



Impact of foreign direct investment, remittances and trade openness on economic growth in Vietnam: an ARDL model approach

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Abstract

This research aims to evaluate the impact of foreign direct investment (FDI), remittances and trade openness on economic growth in Vietnam with data collected in the period 1993-2022 using the autoregressive distributed lag (ARDL) model. The findings show that FDI and remittances positively impact economic growth in the short and long term. In contrast, trade openness has a positive impact on economic growth in the short term but a negative impact on economic growth in the long term. From the research results, the article suggests several policy recommendations focusing on the quality and efficiency of FDI, taking advantage of comparative advantages in international trade while fostering domestic market development and facilitate remittances to invest in production and business activities to create long-term positive development effects for the economy.

Keywords: ARDL, FDI, remittances, trade openness, economic growth.

JEL classification: F21, F24, F43, O11, O47.

1. Introduction

After more than thirty years of international integration, Vietnam's economy has achieved many outstanding achievements in all fields, in which attracting foreign direct investment (FDI), import and export and remittances have become bright spots in Vietnam's international economic integration. FDI contributes significantly to the economy in many aspects, such as supplementing domestic investment capital, accessing advanced foreign technology, increasing state budget revenue, and creating jobs and income for workers. The amount of FDI in Vietnam tends to increase over time: in 1993, the total realised FDI inflow was only about USD 926.3 million, but by 2022, it was up to about USD 17.9 billion, equivalent to 23.4 percent of total social investment capital, creating 3.8 million direct jobs. In addition, international integration also strongly increases import-export turnover and the openness of the economy, with the total import-export turnover reaching 186.5 percent of GDP by 2022, making Vietnam one of the economies with the highest trade openness in the world.

Along with international trade and FDI, the amount of remittances into Vietnam has also increased sharply in recent years, becoming an essential source of foreign currency for the foreign exchange market, contributing to stabilizing the exchange rate and the international balance of payments. However, besides the positive aspects of the increasingly deep economic integration, the Vietnamese economy may become more vulnerable to adverse external fluctuations. With that meaning, this research assesses the short-term and long-term impacts of FDI, remittances, and trade openness on economic growth in Vietnam using the ARDL autoregressive distributed lag method.

2. Methodology

2.1. Theoretical and empirical background

2.1.1. Theoretical background

Solow's growth theory (1956) states that economic growth is created through exogenous factors such as capital and labor. According to Barro and Martin (2004), capital accumulation over time positively impacts economic growth. According to the exogenous growth theory, FDI affects economic growth through its impact on domestic investment (Herzer, 2008). Meanwhile, the endogenous growth theory identifies economic growth as mainly based on technological progress, human capital, and investment in research and development. FDI can be seen as a catalyst of domestic investment and technological progress through technology transfer, human capital accumulation, promoting economic growth and creating development momentum in the host country (Romer, 1990). In addition, the theory of technological progress suggests that the spread of FDI can be through imitation,

competition, and economic relations. Domestic enterprises imitate the technology of FDI enterprises, thereby increasing productivity and growth. When FDI enterprises enter, it creates pressure for domestic enterprises to improve their technology and management skills to improve their competitiveness, thereby leading to growth (Hermes and Lensink, 2003).

The role of trade openness in economic growth, especially for developing countries, has been mentioned in many economic theories. The endogenous growth theory, typically Lucas (1998), Romer (1986), Romer (1990) argues that economic openness stimulates growth through technological progress, technology transfer from developed countries to developing countries, creating technological innovation effects for developing countries. Trade openness allows for more efficient resource allocation based on competitive advantages in international trade (Hey, 2012). However, trade openness has a negative impact on economic growth due to the risk of resource depletion and increased environmental pollution leading to unsustainable growth.

