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Relationship among Foreign Direct Investment, Exports, and Gross Domestic Product in Vietnam - A Vector Autoregression Methodology

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KEYWORDS

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Gross Domestic Product,
Long-term Dynamics,
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Vietnam.

ABSTRACT

This research aims to evaluate the impact of Foreign Direct Investment (FDI) and Exports (EXP) on Vietnam's Gross Domestic Product (GDP) from 1993 to 2022, using a time series analysis approach. The analysis identifies a bidirectional causality between FDI and GDP, highlighting how economic growth attracts FDI while simultaneously utilizing its transformative potential to accelerate industrialization. However, the immediate contribution of FDI to GDP growth is both temporary and limited. In contrast, GDP is indirectly influenced by EXP, as economic expansion is the primary driver of export growth. The study advocates for the synergistic integration of domestic reforms with FDI and EXP to enhance Vietnam's economic resilience. These findings emphasize the crucial role of long-term internal dynamics, such as productivity improvements and policy frameworks, in sustaining economic growth.

1. Introduction

Vietnam has grown into one of Southeast Asia's fastest-growing economies from an agrarian economy to a manufacturing and export hub in recent decades. This change has been fueled by FDI and EXP integration into global markets. Since 1986, Vietnam's strategic reforms under Đổi Mới have attracted FDI, promoted export-driven growth, and made it a major player in global supply chains (C. H. Nguyen, 2020). Vietnam's young labor population and competitive manufacturing costs have attracted considerable FDI, contributing to its rapid GDP development. The relationship between FDI, EXP, and economic progress has long been debated by economists and policymakers, especially in developing countries. Economic theory suggests that FDI may boost economic growth by providing money, expertise, and global market access (Borensztein et al., 1998a). By increasing production, competitiveness, and economies of scale, EXP can enhance economic growth (Helpman et al., 2004a). FDI and EXP may promote sustainable economic growth, particularly in export-oriented industrialized countries like Vietnam (GSO, 2020). There is consensus that FDI and EXP boost economic

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growth, but their effects in Vietnam are less clear. Although various studies have examined the influence of FDI on economic growth, few have explicitly analyzed the causal relationship between FDI, EXP, and GDP over a prolonged period, especially using rigorous econometric approaches like the vector autoregression (VAR) model. Given Vietnam's expanding role in global commerce and investment, recognizing these links is crucial. This understanding will help develop informed economic policies that can sustain the country's growth. FDI and EXP's impact on Vietnam's GDP is the study's main emphasis. Previous research suggests a positive link between FDI, EXP, and GDP (H. H. Nguyen, 2019); however, the direction and amount of this correlation must be determined. Does FDI increase GDP directly or indirectly via EXP? Does GDP growth boost FDI or EXP? How do these components interact dynamically over time, particularly in reaction to global economic shocks like the 2008 financial crisis and the COVID-19 pandemic?

This study aims to investigate the long-term causal links among FDI, EXP, and GDP in Vietnam during the 30-year span from 1993 to 2022. Comprehending these processes will provide insights into Vietnam's historical economic performance and facilitate the prediction of future trends, enabling policymakers to make evidence-based choices that promote sustainable development. The main aim of this study is to analyze the long-term interactions and causal linkages among FDI, EXP, and GDP in Vietnam using a vector autoregression (VAR) model. The study specifically intends to examine the influence of FDI on Vietnam's GDP, including an assessment of whether FDI inflows directly foster economic development or whether their impact is facilitated via other mechanisms such as EXP. It also analyzes the significance of EXP in stimulating GDP growth: This entails evaluating the impact of EXP on Vietnam's GDP and determining the continued relevance of an export-led economic strategy for the nation. The study will analyze whether FDI enhances EXP by augmenting production capacity and facilitating access to foreign markets or whether improved export performance draws in further FDI inflows. Moreover, it assesses the temporal dynamics: The VAR model will be used to analyze the evolution of relationships among FDI, EXP, and GDP during the study period, especially in reaction to major global economic occurrences. By accomplishing these aims, the study will enhance the literature on economic development in Vietnam and provide critical insights for policymakers on optimizing the equilibrium between FDI, EXP, and GDP growth in the next years.

2. Literature review

The interconnection among Foreign Direct Investment (FDI), exports (EXP), and Gross Domestic Product (GDP) has been widely investigated within economics, especially in the context of emerging markets. This review explores three main domains: (1) the influence of FDI on economic growth, (2) the role of EXP in fostering GDP growth, and (3) the interplay between FDI and EXP, with an emphasis on Vietnam and comparable emerging economies.

