DOES FOREIGN DIRECT INVESTMENT PROMOTE ECONOMIC GROWTH IN VIETNAM? AN APPROACH FROM A VAR MODEL AND GRANGER CAUSALITY TEST

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Abstract: Foreign direct investment (FDI) has the potential to influence economic growth in many countries throughout the world. However, previous studies examining the impact of FDI on economic growth have shown significant diversity in objectives, research scopes, methodologies, and conclusions drawn from empirical evidence. This raises the question: does FDI genuinely stimulate economic growth, particularly in developing nations like Vietnam? Utilizing the Vector Autoregression Model (VAR) and the Granger Causality Test with the most up-to-date time series data spanning from 1990 to 2023, this study identifies a positive impact of FDI inflows on Vietnam's economic growth. Additionally, no Granger causality relationship from economic growth to FDI inwards is observed. Besides FDI inflows, population growth also emerges as a key contributor to Vietnam's economic expansion during the observation period. The study concludes by proposing several policy recommendations for Vietnam in the coming times.

Key words: Economic growth, FDI, granger causality test, time series, VAR model, Vietnam.

ĐẦU TƯ TRỰC TIẾP NƯỚC NGOÀI (FDI) CÓ THÚC ĐẨY TĂNG TRƯỞNG KINH TẾ TẠI VIỆT NAM? MỘT CÁCH TIẾP CẬN THÔNG QUA MÔ HÌNH VEC TƠ TỰ HỒI QUY VÀ KIỂM ĐỊNH NHÂN QUẢ GRANGER

Tóm tắt: Đầu tư trực tiếp nước ngoài (FDI) có thể tác động đến tăng trưởng kinh tế ở nhiều quốc gia trên thế giới. Tuy nhiên, các nghiên cứu trước đây xem xét tác động của FDI đến tăng trưởng kinh tế đã cho thấy sự đa dạng đáng kể về mục tiêu, phạm vi nghiên cứu, phương pháp luận và kết luận rút ra từ các bằng chứng thực nghiệm. Điều này đặt ra câu hỏi: FDI có thực sự kích thích tăng trưởng kinh tế, đặc biệt là ở các quốc gia đang phát triển như Việt Nam không? Sử dụng Mô hình vectơ tự hồi quy (VAR) và Kiểm định nhân quả Granger với dữ liệu chuỗi thời gian mới nhất từ năm 1990 đến năm 2023, nghiên cứu này tìm thấy tác động tích cực của dòng vốn FDI đến tăng trưởng kinh tế của Việt Nam. Ngoài ra, không tìm thấy mối quan hệ nhân quả Granger từ tăng trưởng kinh tế đến thu hút dòng vốn FDI. Ngoài vốn FDI, tăng trưởng dân số nổi lên như một yếu tố chính đóng góp vào sự mở rộng quy mô kinh tế của Việt Nam trong giai đoạn nghiên cứu. Bài báo kết thúc bằng việc đề xuất một số khuyến nghị chính sách cho Việt Nam trong những năm tới.

Từ khóa: Tăng trưởng kinh tế, FDI, kiểm định nhân quả Granger, dữ liệu thời gian, mô hình VAR, Việt Nam.

1. Introduction

Foreign direct investment (FDI) refers to cross-border investment where an investor from one economy establishes a long-term interest and significant control over an enterprise in another economy, as outlined by both the OECD and EU definitions. Since the 1980s, FDI inflow has grown significantly in most developing countries. This is because

many developing countries have made extensive policies aimed at reducing FDI barriers and offering tax incentives and subsidies to attract it.

Vietnam, situated on the Indochina Peninsula in Southeast Asia, embarked on significant economic reforms with the Party's Sixth National Congress in 1986. This congress introduced the "Doi Moi" (Reform) initiative, aimed at developing a multi-sector market-oriented economy and fostering investment collaboration with foreign nations. Following this direction, the National Assembly enacted the Law on Foreign Investment in Vietnam in 1987, marking a pivotal moment in the Party and State's perspective on foreign direct investment. This decision laid the groundwork for opening Vietnam's market and attracting FDI, which became a vital and novel resource for the nation's socioeconomic progress. The Law on Domestic Investment Promotion was also issued and went into effect in 1994. To comply with the provisions of the World Trade Organization (WTO), Vietnam issued Investment Law of 2005 and it was amended in 2014 and supplemented in 2020. In over thirty years of attracting FDI since 1988, Vietnam has achieved many important results. By the end of 2023, there were 38,349 operating FDI projects, with a total approved capital of US$ 523.919 billion, of which about US$ 251.193 billion, equivalent to 47.95% of total approved capital, has been paid (GSO, 2025).

Foreign direct investment (FDI) can influence various economic, cultural, and social aspects of a nation. For developing countries like Vietnam, the primary expectation of FDI is its potential to stimulate economic growth. Economists and policymakers attribute this to three key factors. First, FDI inflows enhance the capital account surplus, improving the balance of payments and contributing to the country's macroeconomic stability. Second, with typically low capital accumulation rates in developing countries, FDI serves as an essential supplementary source of capital to support domestic investment and drive economic growth. Third, FDI offers developing nations better access to advanced technology, facilitates technology transfer, promotes knowledge dissemination, and enhances managerial and labor skills. This phenomenon, known as the spillover effect of FDI, boosts labor productivity in domestic enterprises, ultimately fostering economic growth.