Remittances affect economic growth through their impact on aggregate demand, thereby promoting economic growth through the multiplier effect. According to the model of consumption multiplier, a unit of income received from remittances will increase aggregate demand for goods and services, thereby promoting economic growth and creating jobs (Ratha, 2005). However, the impact of remittances on growth depends on the expenditure effect and the labor shortage effect. The expenditure effect increases GDP due to remittances flowing into the country increasing spending. The labor shortage effect reduces GDP due to emigration. Emigration is traded off by the amount of remittances inflow into the country. Still, it cannot compensate for the loss caused by the shortage of labor resources, especially highly skilled labor (Do and Dinh, 2017).

2.1.2. Empirical research

Very little empirical research has evaluated the simultaneous impact of FDI, remittances, and trade openness on economic growth. Still, there are many studies examining the separate effects of factors related to FDI, remittances, and trade openness on economic growth, typically the following studies:

Kumar (2010) used the ARDL bound approach with data collected over the period 1981-2008 to assess the impact of trade openness, remittances, financial development (FIN), FDI and official development assistance (ODA) on income in Vanuatu. The results showed that trade openness and remittances positively impact income. At the same time, the research did not find a statistically significant relationship between FIN, FDI and ODA on income in Vanuatu. The study recommends that substantial market liberalization, attracting remittance inflows and improving overall institutions be put forward as priority policy measures.

Rashid (2014) examines the role of trade openness, inflation, exports and imports, real exchange rate and FDI on economic growth in Pakistan. The analysis is based on time series data from 1980 to 2011. The research uses ADF, PP and DF-GLS techniques to test the stationarity and cointegration relationship between the variables. Using the dynamic ordinary least squares (DOLS) estimation method, the research results show that the negative impact of trade openness can be overcome by import substitution and trade surplus. The results of this study also show that FDI and trade are considered crucial factors in improving Pakistan's economic growth.

Tahir *et al.* (2015) studied the external factors that affected economic growth in Pakistan with time series data over the period 1977-2013. The research found that external factors such as remittances, FDI, and imports play an important role from the growth perspective. Foreign remittances and FDI have a significant positive role in the growth of the Pakistani economy. Meanwhile, imports negatively affect Pakistan's economic growth. The research recommends that policymakers take appropriate steps to increase the inflow of remittances and FDI to achieve long-term economic growth in Pakistan.

Nketiah *et al.* (2020) studied the relationship between foreign direct investment, trade openness and economic growth in Ghana during 1975 and 2017 with data collected from the World Bank and the Bank of Ghana in 1975-2017. The independent variables used in the study include FDI, inflation, and trade openness. The dependent variable is the GDP growth rate. The research results showed that trade openness is the main factor affecting GDP growth in Ghana. However, the research did not find a statistically significant impact of FDI and inflation on GDP growth in Ghana. The research recommends strong measures to improve trade openness to encourage exports and FDI inflows through creating a favorable and friendly business environment to boost output growth in Ghana.

Cao (2020) examined the impact of remittances, FDI and imports on economic growth in Vietnam, using a time series dataset for the period from 2000 to 2018, applying the autoregressive distributed lag (ARDL) method. The error correction model (ECM) from the ARDL model was used to examine the short-term impact. The research results showed that remittances and imports have positive impacts, while FDI has a negative impact on economic growth in the long run. In the short run, the growth impact of remittances and FDI is similar to the long-term impact. In contrast, the impact of imports is not statistically significant on economic growth in Vietnam.

Saha (2021) examined the impact of remittances on economic growth in Bangladesh with time series data from 1995 to 2016. The research used Johansen-Juselius cointegration test and Granger causality test. The research found that remittances impact long-term economic

growth measured by GDP per capita. In addition, the research also found a positive relationship between remittances and domestic investment in Bangladesh. From the findings, the author recommends that the Government of Bangladesh be cautious and smart in maintaining bilateral and multilateral relations with donor organizations and countries, focusing on achieving sustainable development goals.

Nguyen *et al.* (2022) examined the impact of foreign capital flows, trade openness and human capital on economic growth in Vietnam during the period from 1989 to 2019 by applying the ARDL envelope test method. The research results show that ODA, trade openness and human capital have positive impacts in the long run, while FDI negatively impacts economic growth in the long run. The research results did not find a statistically significant impact of foreign debt on economic growth in Vietnam. However, this research argues that FDI directly affects short-term growth and indirectly affects GDP through trade openness and human capital. This research recommends that Vietnam have appropriate policies to improve the efficiency of FDI while promoting domestic factors such as human capital, trade openness and domestic capital to achieve sustainable growth.