2.1. The Impact of FDI on Economic Growth

FDI is widely recognized as a crucial driver of economic growth, particularly in developing nations, via processes including capital accumulation, technology transfer, and productivity improvement. Liu et al. (2009) argue that FDI fosters technological spillovers, strengthens research and development (R&D), hence enhancing productivity. Nosova (2023) similarly asserts that local enterprises gain from technology acquired by foreign direct investment, hence improving productivity. Supporting this, research by Rahaman & Chakraborty (2015) illustrates the beneficial effect of FDI on GDP, since foreign capital inflows stimulate economic expansion. The institutional frameworks are crucial for the efficacy of FDI; Jude and Levieuge (2023) and Berthélemy and Démurger (2000) contend that supportive policies amplify FDI's positive effects.

FDI also catalyzes domestic investment, establishing a "virtuous cycle" of growth. Saleem et al. (2020) contend that FDI stimulates local enterprises to invest by improving the overall business climate and providing a demonstration impact, particularly pertinent in South Asian countries. However, the impact of FDI on GDP differs across nations, shaped by market maturity, institutional quality, and economic structure (Siddikee & Rahman, 2020). Country-specific characteristics, sectoral emphasis of FDI, and the local economy's ability to assimilate investments all influence the varied results of FDI. For example, whereas FDI advantages areas such as agriculture in Nepal (Phuyal & Sunuwar, 2019), resource extraction industries may have restricted spillover effects, confining benefits to certain sectors rather than fostering extensive expansion (Pokharel & Pokharel, 2019).

Furthermore, the enduring effects of FDI on GDP may diverge from immediate advantages. Mugableh (2015) emphasizes that while FDI might result in quick GDP increases, enduring economic advantages rely on the host nation's capacity to capitalize on these investments. Government policies influence the impact of FDI on GDP, with liberalization generally improving economic results, especially in reform-driven nations (Basu et al., 2003). Vietnam has used FDI to shift from an agrarian to an industrial economy, resulting in significant GDP growth via job creation, technological integration, and involvement in global supply chains (Nguyen, 2019, 2020). Alfaro et al. (2004) assert that the advantages of FDI are optimized only in the presence of robust institutions and infrastructure, while inadequate institutions may hinder FDI's beneficial economic effects or even intensify inequality.

The long-term impact of FDI is contingent on a nation's capacity to optimize these investments. Mugableh (2015) notes that while FDI may generate immediate GDP gains, sustainable benefits require robust policies and institutional support. Alfaro et al. (2004) further caution that weak institutions may limit FDI's potential or even exacerbate inequalities. Vietnam's transformation into an industrial economy through FDI illustrates its growth potential, but challenges remain in ensuring equitable and long-term benefits (Nguyen, 2019, 2020). This study builds upon existing literature by examining the contextual factors influencing FDI's effectiveness in Vietnam, including institutional frameworks and economic structures.

2.2. The Function of EXP in Economic Development

The correlation between EXP and GDP underscores EXP as a vital catalyst for economic development. From a Keynesian viewpoint, EXP enhances GDP by augmenting aggregate demand, generating employment, and fostering investment. Studies, such as those by Ramphul (2013) and Kovač et al. (2012), indicate that a 1% increase in exports may result in a corresponding gain in GDP, highlighting the efficacy of export-driven development. Sector-specific effects are considerable, since agricultural exports substantially contribute to less-developed nations, while service exports further bolster GDP development (Sermcheep, 2019). Robust governmental policies that foster a conducive environment are essential for optimizing the beneficial impacts of exports on GDP, as shown by Vietnam's experience (Linh et al., 2023).

While several studies (e.g., Ramphul, 2013; Kovač et al., 2012) have shown a robust positive association between EXP and GDP, they often neglect the varying effects between sectors and phases of economic growth. Sermcheep (2019) highlights the significance of agricultural exports in emerging nations; however, this research does not investigate the contribution of industrial and service exports in transitional economies such as Vietnam. Linh et al. (2023) emphasize that Vietnam's export-oriented growth model depends heavily on favorable government policies, but its ability to withstand global economic fluctuations is unknown. This research analyzes how industry and export-promoting policies affect GDP growth in Vietnam to improve sustainable export strategies.