To provide compelling evidence of the potential relationship between inward FDI and economic growth in Vietnam, this study analyzes the role of inward FDI in Vietnam's economic development. The authors will employ the Vector Autoregression Model (VAR) and the Granger causality test, utilizing the most recent time series data from 1990 to 2023. The structure of the research is as follows: Section 2 reviews the relevant literature, Section 3 outlines the methodologies and dataset, Section 4 summarizes and discusses the findings, and the final section offers concluding remarks along with policy recommendations.

2. Literature Review

Table 1 below will present the notable studies that examined the FDI-Economic growth nexus.

Table 1. A Brief Review of Related Literature

Authors	Duration	Countries	Methodologies	Research results
Vu (2025)	1990 to 2023	Germany	Autoregressive Distributed Lag (ARDL) method	FDI exhibit significant short-term effects, influencing economic fluctuations in the immediate term but showing weaker long-term

Authors	Duration	Countries	Methodologies	Research results
				impacts.
Maza and Hierro (2025)	2004-2021	Spanish regions	Panel data, AMG, CCEMG estimator, FE	- FDI does not significantly affect the level of economic activity. - Controlling for the headquarters effect, as the results indicate that FDI would have a positive effect on growth
Ganić (2024)	short- and long-term analyses	EU-12 countries	Granger causality tests based on the VECM model	- The FBH hypothesis is confirmed in Italy, Spain, and Denmark (short run) and in Spain in the long run. - The DFH hypothesis is confirmed in Germany, France, and Greece (short run), and in Italy, France, and Spain (long run). - The SLH hypothesis is confirmed in Italy (short run). - NLH hypothesis is confirmed in Austria, Belgium, Denmark, Netherland, Luxemburg, Ireland, and Portugal.
Triatmanto, Bawono and Wahyuni (2023)	2000-2020	four ASEAN nations	Panel Vector Auto Regression Model (PVAR)	Foreign Direct Investment (FDI) plays a crucial role in positively impacting the GDP of 4 ASEAN countries (Indonesia, the

Authors	Duration	Countries	Methodologies	Research results
				Philippines, Thailand and Vietnam)
Bénétrix, Pallan and Panizza (2023)	1970-2018	Emerging and developing economies	Cross-country Regressions	- For nations with moderate levels of education or financial depth, no statistically significant relationship exists between FDI and economic growth. - However, countries with advanced financial systems or high levels of human capital demonstrate a positive and statistically significant correlation between FDI and growth. - The connection between FDI and economic growth changes over time. - Recently, there has been a positive and statistically significant link between FDI and growth for the typical country, although local conditions negatively influence this relationship.
Pawar & Raju (2022)	2000-2001 & 2021-2022	India	Correlation Analysis and ANOVA; Regression analysis.	FDI is an important factor in determining India's pace of

Authors	Duration	Countries	Methodologies	Research results
				economic growth.
Nguyen (2022)	1990-2020	Vietnam	Vector Autoregression Model	- **Short-Term Impact:** FDI boosts economic growth in Vietnam. - **Long-Term Impact**: In the long run, FDI can sometimes harm Vietnam's economic growth.
Liang, Shah & Bifei (2021)	2000-2019	113 developing and transition countries.	Instrumental variables regression (2SLS).	A positive relationship between FDI and economic growth.
Adedoyin et al. (2020)	1981-2017	United States	Johansen cointegration test; FMOLS, DOLS and CCR techniques;	The negative connection between FDI and GDP. However, The interaction between FDI and ICTs enhances economic Growth.
Najaf & Ye (2018)	1990 - 2014	Indonesia, India, Malaysia and Bangladesh	Vector Error Correction Model (VECM), Granger causality (GC) test	The findings reveal an unclear and complex relationship between Foreign Direct Investment (FDI) and economic growth, indicating that the connection is neither strictly positive nor negative and may depend on various contextual factors.
Hoang & Duong (2018)	1986-2015	Vietnam	VAR model	Positive linkage between FDI and GDP.