Doan and Nguyen (2023) analyzed the impact of FDI and trade openness in Vietnam from 1991 to 2020 using the VECM model, which includes endogenous variables such as FDI, trade openness, exchange rate, and real GDP, and an exogenous variable, the US Federal Reserve interest rate. The research results show that FDI, trade openness, and the exchange rate positively impact economic growth. The research suggests that Vietnam needs to increase the attraction and use of FDI and trade openness to promote economic growth.

2.2. Data

This research examines the impact of FDI, remittances, and trade openness on economic growth in Vietnam, employing the World Bank's thirty-year time series data from 1993 to 2022.

TABLE 1: **Data and variables**

Variable	Measure	References
lnGDP	Natural logarithm of GDP per capita	Kumar (2010); Bibi and Rashid (2014); Saha (2021)
FDI	Foreign direct investment (as share in GDP, %)	Tahir <i>et al.</i> (2015); Nketiah <i>et al.</i> (2020)
REMIT	Remittances to Vietnam (as share in GDP, %)	Tahir <i>et al.</i> (2015); Saha (2021)
TRADE	Total import and export turnover/GDP (%)	Kumar (2010); Nketiah <i>et al.</i> (2020)

Source: Author's literature review.

TABLE 2: Description of variables

Variable	lnGDP	FDI	REMIT	TRADE
Mean	6,9191	5.6146	3.9663	128,6964
Standard deviation	1.0011	2.2216	1.6057	31.1643
Maximum	8.2312	11.93948	7.9830	186.4682
Minimum	5.4144	3.3904	3.3904	66.2122
Skewness	-0.0697	0.2832	0.0248	- 0.0272
Kurtosis	2.6088	3.0492	3.0278	2.8417

Source: Author’s calculation.

As shown in Table 2, the skewness of the variables lnGDP, REMIT and TRADE is close to zero, so the shape of the distribution is close to a normal distribution. The skewness of the FDI variable is greater than zero, so the shape of the distribution is skewed to the right. The kurtosis of the FDI and REMIT variables is close to 3, so the shape of the distribution is close to a normal distribution. The kurtosis of the lnGDP and TRADE variables is less than 3, so the shape of the distribution is less steep than a normal distribution. Thus, the data series of this research’s variables do not have serious problems with outliers, so the data series is suitable for using the ARDL model.

2.3. Estimation method

This research uses the autoregressive distributed lag (ARDL) model proposed by Pesaran *et al.* (1996). The model has the following advantages: (i) When the sample size is small, the model is a more statistically significant approach to test cointegration; (ii) To find a long-run relationship, the model only estimates one equation without estimating a system of equations like other methods; (iii) In the ARDL model, the regressors can have different optimal lags; (iv) The model allows application to integrated series of order I(0) or I(1); (v) The model can assess the short-term and long-term impact of one variable on another. Due to the above advantages, the ARDL model is suitable for assessing the impact of FDI, remittances and trade openness on economic growth in Vietnam. The proposed general research model is as follows:

$$\Delta \ln \text{GDP}_t = \alpha + \sum_{i=1}^n \beta_i \Delta \ln \text{GDP}_{t-i} + \sum_{i=0}^n \gamma_i \Delta \text{FDI}_{t-i} + \sum_{i=0}^n \delta_i \Delta \text{REMIT}_{t-i} + \sum_{i=0}^n \theta_i \Delta \text{TRADE}_{t-i} + \omega \ln \text{GDP}_{t-1} + \rho \text{FDI}_{t-1} + \phi \text{REMIT}_{t-1} + \tau \text{TRADE}_{t-1} + \varepsilon_t$$

Where: α is the intercept; β , γ , δ , θ are short-run coefficients; ω , ρ , ϕ , τ are long-run coefficients; ε_t : White noise error; Δ : are stationary variables. The variables lnGDP, FDI, REMIT, TRADE are economic growth, foreign direct investment, remittances and trade openness, respectively.