2.3. The Relationship Between Foreign Direct Investment and Exports

FDI and EXP often enhance each other, since export-oriented FDI improves production capacity, product quality, and access to international markets (Helpman et al., 2004b). Research in developing economies, such as Mexico and Greece, underscores the significance of FDI in enhancing EXP (Pacheco-Lopez, 2005; Dritsaki & Dritsaki-Bargiota, 2005). FDI inflows into export industries such as electronics in Vietnam have improved production and worldwide competitiveness (Nguyen et al., 2019). Although FDI generally promotes export performance, its efficacy may fluctuate depending on the institutional quality of a nation. This research enhances the existing literature by examining the long-term correlations between FDI, EXP, and GDP in Vietnam from 1993 to 2022 using a VAR model.

The relationship between FDI and EXP has been studied (Helpman et al., 2004b; Pacheco-Lopez, 2005), but not in emerging countries. Nguyen et al. (2019) emphasize export-oriented foreign direct investment's competitiveness benefits, but they ignore institutional weaknesses. The trade-off between FDI and domestic production capacity needs more investigation, especially in multinational-dominated sectors. This study uses the VAR model to investigate FDI, EXP, and GDP in Vietnam from 1993 to 2022 to provide a long-term perspective and explain the impacts under different institutional conditions.

3. Methodology

This research utilizes time series econometrics to examine the dynamic interrelationships among FDI, EXP, and GDP in Vietnam from 1993 to 2022, using a Vector Autoregression (VAR) model. The VAR framework captures bidirectional interactions among the variables without establishing causal hierarchies, providing a thorough knowledge of the short- and long-term interactions influencing Vietnam's economic development by including specification, stationarity tests, impulse response analysis, variance decomposition, Granger causality testing, and stability assessments. The VAR model considers the natural logarithmic transformations of FDI (lnfdi), EXP (lnexp), and GDP (lngdp) as endogenous, indicating dynamic feedback. The optimal lag selection, determined by SBIC, HQIC, and AIC criteria, indicated a lag duration of two for enhanced model accuracy and parsimony. Stability tests verified that all eigenvalues resided inside the unit circle, indicating that disturbances within the system diminish with time, hence affirming model appropriateness (Nguyen, 2020).

To guarantee precise VAR modeling, the stationarity of the data was assessed using ADF and PP tests, indicating the need for first differencing of each series (D.lngdp, D.lnfdi, D.lnexp) owing to non-stationary levels. Impulse Response Functions (IRFs) were used to assess the responses of lngdp, lnfdi, and lnexp to shocks across eight periods. Findings indicate that economic growth (lngdp) draws FDI, although FDI has only a negligible, short-term effect on GDP, implying that domestic demand is the main engine of expansion. Variance decomposition reveals that GDP variations are mostly influenced by internal variables such as domestic demand, productivity, and government policy, whereas FDI serves a secondary role in economic swings (Alfaro et al. 2004).

Granger causality tests established the directional impact among the variables: FDI inflows boost economic growth, which subsequently attracts more FDI. GDP growth increases export capacity, demonstrating a unidirectional link in which growing GDP elevates EXP (Saleem et al., 2020). The stability of the model was confirmed by analyzing the roots of the VAR model, all of which were inside the unit circle, hence validating the impulse response and variance decomposition outcomes for sound economic interpretations. Data on GDP, FDI, and EXP from 1993 to 2022, obtained from the World Bank and the State Bank of Vietnam, were log-transformed to stabilize variance. The established stationarity of the first-differenced series is crucial for VAR analysis, guaranteeing precise insights into the relationships among FDI, EXP, and GDP in Vietnam.

Although the VAR model is a useful tool for analyzing dynamic relationships, it still has some limitations. First, the model assumes a linear relationship between the variables, which may not accurately reflect the actual complexity. Secondly, the incorrect selection of lag can lead to biased results; thus, stability checks are necessary to ensure the model's reliability. The VAR model depends only on first-order differences to attain stationarity, which may lead to the forfeiture of information about long-term relationships. Moreover, the model assumes that shocks are exogenous; yet, in reality, external factors such as policy changes or global variations may affect the outcomes. The use of aggregated data may obscure differences across sectors; thus, the research should improve sectoral analysis to more precisely evaluate the impacts of FDI and EXP on GDP. Notwithstanding its constraints, the VAR model persists in providing substantial insights into the dynamic interconnections among FDI, EXP, and GDP within the Vietnamese economy.