Authors	Duration	Countries	Methodologies	Research results
Ha et al. (2017)	1990-2015	Vietnam	Ordinary Least Square regression, Unit root test, Granger causality test.	FDI inflows contributed to speed up the GDP growth.
Chaudhry, Iffat & Farooq (2017)	1990-2014	25 region wise selected developing countries	Panel unit root tests; Granger causality test; Johansen Fisher Panel Co-integration test; FMOLS method.	FDI has significant positive relationship with economic growth.
Gunby, Jin & Reed (2017)	Na	China	Meta-analysis	The influence of Foreign Direct Investment (FDI) on China's economic growth appears to be less significant than anticipated.
Luu, Trinh & Vu (2017)	1996-2006 2010-2014	Vietnam	The OLS and GMM estimator.	Inward Foreign Direct Investment (FDI) fosters economic growth, while economic growth, in turn, attracts more FDI-a mutually reinforcing, bi-directional relationship. This dynamic was observed during the post-crisis period but was notably absent in the pre-crisis era.
Zekarias (2016)	1980-2013	14 Eastern Africa countries	Panel data, using dynamic GMM estimators.	FDI is a key deriver of economic growth.
Daniel, Vedia-Jerez & Chasco (2016)	1960-1980 1981-2008	South America	β-convergence model specification in Mankiw et al. (1992) and Barro and Sala-i-Martin (1992).	FDI positively and significantly influences growth exclusively during the second sub-period (1981-2008).
Trinh & Nguyen	1990-2013	Vietnam	Time series analysis	FDI inflows have

Authors	Duration	Countries	Methodologies	Research results
(2015)			techniques; the Unit root test and Cointegration approach.	positive impacts on economic growth.
Kaleem et al. (2015)	1972-2013	Bangladesh	Time series econometric technique; Johansen Co-integration; Granger causality test.	FDI does not Granger cause GDP
Uwazie, Igwemma, & Eze (2015)	1970-2013	Nigeria	Vector error correction model; Granger causality test.	FDI serves as a Granger cause for economic growth in Nigeria, influencing it in both the short and long term.
Fadhil & Almsafir (2015)	1975-2010	Malaysia	Unit root test and Johansen Co-integration test; Hierarchical multiple regressions (HMR) analysis	FDI inflows, combined with advancements in human capital development, play a significant role in driving economic growth within the host country.
Pegkas (2015)	2002-2012	Eurozone countries	Panel data estimations; the Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) methods.	A positive long-term cointegrating relationship exists between FDI stock and economic growth.
Silajdzic & Mehic (2015)	2000-2013	Transition economies (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia)	Econometric analysis	FDI primarily drives economic growth through knowledge spillovers, with higher levels of technological development correlating to improved growth outcomes. performance among transition economies.

Authors	Duration	Countries	Methodologies	Research results
Dritsakis & Stamatiou (2014)	1970-2011	Greece, Portugal, Ireland, Spain, Italy	The panel data; Granger causality test.	There is no causality between economic growth and FDI
Nafeesa & Samiul (2014)	1972-2011	Bangladesh	Multiple regression method.	Foreign direct investment is less significant effect to the growth.
Sani (2014)	1971-2013	Ghana and Nigeria	Johansen and Juselius co-integration approach; VECM; Granger causality test.	FDI has had a long run relationship with economic growth in Ghana and Nigeria.
Bahname (2012)	1977-2009	Southern Asia	Random effects model	Positive relation between FDI and growth.
Elboiashi (2011)	1971-2005	76 developing countries (large sample)	Cointegration Equation & Vector Error Correction Model (VECM); Twostep system GMM; RE estimator;	FDI inflows have a more significant effect on economic growth than other type of capital inflows, such as portfolio investment and loans inflows.
Hoang (2010)	1995-2006	Vietnam	Panel data model across 61 provinces in Vietnam	FDI has a significant and positive impact on Vietnam's economic growth, primarily by enhancing the stock of capital.
Anwar & Nguyen (2010)	1996-2003	Vietnam	Generalized method of moments (GMM), Panel data set for 61 provinces.	FDI exerted a positive and statistically significant influence on economic growth.
Herzer, Klasen, & Nowak-Lehmann (2008)	1970-2003 for all; 1976-2003 for Korea; 1972-2003 for Singapore.	28 developing countries;	Panel cointegration techniques.	FDI has no impact on growth, either in the short term or the long term.
CIEM (2006)	1988-2003	Vietnam	Instrumental	FDI has positive

Authors	Duration	Countries	Methodologies	Research results
			variables in 2SLS method	effect on economic growth.
Khawar (2005)	1970-1992	Cross-country	OLS	Strong positive correlation between FDI and growth of GDP per capita.
Li & Liu (2004)	1970-1999	84 countries	Single equation and simultaneous equation system techniques.	FDI directly promotes economic growth.
Borensztein, Gregorio & Lee (1998)	1970-1979 and 1980-1989	69 developing countries	cross-country regression framework	FDI serves as a crucial channel for technology transfer, playing a more significant role in driving growth compared to domestic investment.
Luiz & de Mello (1997)	Na	Developing countries.	Reviewing the literature on inward FDI-economic growth linkage.	The relationship between growth and FDI is influenced by country-specific factors that cannot be captured through time series analysis.

Source: The author's compilation.

