities to promote scientific and technological and innovation activities to bring practical effects in local socio-economic development. In particular, the Government focuses on promoting solutions to strengthen the socialization of investment in science, technology and innovation, especially from businesses. The Government focuses on synchronously implementing solutions on economy, trade, investment and improving the business environment to stimulate technology demand and innovation demand from the business sector, promote the National Technological Innovation Fund and the scientific and technological development fund of enterprises to support technological innovation in enterprises.

Third, improve the institutional environment to promote economic growth. In particular, the Government needs to comprehensively review the structure of institutional groups in order to "untie" the "bottlenecks and bottlenecks" that are restricting the process of production, circulation, exchange and integration; attach importance to ensuring the compatibility, resonance and positive impact of the institutional system of economic development, ensuring the synchronization of the institutional system of economic development not only at one stage and one field but also on the overall reproduction process of the socialist-oriented market economy.

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