4. Data and specification of the model

From 1993 to 2022, Vietnam saw consistent growth in FDI and EXP, although GDP exhibited more volatility. FDI had a substantial rise post-2010, signifying an enhancement in the appeal of the foreign investment landscape. EXP demonstrated a steady rising trajectory, underscoring Vietnam's significant position in the global supply chain. Vietnam's GDP had significant volatility, especially before ~~to~~ 2000, and suffered a dramatic decrease in 2020, mostly because ~~to~~ of the profound effects of the COVID-19 epidemic. The epidemic impeded economic operations, diminishing consumer demand, EXP, and investment. However, since 2020, both FDI and GDP have rebounded, indicating that Vietnam's economy is stabilizing and progressing after the global disruption. EXP ~~have~~ has maintained a consistent growth trajectory throughout 2022, significantly aiding the nation's economic recovery and expansion.

Table 1 below presents the descriptive statistics for all variables included in our study. The average values of FDI, export, and GDP are dissimilar, with GDP exhibiting the greatest mean (1.864) and FDI the lowest (1.511). FDI has the greatest volatility, shown by a substantial standard deviation of 1.01, while GDP displays somewhat lower volatility with a standard

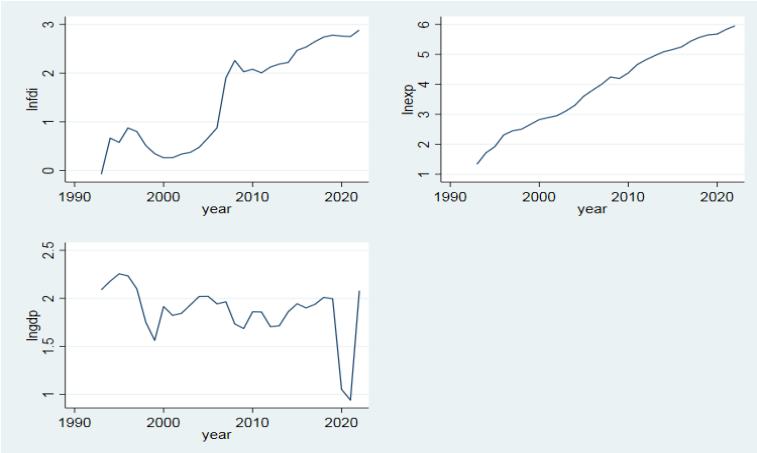

Figure 1. Time Trends of logged FDI Series, logged Export Series and logged GDP Series (1993–2022)

Table 1. Descriptive statistics of the variables (1993–2022)

Desc. Stats	$lnFDI_t$	$lnEXP_t$	$lnGDP_t$
Obs	30	30	30
Mean	1.511	3.942	1.864
Std. Dev.	1.01	1.373	0.286
Min.	-0.766	1.331	0.941
Max.	2.885	5.951	2.256
Skewness	-0.668	-0.186	-1.748
Kurtosis	1.341	1.795	6.531
Coeff. of variation (CV)	1.021	1.886	0.082

deviation of 0.286. Notwithstanding the variations in FDI and EXP, GDP has a rather steady growth rate, as seen by its low coefficient of variation (CV = 0.082), much lower than that of FDI (CV = 1.021) and EXP (CV = 1.886). During the study period, GDP numbers fluctuated between 0.941 and 2.256, demonstrating a more limited range of variation in contrast to the wider oscillations seen in FDI and EXP. Table 1 indicates that both FDI and EXP have negative skewness, with FDI exhibiting a greater degree of negative skewness (-0.668) compared to EXP (-0.186), implying that both distributions include elongated left tails. Conversely, GDP has a pronounced negative skewness (-1.748), suggesting that GDP values are mostly clustered at the upper end of the distribution. Kurtosis results indicate that GDP has a stronger peak (kurtosis = 6.531) relative to FDI (kurtosis = 1.341) and EXP (kurtosis = 1.795), indicating a thicker tail for GDP. This analytical assessment offers first evidence that, while both FDI and EXP show significant volatility and asymmetry, GDP growth remains comparatively constant throughout the study period. This indicates that FDI and EXP may not significantly restrain GDP growth to date, and the economy has shown resilience in sustaining consistent output growth despite substantial volatility in external economic factors such as FDI and EXP.