Studies on the impact of FDI on economic growth have employed diverse methodologies, pursued varying objectives, and explored different research scopes. Consequently, they have arrived at a wide range of conclusions regarding the role of FDI in fostering economic growth, as highlighted in Table 1 above. Most of them found a positive relationship between the two. However, few studies found no or negative impact of FDI inflow on economic growth in sample countries in the empirical literature (Adedoyin et al., 2020; Kaleem et al., 2015; Dritsakis & Stamatiou, 2014; Herzer, Klasen & Nowak-Lehmann, 2008). Bruno and Campos (2013) conducted a survey revealing that 11% of studies identified a negative relationship between FDI and economic growth. This adverse connection points to factors such as unfair competition or harmful economic spillovers (Herzer, Klasen & Nowak-Lehmann, 2008; de Mello, 1999). These negative spillovers are attributed to variables like the level of education, quality of institutions, or the predominantly primary nature of FDI inflows (Agbloyor et al., 2016; Alfaro, 2003; Xu, 2000; Borensztein, Gregorio & Lee, 1998). Meanwhile, some found ambiguous interrelationship between FDI and economic growth (Najaf & Ye, 2018; Nafeesa & Samiul, 2014).

For the case of Vietnam, Nguyen (2022), Hoang & Duong (2018), Ha et al. (2017), Luu, Trinh & Vu (2017), Trinh & Nguyen (2015), Hoang (2010), Anwar & Nguyen (2010), CIEM (2006) … concluded that FDI has had a positive impact on economic growth.

Overall, the role of FDI in economic growth seems to be based on the period of analysis, the economic sectors, countries, regions, the econometric/growth model, estimation techniques used in the samples as well as the economic and technological conditions of the recipient countries. To have more persuasive evidence for the possible relationship between FDI and economic growth in Vietnam-a developing country, one of the most attractive destinations of FDI in Southeast Asia, this research will re-examine the role of FDI in economic growth in Vietnam by applying the Vector Autoregression Model (VAR) and Granger causality test with the most updated time series data from 1990 to 2023 with addressing the time series stationary.

3. Methodology and Data

Essentially, a VAR model is an extension of the univariate autoregressive model, designed to forecast multiple time series simultaneously. It comprises a separate equation for each variable, where the right-hand side includes a constant and the lagged values of all variables in the system. This approach accommodates complex interdependencies between variables. A two-variable Vector Autoregressive (VAR) model with one lag can be represented as below:

$$y_{1,t} = c_1 + \Phi_{11,1}y_{1,t-1} + \Phi_{12,1}y_{2,t-1} + u_{1,t} \quad (1a)$$

$$y_{2,t} = c_2 + \Phi_{21,1}y_{1,t-1} + \Phi_{22,1}y_{2,t-1} + u_{2,t} \quad (1b)$$

Variables $u_{1,t}$ and $u_{2,t}$ represent white noise processes, which may exhibit contemporaneous correlation. The coefficient $\phi ii,\ell$ denotes the effect of the ℓth lag of Yi on itself, while the coefficient $\phi ij,\ell$ signifies the impact of the ℓth lag of Yj on Yi. For stationary series, forecasts are produced by directly fitting a Vector Autoregression Model (VAR) to the data, a method referred to as a "VAR in levels."

Causality between two variables X and Y can be demonstrated using the Granger causality test, named after the British econometrician Clive Granger. This method employs the Student's t-statistic and F-statistic tests to determine whether the values of X provide statistically significant insights into the future values of Y. Assuming X and Y are variables with stationary time series data, the test begins by identifying the appropriate p-lagged values of Y (the order p of the AR(p) process) to incorporate into an autoregressive model of Y to evaluate the null hypothesis that X does not Granger-cause Y.

$$y_t = c + \Phi_1.y_{t-1} + \Phi_2.y_{t-2} + \ldots + \Phi_p.\ y_{t-p} + \varepsilon_t \quad (1c)$$

Where Φ1, Φ2,…, Φp are parameters determined using specialized computer software, and c represents the intercept of the AR(p) process. Next, the equation (1d) is augmented by including lagged values of the variable X:

$$y_t = c + \Phi_1.y_{t-1} + \Phi_2.y_{t-2} + \ldots + \Phi_p.\ y_{t-p} + \omega_m.x_{t-1} + \ldots + \varepsilon_t \quad (1d)$$

Where m represents the maximum lag length at which the lagged value of variable X has been shown to be statistically significant. In equation (1d), we retain all lagged values of the variable X that are statistically significant based on their t-statistic, provided that they collectively enhance the explanatory power of equation (1d), as indicated by the F-statistic test. The null hypothesis, stating that X does not Granger-cause Y, is accepted when none of the lagged values of X remain after applying both the t-statistic and F-statistic tests in equation (1d). Otherwise, the null hypothesis is rejected in favor of the alternative, leading to the conclusion that X Granger-causes Y, implying that the future values of Y depend on the current values of X.

Combining the VAR model and the Granger causality test, in this research, the author will examine the possible relationship between FDI inflows, Vietnam's economic growth and other externalities/variables/factors by justifying a growth model for Vietnam.

Accordingly, five variables including LnGDPvnt, LnPOPvnt, LnINVEST, LnTRADEOPvnt and LnFDIvnt are employed to predict the relationship between them in duration of 1990-2023, in which:

LnGDPvnt is the natural logarithm (Ln) of Vietnam's GDP at 2015 price in US$ in year t offered by the World Bank.

