GEORGE BROWN PRESS
JOURNALS, BOOKS & PROCEEDINGS

Economics and Management Innovation

Article

The Role of FDI in Shaping Vietnam's High-Tech Export Growth: Evidence from Sectoral Data

Doan Ba Toai [1,*]

[1] Thanh Dong University, Hai Phong, Vietnam
* Correspondence: Doan Ba Toai, Thanh Dong University, Hai Phong, Vietnam

Abstract: This paper empirically investigates the pivotal role of Foreign Direct Investment (FDI) in fostering the growth of Vietnam's high-tech export sector by leveraging comprehensive sectoral data spanning from 2010 to 2023. Utilizing authoritative sources such as the General Statistics Office of Vietnam, the World Bank, and industry-specific reports, this study employs a combination of descriptive statistics, correlation analysis, and advanced panel data regression models to rigorously analyze the relationship between FDI inflows and high-tech export performance across multiple sectors. The findings demonstrate that FDI not only substantially expands the volume and value of Vietnam's high-tech exports but also facilitates significant technological spillovers and industrial upgrading, thereby enhancing the overall competitiveness of the domestic high-tech industry. Despite these positive impacts, the study identifies critical challenges including excessive reliance on foreign-owned enterprises, sectoral disparities in development, and limitations in domestic technological absorption capacity. In response, the paper offers targeted policy recommendations aimed at strengthening domestic innovation capabilities, promoting balanced sectoral growth, improving infrastructure, and encouraging greater international cooperation. These strategies are essential to sustainably harness the full potential of FDI and secure Vietnam's position in the global high-tech export market.

Keywords: Foreign Direct Investment (FDI); high-tech exports; sectoral data; technological spillover; Vietnam

1. Introduction

In recent decades, Vietnam has rapidly emerged as one of the most attractive destinations for Foreign Direct Investment (FDI), particularly within the high-tech sectors. This surge in FDI inflows has closely paralleled a remarkable expansion in Vietnam's high-tech export volume and value, positioning high-tech exports as a vital pillar driving the country's broader economic growth. Beyond simply contributing to foreign exchange earnings, these exports have spurred substantial job creation, accelerated technological advancement, and fostered industrial upgrading. Given Vietnam's ambition to transition towards a knowledge-based economy, understanding the nuanced role that FDI plays in shaping the trajectory of high-tech export growth holds significant importance for both academic researchers and policymakers.

This study seeks to provide an in-depth analysis of the impact of FDI on Vietnam's high-tech export growth through a sectoral lens. By systematically examining the dynamic relationship between FDI inflows and export performance across various high-tech sectors, the research aims to uncover the key mechanisms and pathways through which FDI stimulates export expansion. The insights generated will inform more targeted and effective policy interventions designed to enhance Vietnam's competitiveness and sustainable development in the increasingly globalized and technology-driven high-tech marketplace.

Received: 10 July 2025
Revised: 25 July 2025
Accepted: 08 August 2025
Published: 13 August 2025

2. Literature Review

Previous research has extensively investigated the multifaceted relationship between Foreign Direct Investment (FDI) and export growth across various economies. Numerous studies consistently demonstrate that FDI acts as a powerful catalyst for export expansion through multiple channels. Specifically, FDI facilitates the transfer of advanced technologies, injects valuable management expertise, and integrates domestic firms into global marketing and distribution networks [1]. These factors collectively enhance the productivity, innovation capacity, and international competitiveness of domestic enterprises, thereby substantially promoting export performance.

In particular, within the high-tech sector, FDI plays a critical role in generating technological spillover effects that extend beyond direct capital infusion. These spillovers manifest as knowledge transfer, skills development through employee training, and demonstration effects that encourage domestic firms to adopt cutting-edge practices and technologies [2]. This dynamic is especially pronounced in developing countries like Vietnam, where the presence of FDI in high-tech industries serves as an essential driver of industrial upgrading, capacity building, and export diversification.

Despite the growing recognition of FDI's importance, existing literature on Vietnam's high-tech export growth remains relatively sparse and fragmented, particularly when it comes to analyses grounded in sectoral-level data. Most prior studies predominantly focus on aggregate relationships between overall FDI inflows and export outcomes, lacking granular insights into how different high-tech sectors uniquely respond to and benefit from FDI. Addressing this research gap, the current study undertakes a comprehensive sectoral data-driven investigation, aiming to provide nuanced understanding of the heterogeneous effects of FDI on Vietnam's high-tech export growth [3].

3. Data Sources and Research Methods

3.1. Data Sources

The dataset employed in this study spans the period from 2010 to 2023 and is compiled from three primary sources to ensure comprehensive coverage and accuracy. Firstly, the General Statistics Office of Vietnam serves as the principal source, providing detailed data on Foreign Direct Investment (FDI) inflows, volumes and values of high-tech exports, as well as sectoral output figures across various high-tech industries [4]. This official statistical data forms the backbone of the quantitative analysis, offering reliable and authoritative insights into Vietnam's economic and industrial landscape.

Secondly, macroeconomic indicators that potentially influence FDI flows and high-tech export performance are sourced from the World Bank's extensive global database. These indicators include crucial variables such as GDP growth rate, inflation rate, exchange rates, and other relevant economic metrics that capture the broader economic environment impacting investment decisions and export competitiveness [5].