Table 2 reveals an interplay between FDI, EXP, and GDP. While FDI and EXP exhibit a positive correlation, suggesting that increased EXP attract foreign investment, the relationship between these variables and GDP is more nuanced. This means that when EXP increases, FDI also tends to increase and vice versa. FDI has a negative relationship with GDP. When FDI growth increases by 1%, GDP decreases by 35.8%. This shows that increasing FDI does not necessarily lead to growth in the overall economy, but on the contrary, it can have a negative impact on GDP. EXP also has a negative relationship with GDP. When EXP growth increases by 1%, GDP decreases by 44.5%. This implies that although EXP increases, it does not bring positive effects to the overall economy, but can also cause GDP to decrease.

Table 2. Correlation matrix

Variable	lnFDI	lnEXP	lnGDP
lnFDI	1		
lnEXP	0.9316	1	1
lnGDP	-0.3587	-0.4456	

Table 3. ADF Unit root tests

	Level		First Difference	
Variables	ADF	PP	ADF	PP
$lnFDI_t$	-2.669	-2.063	-3.592**	-4.752***
$lnEXP_t$	-1.906	-2.614	-3.62**	-4.99***
$lnGDP_t$	-2.065	-3.547**	-3.703**	

*Notes: ***p < 0.01; **p < 0.05; *p < 0.1*

Table 4. Lag Section Test Result

Lag	LL	LR	Prob.	FPE	AIC	HQIC	SBIC
0	-42.492	-	-	0.007642	3.639	3.68	3.786
1	36.351	157.69	0.000	0.000029	-1.948	-1.786	-1.363
2	47.1477	21.593	0.01	0,000026*	-2.092	-1.807*	-1.068
3	56.544	18.793	0.027	0.000028	-2.124	-1.718	-0.661
4	68.08	23.073	0.006	0.000027	-2.326*	-1.799	-0.425
5	76.5452	16.93*	0.05	0.000042	-2.284	-1.635	0.057

Where: LL is log likelihood; FPE is final prediction error; AIC is Akaike information criteria; HQIC is Hannan-Quinn information criteria, & SBIC is Schwarz information criteria. Source: Authors' Compilation using Stata ver.17.
** reflects the appropriate lag length suggested by each criterion, and where LR is Likelihood Ratio, FPE is Final Prediction Error, AIC is Akaike Information Criterion, HQIC is Hannan-Quinn Information Criterion.*

To conduct integration for testing long-term causal relationships among chosen variables, it is essential that the logarithmized time series be stable at initial differences I (1) and nonstationary in its original values. The stationarity test is conducted using the Augmented Dickey-Fuller test (ADF test). The lag length of the time series in the ADF test was determined using the Schwarz criteria. Based on the analysis of logarithm-adjusted data, a test stationary equation included a coefficient for FDI and EXP, while it contained a trend coefficient for GDP.

The results of the ADF test are shown in Table 3. The first section of the table presents data reflecting the values of two examined non-stationary time series, while the subsequent section documents data illustrating the stationarity of the time series at first differences. The prerequisite for further testing and investigation of long-term correlations among the stated variables is satisfied, as the stationarity of the time series was established in the initial differences.

Table 4 delineates the criteria for determining the suitable lag length for the VAR model in the analysis of the interrelationship among FDI, GDP, and EXP. The LR test demonstrates that lag 5 is statistically significant at the 5% level (Prob. = 0.05), indicating that the inclusion of five lags substantially enhances the model fit. Nevertheless, metrics such as FPE, HQIC, and SBIC indicate that lag 2 is the optimal selection. The FPE is minimal at lag 2 (0.000026), indicating that two lags provide the best precise prediction for the FDI, GDP, and EXP variables. HQIC and SBIC both use lag 2, since it provides the optimal equilibrium between model complexity and data fit. While AIC favors lag 4, the predominant criteria endorse lag 2. Consequently, lag 2 is the most often endorsed option for examining the correlation among FDI, GDP, and EXP.

We conducted three independent VAR analyses using only three of our key variables (FDI, EXP, GDP) to assess whether our results remain consistently

Table 5. Var Results

Variables	FDI	EXP	GDP
FDI (t-1)	0.9456*** (.1824551)	0.0079 (.0078938)	0.0323 (.03322613)
FDI (t-2)	-0.2777 (.1719536)	-0.0147 (-.0149714)	0.0216 (.0215671)
EXP (t-1)	0.3416 (.5141313)	1.0179*** (.2198556)	0.6066848 (.4936602)
EXP (t-2)	-0.0660 (.4893337)	-0.0337 (.0806783)	-0.7203 (.46985)
GDP (t-1)	0.1350 (.1886659)	0.0251 (.0806783)	0.5954*** (.5953925)
GDP (t-2)	0.0345 (.2254759)	-0.0223 (.0964192)	-0.9053*** (-.9053067)
Constant	-0.8598	0.2123	2.7094***

*Note: ***show significance at % levels, respectively. Standard errors in ().*

robust when accounting for the potential effects of other variables.