LnPOPvnt is the natural logarithm (Ln) of Vietnam's total population in year t offered by the World Bank.

LnINVESTvnt is the natural logarithm (Ln) of Vietnam's total investment in the economy in year t as % of GDP offered by the International Monetary Fund (IMF).

LnTRADEOPvnt is the natural logarithm (Ln) of Vietnam's trade openness in year t calculated by the following formula: (Merchandise Exports + Merchandise Imports)/GDP.

LnFDIvnt is the natural logarithm (Ln) of Vietnam's inward FDI (Implemented capital) in year t offered by the GSO of Vietnam.

The data is collected from trustworthy sources such as the World Bank and the GSO of Vietnam. All of those variables are time series for the period 1990-2023. Those above variables will be calculated using the natural logarithm (Ln) form and test the stationary before running VAR model and ***Granger causality test*** using the Stata software to make it smoothly.

4. Results and Discussions

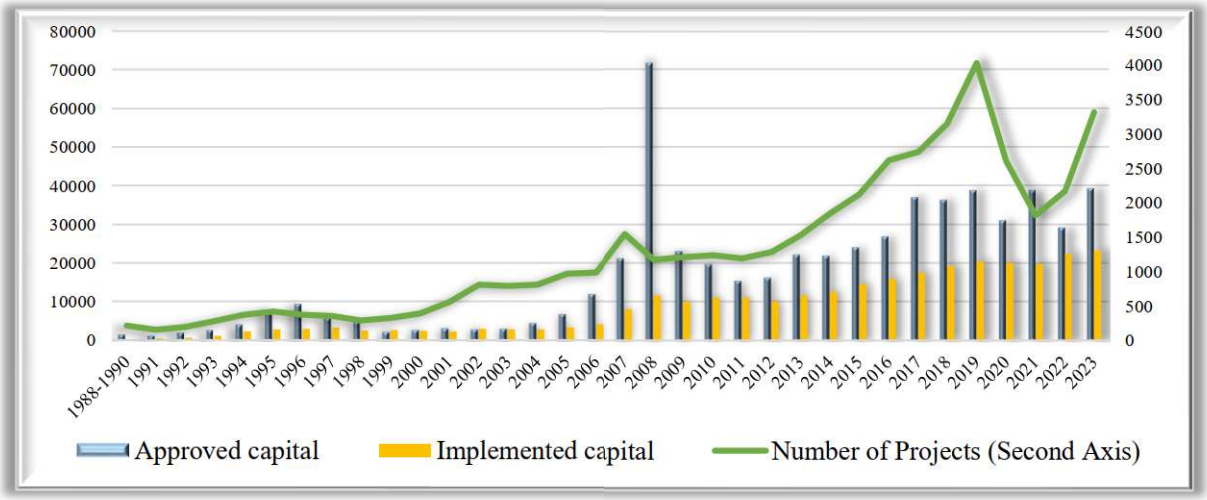

Figure 1. FDI Inflows into Vietnam during 1988-2023 (Million US$)

Source: GSO Vietnam, 2025.

The flows of FDI into Vietnam over the span 1988-2023 is depicted in the Figure 1 above. Foreign Direct Investment in Vietnam began in 1987 following the enactment of the Law on Foreign Investment. According to General statistics Office of Vietnam, the country has made significant strides in attracting FDI. Between 1988 and 1990, FDI started modestly with a total registered investment capital of US$ 1.603 billion across 211 projects. However, it surged dramatically during 1991-1995, with 1,409 projects approved and a total registered capital of approximately US$ 18.379 billion. Unfortunately, the period from 1996 to 2000 experienced a decline due to the impact of the Asian financial crisis happening in 1997. FDI decreased year-by-year during this period. FDI experienced a resurgence during 2001-2005, with approved capital amounting to US$ 20.806 billion across 3,935 investment projects-an impressive 30% above the Vietnamese government's target. FDI increased annually

during this period. The real deal came in 2008 after Vietnam accession to the WTO. This signified an unprecedented period of booming FDI under euphoria of Vietnam's WTO accession. Between 2007 and 2010, Vietnam secured an impressive US$ 136.070 billion across 5,160 new investment projects, surpassing the achievements of the 2001-2005 period. Approved FDI capital soared during these years, reaching its peak in 2008 with a record-breaking US$ 71.726 billion, despite the global recession of 2008-2009. From 2011 onwards, Vietnam had a downturn trend in foreign investment attraction as the market struggled to cope with the effects of excessive capital inflows. However, it appeared to stabilize in 2014-2015 and raised back during 2016-2023. As of 2024, South Korea leads FDI contributions, followed by Singapore, Japan, and Taiwan. FDI has spread across most provinces in Vietnam, bringing investments from globally renowned companies such as Samsung, Sanyo, LG, Intel, Foxconn, Microsoft, Sony, Fujitsu, Toshiba, Nvidia, Coca-Cola, Pepsi Cola and Panasonic. The contributions of these FDI projects to Vietnam's socio-economic development can be categorized into several key aspects.