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

- Step 1: Testing the stationarity of time series data;
- Step 2: Determining the optimal lag based on the FPE, AIC, HQIC, SBIC criteria;
- Step 3: Testing the envelope to determine the long-term relationship between variables;
- Step 4: Estimating the ARDL model with the determined lag;
- Step 5: Assessing the short-term and long-term impacts between variables in the model;
- Step 6: Checking the reliability and stability of the model.

3. Results

With time series data, before going into regression analysis, the variables need to ensure stationarity.

TABLE 3: Augmented Dickey-Fuller test

Variable	t-statistic	Probability
lnGDP	-1,394	0.5850
FDI	-2,175	0.2153
REMIT	-1.987	0.2925
TRADE	-1,037	0.7396
First difference		
Δ lnGDP	-3.642	0.0050
Δ FDI	-6.605	0.0000
Δ REMIT	-5.350	0.0000
Δ TRADE	-5.144	0.0000

Source: Author's calculation.

The result of the Dickey-Fuller unit root test shown in Table 3 implies that all variables are not stationary in the original series but are stationary at the first difference I(1) at the 1% level of significance. Thus, the data series of the variables in this study are suitable for using the ARDL model.

TABLE 4: Optimum lag selection criterion

Lag	FPE	AIC	HQIC	SBIC
0	0.383312	10.3924	10.4465	10.5875*
1	0.590573	10.803	11.0734	11,7781
2	0.7453	10.9226	11.4094	12.6778
3	0.3194	9.7596	10.4628	12.2949
4	0.1067*	7.9215*	8.8410*	11.2368

Note: * indicates significance at 10%.

Source: Author's calculation.

Table 4 shows the optimal lag of the ARDL model with stationary variables at first difference I(1). Based on the AIC criterion, the optimal lag is chosen as 4.

This research conducted the ARDL bound test to examine the long-run relationship between variables.

TABLE 5: Long-run ARDL bounds tests for co-integration

Test Statistic		Significance	Critical value bounds	
F-statistic	Value		I(0)	I(1)
F	5.888	1%	4.29	5.61
		2.5%	3.69	4.89
		5%	3.23	4.35
		10%	2.72	3.77

Source: Author's calculation.

The envelope test results in Table 5 show that the statistical value $F = 5.888$ greater than the upper envelope critical values $I(1)$ at the 1% level of significance. Thus, the ARDL model has a long-run relationship between the variables.

The results of estimating the short-run and long-run relationships using the ARDL model are presented in the Table 6.

TABLE 6: ARDL estimation results

lnGDP	ADJ	Long-run	Short-run
(Constant)			0.3105**
lnGDP _{t-1}	-1.9760**		
FDI _{t-1}		0.0867***	
REMIT _{t-1}		0.1257***	
TRADE _{t-1}		-0.0123***	
ΔlnGDP			0.5910
ΔFDI			0.1568***
ΔFDI _{t-1}			0.1411**
ΔFDI _{t-2}			0.1334**
ΔFDI _{t-3}			0.0525**
ΔREMIT			0.2358**
ΔREMIT _{t-1}			0.1525**
ΔREMIT _{t-2}			0.1091**
ΔTRADE			0.0272**
ΔTRADE _{t-1}			0.0241**
ΔTRADE _{t-2}			0.0234**
ΔTRADE _{t-3}			0.0118**

Note: *, **, *** indicates significance at the 1%, 5% and 10%, respectively. Number of observations: 30.

Source: Author's calculation.

To ensure the reliability of the estimates, this research conducted autocorrelation tests, heteroscedasticity tests, residual normal distribution tests, and model fit tests. The results showed that the ARDL model ensured reliability (Table 7).

TABLE 7: **Diagnostic tests**

Test statistics	Probability	Result
Test of residual serial correlation	0.1129	No serial correlation
Test for heteroscedasticity	0.2246	Homoscedasticity
Jarque-Bera test	0.2327	Normality
Ramseys RESET test	0.2412	Functional form

Source: Author's calculation.