The results of the Vector Autoregression (VAR) in Table 5 regression model evaluate the relationship between the variables FDI, EXP, and GDP. The values represent the estimated coefficients, with lags 1 and 2 for each variable. The analysis shows: The relationship of the variables with themselves and other variables at lags: FDI (t-1) has a coefficient of 0.9456*** (Std.Err=.1824551), which is statistically significant. This shows that FDI in the previous period has a strong and significant positive impact on current FDI, with a large impact. FDI (t-1) has an insignificant impact on EXP and GDP, because the coefficients do not have *** signs and are quite low. FDI (t-2): has no clear impact on current FDI, EXP, or GDP. EXP (t-1) has a coefficient of 1.0179*** (Std.Err = .2198556), indicating that EXP in the previous period has a positive and strong impact on current EXP. This coefficient is statistically significant. However, the results show that EXP (t-1) There is no significant impact of EXP (t-1) on FDI and GDP. EXP (t-2): EXP in the second lag has no significant impact on other variables. GDP (t-1): has a coefficient of 0.5954*** (Std.Err=.5953925), indicating that GDP in the previous period has a positive and significant impact on current GDP. There is no significant impact of GDP (t-1) on FDI and EXP. GDP (t-2) has a coefficient of -0.9053*** (Std.Err=.0964192), which is statistically significant and shows a negative impact of GDP in the 2nd lag on current GDP. Constant: shows the base value of each equation. The constant 2.7094*** of GDP is statistically significant, which shows that in the absence of impacts from other variables, GDP tends to be positive.

Therefore, FDI is highly autoregressive (i.e, strongly dependent on its value in the previous period) but has no significant impact on EXP and GDP. EXP is also highly autoregressive but has no strong impact on FDI or GDP. GDP has a more complex relationship: positively dependent on its value in the previous period, but has a negative impact from the value of GDP in the second lag. The relationship between the variables does not show a clear impact of FDI or EXP on GDP, which may imply that increasing FDI and EXP does not directly promote economic growth in the short run, but may have the potential to have the opposite effects.

The impulse response analysis offers valuable insights into the dynamic interrelationships among FDI, GDP, and EXP. The results demonstrate that FDI has a substantial and favorable influence on GDP, with the effects reaching its zenith quickly after the first shock and then stabilizing over time. This underscores the essential function of FDI in propelling economic development in the short to medium term. Conversely, GDP and EXP have negligible effects on FDI, indicating that FDI inflows are not significantly affected by domestic production or export performance within the parameters of this model. Furthermore, the correlation between EXP and GDP is tenuous, with only slight variations in GDP seen after an export shock. Furthermore, each variable exhibits robust self-sustaining dynamics, with significant reactions to their own disturbances, especially for GDP and FDI. These findings highlight the significance of FDI in facilitating