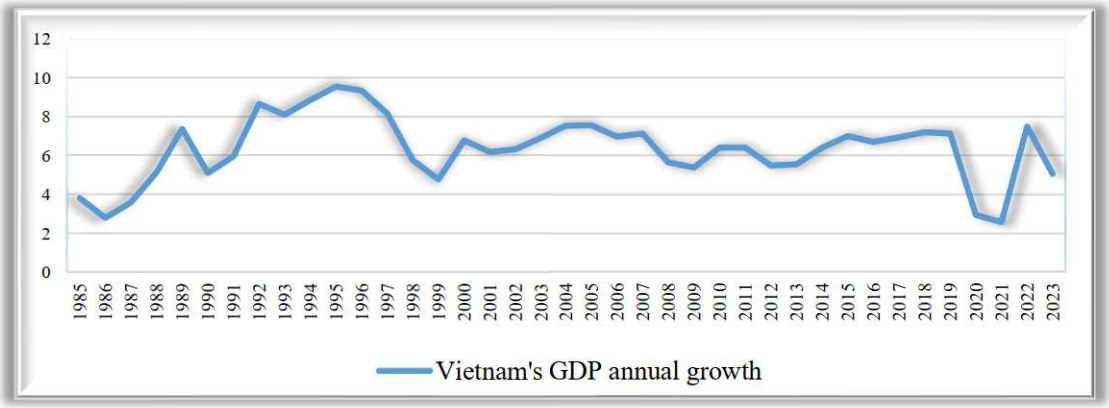

Figure 2. Vietnam's GDP Annual Growth (%)

Source: The World Bank, 2025.

Figure 2 above illustrates Vietnam's GDP at 2015 constant price annual growth between 1985 and 2023. Vietnam is an agro-industrial state. Vietnam's economy is among the fastest-growing in Asia, boasting an average annual GDP growth rate of approximately 6.5%. Combined with steady population growth and rising levels of prosperity, Vietnam presents a compelling opportunity for long-term market potential. The level of normal GDP for 2024 reached over US$ 476.3 billion. Key priority sectors of Vietnam's economy include processing industries, high-tech industries (such as electronics), energy, mining, as well as metallurgical and chemical industries. Agriculture, encompassing forestry and fishing, continues to play a significant role in the nation's economic landscape. This sector accounts for approximately 40% of the economically active workforce, with 65% of the population residing in rural areas. The services market is actively developing. It accounted for about 30% of the country's GDP. Vietnam has maintained a trade surplus since 2012. The country's primary imports include machinery and equipment, computers and electronic devices, fabrics, raw materials and consumables for light industries, ferrous metal products, and plastics. As an export-oriented economy, Vietnam has signed and joined over 17 FTAs and nearly 60 bilateral investment promotion and protection agreements. Its membership in ASEAN and accession to the WTO have enhanced its global economic integration, driving significant improvements in investment legislation. Additionally, a long-term policy focused on creating favorable conditions and assurances for investors has contributed to a stable and reliable investment framework. These factors have positioned Vietnam as one

of the most appealing destinations for foreign investment (Vietnam's MFA, 2022). Vietnam's economic growth reached the peak in 1995 before the Asian financial crisis took place. After the Asian financial crisis happened, the country's economic growth slowed down and recovered from 2001 to 2007 before the 2008 global financial and economic crisis started in the US. From 2012, Vietnam's economy recovered and achieved good growth in the period of 2013-2019. Under the impact of the COVID-19 epidemic, Vietnam's economic growth was sharply reduced and recovered to 7.5% in 2022 then decreased to 5.03 in 2023. The nation's gross domestic product experienced a growth rate of 7.09% in 2024 (GSO, 2025).

Table 2 and Table 3 below summaries the estimated results using the Stata software.

Table 2. Vector Autoregression Estimated Results
Dependent Variable LnGDPvnt

Variable	Coefficient	Std. err.	z	P>|z|
LnGDPvnt (L6)	2.944592	1.60e-11	1.8e+11	0.000
LnFDIvnt (L6)	.0061642	4.23e-13	1.5e+10	0.000
LnPOPvnt (L6)	.9005264	2.21e-12	1.3e+10	0.000
LnINVESTvnt (L6)	-.1129643	2.59e-12 -	4.4e+10	0.000
LnTRADEOPvnt (L6)	-.154925	6.13e-12	2.5e+10	0.000