Next, this research tested the stability of the model through the cumulative sum of residuals test and the cumulative sum of residuals square test. The results showed that the cumulative sum of residuals and the cumulative sum of residuals square were both within the standard range at the 5% significance level. Thus, the ARDL model examining the impact of foreign direct investment, remittances and trade openness on economic growth in Vietnam is stable.

4. Discussion

The estimated results from the ARDL model show:

Firstly, FDI positively impacts economic growth in the short and long run. In the short run, FDI has an immediate impact on economic growth and has an impact at lags 1, 2, and 3. The impact of FDI on economic growth through supplementing domestic investment capital, technology transfer, and human capital accumulation creates momentum for short-term and long-term economic growth in the investment recipient country. This research result is consistent with the research results of Kumar (2010), Bibi and Rashid (2014), Tahir *et al.* (2015), Doan and Nguyen (2023) and contrary to the research results of Minh (2020).

Secondly, remittances positively impact economic growth in the short and long run. In the short run, remittances immediately impact economic growth in lags 1 and 2. When the amount of remittances increases, remittances stimulate increased consumption, investment and aggregate demand for goods and services, promoting economic growth in the short term and increasing production capacity to promote economic growth in the long term. This research result is consistent with the research results of Cao (2020) and Saha (2021).

Thirdly, trade openness has a positive impact on economic growth in the short term but a negative impact on economic growth in the long term. In the short term, trade openness affects economic growth at lags 1, 2 and 3 and has an immediate impact. When trade openness increases, it helps the economy's resources to be allocated more effectively based on competitive advantages in international trade, thereby positively affecting growth in the short term. Still, if the openness of the economy is too high, it makes the economy more vulnerable to adverse external fluctuations, negatively impacting long-term economic growth. This research result is consistent with the studies of Kumar (2010), Bibi and Rashid (2014), and Tahir *et al.* (2015).

Thus, this research's results are consistent with those of previous studies and also with the practical context in Vietnam.

5. Conclusion and policy implications

This research evaluates the impact of FDI, remittances and trade openness on economic growth in Vietnam from 1993 to 2022 using the ARDL model. The research results show that FDI and remittances positively impact economic growth in the short and long term. In contrast, trade openness has positive impacts on economic growth in the short term but negative impacts on economic growth in the long term.

From the above finding, the following policies should be considered:

First of all, continue to promote FDI attraction, but focus on quality, focus on attracting FDI projects using source technology, high technology, new technology, core technology of the Fourth Industrial Revolution; prioritize investment projects from developed countries, large corporations leading in technology application and transfer, associated with supporting industry development, human capital development, creating positive spillover effects on technology, connecting with global production and supply chains. Strengthen the improvement of foreign direct investment efficiency by taking advantage of competitive advantages, closely linking FDI with the domestic economic sector, and creating sustainable economic development.

Second, promoting the country's comparative advantages in international trade associated with transforming the production structure and trade structure towards saving input materials and production costs, creating highly competitive export products, creating a solid position in the global supply chain, better meeting the increasingly stringent demands on quality and environmental standards from Vietnam's major trading partners such as the United States, European Union, Japan, etc. Focus on promoting the development of the domestic market, linking the domestic market with the international market, and linking the circulation of domestic goods with trade liberalization and global economic integration. It is necessary to focus on importing goods suitable for the country's socioeconomic development strategy in the new context, avoiding dependence on external factors to limit risks when adverse fluctuations occur in the world market.

Third, continue to innovate financial and monetary policies to attract remittances from overseas Vietnamese, and at the same time create more favorable conditions to encourage and motivate remittances to invest in production and business activities, transport infrastructure, electricity, water, telecommunications; invest in agriculture, agricultural processing, high-tech agricultural development, service sectors that create high added value such as finance, banking, insurance or input in the fields of education and training, human resource development, etc. to develop long-term positive development effects for the economy.

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