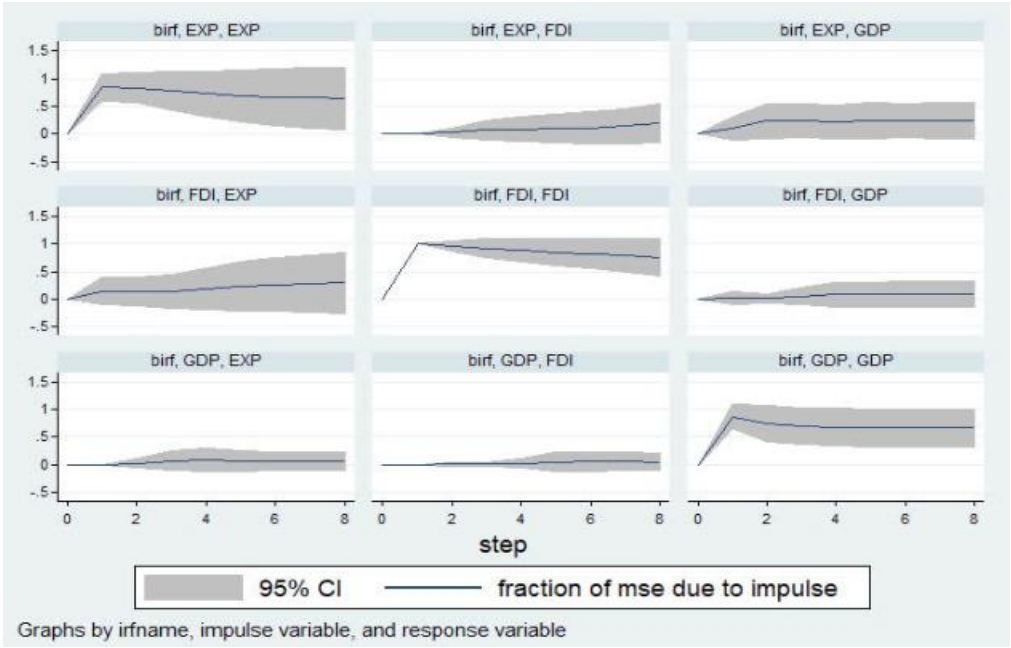

Figure 2. Impulse-Response Functions

GDP development, while EXP seems to have a very limited influence on both FDI and GDP. Consequently, measures designed to encourage FDI may be essential for promoting economic growth, considering its substantial impact on GDP in this context.

The Granger causality test demonstrates significant interactions among FDI, GDP, and EXP. The findings indicate that FDI Granger-causes EXP, suggesting that FDI significantly enhances export operations, presumably via knowledge transfer and increased production capacity. Nevertheless, EXP does not Granger-cause FDI, indicating that export performance does not substantially affect FDI inflows. Notably, FDI and GDP do not Granger-cause one another, signifying that under this model, neither indicator forecasts the other. This may indicate that the influence of FDI on GDP is indirect or postponed. Furthermore, GDP does not substantially Granger-cause EXP, but there is a marginal suggestion that economic growth may affect export levels.

The combined study indicates that FDI Granger-causes both GDP and EXP, highlighting FDI's pivotal role in stimulating growth and trade. Likewise, GDP Granger-causes both FDI and EXP, indicating that economic growth may affect both investment and export performance when analyzed collectively. These results underscore the essential significance of FDI enhancing EXP and its wider economic implications, while indicating that further study is necessary to fully grasp these relationships.

The VAR model's stability is validated by the companion matrix roots plot, which shows that all roots are situated inside or on the boundary of the unit circle. This signifies that the model is stable and convergent, as necessary for a proper VAR model. The positioning of the roots indicates that the system does not demonstrate explosive behavior over time, making it dependable for forecasting and impulse response analysis. The existence of roots with non-zero

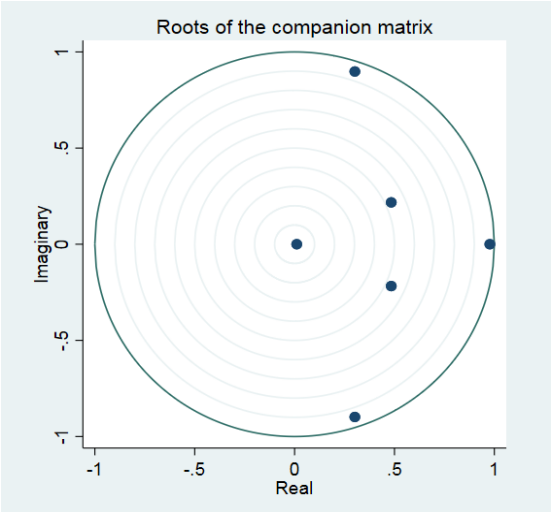

Figure 3. VAR stability test using eigenvalues

Table 6. Granger causality

	Null hypothesis	Lag order	Chi-square	P-Value	Result
1	Log FDI does not cause granger log EXP	2	9.896	0.007	Reject
2	Log FDI does not cause granger log GDP	2	0.919	0.632	Accepted
3	Log FDI does not cause granger log GDP and EXP	4	10.751	0.03	Reject
4	Log EXP does not cause granger log FDI	2	0.053	0.974	Accepted
5	Log EXP does not cause granger log GDP	2	0.103	0.95	Accepted
6	Log EXP does not cause granger log GDP and FDI	4	0.182	0.996	Accepted
7	Log GDP does not cause granger log FDI	2	0.264	0.877	Accepted
8	Log GDP does not cause granger log EXP	2	5.133	0.077	Reject
9	Log GDP does not cause granger log EXP and FDI	4	10.343	0.035	Reject

imaginary parts indicates potential oscillatory activity in the system; yet, the model remains stable since all roots lie inside the unit circle.