Table 3. Summary of the Granger causality Wald tests

Equation	Excluded	Chi2	df	Prob > Chi2	Relation
LnGDPvnt	LnPOPvnt	1.6e+07	2	0.000	Positive
LnGDPvnt	LnINVESTvnt	177.53	4	0.000	Negative
LnGDPvnt	LnTRADEOPvnt	62.317	4	0.000	Negative
LnGDPvnt	LnFDIvnt	162.85	4	0.000	Positive
LnGDPvnt	All	8.3e+07	14	0.000	-
LnPOPvnt	LnGDPvnt	69.754	4	0.000	Positive
LnPOPvnt	LnINVESTvnt	100.03	4	0.000	Negative
LnPOPvnt	LnTRADEOPvnt	13.674	4	0.008	Negative
LnPOPvnt	LnFDIvnt	65.765	4	0.000	Negative
LnPOPvnt	All	258.13	16	0.000	-
LnINVESTvnt	LnGDPvnt	24.409	4	0.000	Negative
LnINVESTvnt	LnPOPvnt	33980	2	0.000	Positive
LnINVESTvnt	LnTRADEOPvnt	37.109	4	0.000	Positive
LnINVESTvnt	LnFDIvnt	59.076	4	0.000	Positive
LnINVESTvnt	All	3.2e+05	14	0.000	-
LnTRADEOPvnt	LnGDPvnt	524.28	4	0.000	Positive
LnTRADEOPvnt	LnPOPvnt	6.4e+06	2	0.000	Positive
LnTRADEOPvnt	LnINVESTvnt	426.16	4	0.000	Positive
LnTRADEOPvnt	LnFDIvnt	303.38	4	0.000	Positive
LnTRADEOPvnt	All	2.6e+07	14	0.000	-

Equation	Excluded	Chi2	df	Prob > Chi2	Relation
LnFDIvnt	LnGDPvnt	8.0966	4	0.088	-
LnFDIvnt	LnPOPvnt	38000	2	0.000	Positive
LnFDIvnt	LnINVESTvnt	9.8233	4	0.044	Positive
LnFDIvnt	LnTRADEOPvnt	18.075	4	0.001	Positive
LnFDIvnt	All	1.5e+05	14	0.000	-

Source: Author's compilation.

- All the time series have been tested for stationarity using Dickey–Fuller test for unit root. In case they are not stationary, the author will use the difference technique to process the stationarity of the time series.

- The results of the lag selection test (varsoc) suggest choosing the VAR (6)/lag 6 model (see the appendix3).

- Checking the correlation between independent variables using the correlation matrix, the results show that most of the correlation coefficients between independent variables are less than 0.8 (see the appendix 4).

- Using Lagrange multiplier test, the results show no autocorrelation at each selected lag. The Var model is stable (see the appendix 5).

- In Table 2, if Prob > Chi2 < estimation error (α = 5%), we conclude that the lags of the variables can explain for the fluctuation of the dependent variable.

The estimated results presented in Table 2 and Table 3 above show that there exists a bi-directional causality between population growth and economic growth in Vietnam during 1990-2023. This result drives the author to share the same conclusion with Kremer (1993). This finding also supports for the Optimistic View that the population growth fuels economic growth. This is the main message coming from Kuznets (1960, 1967), Simon (1981), Boserup (1989). It is suggested that larger economies possess greater ability to utilize, share, and expand the flow of knowledge they generate. This aligns with the idea that population growth enhances the returns to innovation, thereby spurring technological advancements-key drivers of economic progress. Further optimistic perspectives on this view have been discussed by scholars such as Lianos et al. (2022), Shamsul et al. (2020), Jacob et al. (2016), Tamura (2002, 2006), and Jones (2001a).

In addition to population growth, inward foreign direct investment, measured as a percentage of GDP in this study, has also been a significant driver of Vietnam's economic growth. FDI has played a pivotal role in the remarkable economic progress of many developing nations, including Victnam. Broadly spcaking, FDI not only bolsters capital supply but, with suitable host-country policies in place, also fosters technology transfer. This transfer contributes to the development of human capital, further enhancing economic growth prospects. In essence, FDI stimulates economic growth through both direct and indirect mechanisms (Anwar and Nguyen, 2010). This finding aligns with prior research by CIEM (2006), Anwar and Nguyen (2010), Hoang (2010), Trinh and Nguyen (2015), Luu, Trinh, and Vu (2017), Ha et al. (2017), Hoang and Duong (2018), and Nguyen (2022).

Firstly, foreign direct investment (FDI) serves as a vital contributor to the overall capital needed for societal development, acting as a key driver of economic growth. In 2024, FDI accounted for approximately 16% of the total investment in Vietnam's economy.

Secondly, FDI has been instrumental in driving economic restructuring in Vietnam. Presently, 58.2% of FDI capital is directed towards the processing and manufacturing sector, which contributes to more than 50% of the industrial production outputs. This significant investment has facilitated the

development of essential industries, including telecommunications, oil and gas, electronics, and information technology. FDI has also improved the seaport system. These industries not only lay the groundwork for sustainable long-term growth but also play a crucial role in advancing the country's modernization and industrialization efforts.

Thirdly, FDI has played a significant role in advancing high-quality service sectors, including logistics, education and training, banking and finance, legal consultancy, insurance, auditing, shipping, hospitality, tourism, healthcare, retail, and more. It has introduced innovative distribution methods for consumer goods, boosted domestic trade, restructured the agricultural sector, enhanced the export value of agricultural products, and introduced modern production techniques that have upgraded outdated farming practices and improving infrastructure in certain regions.

Furthermore, FDI has played a vital role in promoting and expanding import-export markets. It has facilitated the restructuring of exporting goods and progressively integrated Vietnam into the global production network and value chain. The FDI sector has also enabled technology transfer in various industries, generated spillover effects on domestic enterprises, and supported the growth of auxiliary industries.