5. Discussion, Implications, and Limitations

5.1. Discussion

This analysis elucidates the intricate interconnections among FDI, EXP, and GDP in Vietnam from 1993 to 2022, demonstrating that while FDI and EXP facilitate economic development, their impacts on GDP differ across sectors and circumstances (Xu & Liu, 2022). In Vietnam, FDI is mostly focused on export-oriented sectors, such as electronics and textiles, hence limiting its advantages to other economic domains. Thus, the influence of FDI on GDP may be postponed or indirect, since robust institutional frameworks are crucial for optimizing FDI's development potential (World Bank Group Macroeconomic Models for Climate Policy Analysis, 2022).

The results indicate a constrained effect of EXP on sustained GDP growth owing to Vietnam's dependence on low-value exports. Textiles and agriculture contribute to economic growth but do not provide the high-value product necessary for sustained development (Antonietti & Mondolo, 2023). Diversifying into higher-value exports, like electronics and equipment, may mitigate Vietnam's susceptibility to external shocks and amplify the beneficial impacts of EXP on GDP.

Although FDI and EXP contribute to GDP growth, their effects on GDP are not immediate. This can be attributed to the structure of Vietnam's economy, where exports mainly consist of low-value products such as textiles and agriculture. High-value industries, like electronics and equipment, are still underdeveloped and could be critical for more immediate growth impacts. Additionally, the absorption capacity of the domestic economy and the time required for technological and productivity improvements influence how quickly FDI and EXP translate into GDP growth.

This finding aligns with the studies of Xu & Liu (2022), who found that the impact of FDI on GDP in emerging economies is often delayed, especially when investments are concentrated in low-value sectors. However, unlike other studies such as Miroshnychenko (2022), which highlighted the immediate benefits of FDI in manufacturing, this study suggests that Vietnam's export composition and reliance on low-value goods limit such effects.

The role of internal factors such as labor productivity and government policies is crucial in determining the effectiveness of FDI and EXP. Vietnam's labor productivity remains relatively low compared to other regional economies, which constrains the immediate benefits of foreign investments. Additionally, government policies, particularly those that promote industrial upgrading and technological adoption, play a significant role in enabling FDI to contribute to long-term economic growth (Nguyen, 2020). To enhance the effectiveness of FDI, improving labor skills and aligning policies to foster innovation and higher-value exports are essential.

The indirect impact of FDI and EXP on GDP is significant, as these factors contribute to improvements in domestic productivity, technology transfer, and infrastructure development. However, these effects are not immediate and require substantial time for local firms to absorb and adapt to new technologies. One way to enhance these indirect impacts is by creating policies that promote innovation, education, and the development of industries that are more capable of integrating FDI and utilizing export opportunities more effectively.

5.2. Implications

To optimize the benefits of FDI and EXP on GDP, it is recommended that Vietnam improve its export supply chains, especially in high-value sectors like electronics and renewable energy. Policies should focus on enhancing the competitiveness of domestic firms through better infrastructure, labor force training, and access to global markets. Additionally, investing in green technologies and sustainable industries can ensure that FDI aligns with Vietnam's long-term economic and environmental goals.

Policymakers should encourage diversifying export structures by promoting high-value industries like technology, renewable energy, and medical equipment. Simplifying regulatory frameworks and boosting institutional transparency may help ~~to~~ attract and retain long-term FDI. Workforce upskilling, including vocational training and education changes, is critical for aligning workforce quality with the needs of technology-based sectors. Furthermore, encouraging green investments in infrastructure and industry ties economic development with environmental sustainability objectives, assuring a steady growth path.

5.3. Limitations

This analysis relies mostly on aggregate statistics, which may mask sectoral or geographical differences in FDI and EXP consequences. Future study should use disaggregated data to look at how FDI affects certain sectors, notably high-tech and manufacturing. Furthermore, using a linear VAR model may ignore nonlinear dynamics or structural developments in Vietnam's economy. Advanced modeling techniques, such as threshold regression or DSGE models, may give more detailed insights. Finally, external variables such as political stability, global market volatility, and technical breakthroughs, which are outside the scope of this research, need more investigation to fully comprehend the effect of FDI and EXP on GDP growth.

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