Overall, in over the past 30 years, the attraction and utilization of FDI capital have made significant contributions to enhancing the economic and business investment environment in accordance with market economy principles. This has also strengthened economic management and corporate governance capabilities, supported the reform of state-owned enterprises, and boosted the overall competitiveness of the economy.

5. Concluding remarks and some policy implications

Concluding remarks

FDI has been associated with economic growth in various countries. However, previous researches on the impact of FDI on economic growth has shown significant diversity in objectives, research scopes, and methodologies, leading to a wide range of conclusions in the academic literature. By employing the Vector Autoregression Model and Granger causality test with the most updated time series data from 1990 to 2023, this research finds the positive impact of FDI inflows on economic growth in Vietnam-a developing country in Southeast Asia. Thus, the author finds no Granger cause from economic growth to FDI inwards. Beside FDI inflows, population growth is also a factor promoting the growth of Vietnam's GDP at the observation time.

Policy implications

This study provides a robust and dynamic analysis of the relationship between FDI and economic growth. This methodological approach allows for a deeper understanding of the temporal and causal links. This research specifically examines Vietnam, a rapidly developing economy with unique characteristics. This localized focus helps in understanding how FDI impacts economic growth in a transitional economy. The study contributes to the broader literature by providing empirical evidence on the FDI-growth nexus in Vietnam, which can be compared with findings from other countries.

Suggestions

To enhance the efficiency of utilizing FDI capital, Vietnam must implement further legal reforms to improve the business environment, upgrade infrastructure, and enhance workforce skills. Accordingly, the strategic approach to attracting FDI should be adjusted as follows: (1) Economic sectors: Vietnam aims to prioritize attracting FDI in key areas such as advanced technologies, high-tech industries, environmentally friendly practices, medical equipment production, clean and renewable energy, financial services, education and training, logistics, and smart agriculture; (2) Alignment with national advantages: FDI should be attracted in sectors that align with Vietnam's national strengths to maintain competitive advantages in participating in global value chains; (3) Markets and partners: Vietnam should adopt a strategy of multilateralization and diversification, targeting

FDI from potential markets and partners like Japan, South Korea, Singapore, the United States, and countries from Euro zone.

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Appendix

Appendix 1. Summary of the statistics.

Variable	Mean	Std. Dev.	Min	Max
LnGDPvnt	.0645454 .	0154295 .	0200005	.1000004
LnPOPvnt	18.24175	.121678	18.01859	18.4242
LnINVESTvnt	3.435471	.2638517	2.386007	3.753027
LnTRADEOPvnt	.020303	.0922458	-.2000003	.2200003
LnFDIvnt	22.46121	1.093137	19.88	23.87

Appendix 2. Data resources.

Variable	Data Resources
LnGDPvnt	The World Bank: https://data.worldbank.org/indicator/ny.gdp.mktp.kd
LnPOPvnt	The World Bank: https://data.worldbank.org/indicator/SP.POP.TOTL

Variable	Data Resources
LnINVESTvnt	IMF: https://www.imf.org/en/Publications/WEO
LnTRADEOPvnt	The World Bank: https://data.worldbank.org/indicator/NE.TRD.GNFS.ZS
LnFDIvnt	GSO of Vietnam: https://www.gso.gov.vn/px-web-2/?pxid=V0411&theme=%C4%90%E1%BA%A7u%20t%C6%B0

Appendix 3. Lag-order selection criteria

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	158.799	-	-	-	3.1e-12	-12.3039	-12.2363	-12.0601
1	315.346	313.09	25	0.000	8.8e-17	-22.8277	-22.422	-21.3651
2	359.896	89.1	25	0.000	2.4e-17	-24.3917	-23.648	-21.7102
3	441.967	164.14	25	0.000	6.0e-19	-28.9573	-27.8755	-25.0569
4	961.923	1039.9	25	0.000	5.3e-35*	-68.5538	-67.1339	-63.4345
5	3411.59	4899.3	25	0.000	-	-262.927	-261.237	-256.833
6	3896.29	969.41*	25	0.000	-	301.703*	-300.013*	-295.609*
7	3851.38	-89.817	25	-	-	-298.111	-296.42	-292.016
8	-	-	25	-	-	-	-	-

Appendix 4. Correlation matrix

	LnGDPvnt	LnFDIvnt	LnPOPvnt	LnINVESTvnt	LnTRADEOPvnt
LnGDPvnt	1				
LnFDIvnt	0.3590	1			
LnPOPvnt	-0.4476	0.3598	1		
LnINVESTvnt	-0.1323	0.5745	0.4732	1	
LnTRADEOPvnt	0.0737	0.0090	-0.0414	0.1871	1

Appendix 5. Lagrange-multiplier test

Lag	Chi2	Df	Prob > chi2
1	6.2642	4	0.18027
2	4.4906	4	0.34367
3	1.3004	4	0.86130
4	3.7365	4	0.44284

H0: no autocorrelation at lag order