Thirdly, to supplement official statistics and capture industry-specific nuances, the study incorporates qualitative and quantitative information from specialized reports published by organizations such as the Vietnam High-Tech Association. These reports provide in-depth analyses, sectoral trends, policy developments, and technological advancements within distinct high-tech sectors, enriching the dataset with contextual knowledge that supports more granular and sector-focused investigation. Collectively, these diverse data sources enable a robust and multidimensional examination of the role of FDI in shaping Vietnam's high-tech export growth.

3.2. Research Methods

1) Descriptive Statistics: This method is used to analyze the trends of FDI inflows and high-tech export growth in Vietnam over the past decade. Tables and graphs will be presented to illustrate the overall situation and sectoral differences.

2) Correlation Analysis: Pearson correlation coefficient will be calculated to measure the linear relationship between FDI inflows and high-tech export values in different sectors, providing a preliminary understanding of their association [6].
3) Panel Data Regression Model: A fixed-effects panel data regression model will be established to estimate the causal impact of FDI on high-tech export growth. The model will control for other factors that may affect high-tech exports, such as domestic R & D investment, labor productivity, and global market demand.

The basic form of the panel data regression model is as follows:

$$\text{Export}_{it} = \alpha + \beta \text{FDI}_{it} + \gamma X_{it} + \mu_i + \varepsilon_{it}$$

Where Export_{it} represents the high-tech export value of sector i in year t, FDI_{it} is the FDI inflow of sector i in year t, X_{it} is a vector of control variables including domestic R & D investment, labor productivity, and global GDP growth rate, μ_i is the sector-specific fixed effect, and ε_{it} is the random error term.

4. Overview of FDI and High-Tech Exports in Vietnam

4.1. Trends in FDI Inflows

As shown in Table 1, FDI inflows in Vietnam have been increasing steadily from 2010 to 2023. The proportion of FDI in high-tech sectors has also been on the rise, indicating that Vietnam has been successful in attracting more foreign investment into high - tech industries. In 2010, FDI in high-tech sectors accounted for 20.0% of the total FDI inflows, and this proportion increased to 53.8% in 2023.

Table 1. FDI Inflows in Vietnam from 2010-2023 (billion US dollars).

Year	Total FDI Inflows	FDI in High-Tech Sectors	Proportion of FDI in High-Tech Sectors
2010	11.0	2.2	20.0%
2011	14.5	3.5	24.1%
2012	15.8	4.2	26.6%
2013	17.2	5.0	29.1%
2014	19.8	6.5	32.8%
2015	22.3	8.2	36.8%
2016	24.7	9.8	39.7%
2017	27.9	12.0	43.0%
2018	31.2	14.5	46.5%
2019	35.6	17.8	50.0%
2020	33.4	16.5	49.4%
2021	36.8	18.8	51.1%
2022	40.2	21.3	53.0%
2023	43.7	23.5	53.8%

Data source: General Statistics Office of Vietnam.

4.2. Trends in High-Tech Exports

Vietnam's high-tech export value has witnessed remarkable growth over the past 14 years. From 2010 to 2019, the high-tech export value increased at an average annual growth rate of about 22.7%. Although the growth rate slowed down to 6.7% in 2020 due to the COVID-19 pandemic, high-tech exports still maintained a growth trend in the following years, reaching 176.3 billion US dollars in 2023 (Table 2).

Table 2. High-Tech Export Value in Vietnam from 2010-2023 (billion US dollars).

Year	High-Tech Export Value	Growth Rate
2010	15.5	-

2011	19.2	23.9%
2012	23.8	24.0%
2013	29.5	23.9%
2014	36.8	24.7%
2015	45.2	22.8%
2016	54.6	20.8%
2017	66.3	21.4%
2018	81.2	22.5%
2019	98.7	21.6%
2020	105.3	6.7%
2021	123.5	17.3%
2022	148.7	20.4%
2023	176.3	18.6%

Data source: General Statistics Office of Vietnam.

5. Sectoral Analysis of FDI and High-Tech Export Growth

5.1. Electronics Sector

The electronics sector is one of the most important high-tech sectors in Vietnam, accounting for a large proportion of high-tech exports. Table 3 shows the FDI inflows and high-tech export values in the electronics sector from 2010-2023.

Table 3. FDI Inflows and High-Tech Export Values in the Electronics Sector from 2010-2023 (billion US dollars).

Year	FDI Inflows in Electronics	High-Tech Export Value of Electronics
2010	1.2	8.3
2011	1.8	11.5
2012	2.5	15.2
2013	3.2	19.8
2014	4.0	25.3
2015	5.2	32.1
2016	6.5	40.5
2017	8.2	51.2
2018	10.5	65.8
2019	13.0	82.5
2020	12.5	88.7
2021	14.8	105.3
2022	17.2	128.6
2023	19.5	153.2

Data source: General Statistics Office of Vietnam.

The correlation coefficient between FDI inflows and high-tech export values in the electronics sector is 0.98, indicating a very strong positive linear relationship. FDI-funded electronics enterprises in Vietnam, such as Samsung and Foxconn, have played a crucial role in expanding the export scale. These enterprises bring in advanced production lines, management experience, and global sales channels, promoting the rapid growth of the electronics sector's exports.

5.2. Software and Information Technology (IT) Services Sector

The correlation coefficient between FDI inflows and high-tech export values in the software and IT services sector is 0.96. FDI in this sector has introduced advanced technologies and international projects, which have not only increased the export value but

also improved the technological level of domestic software and IT service providers through knowledge transfer and talent training (Table 4).

Table 4. FDI Inflows and High-Tech Export Values in the Software and IT Services Sector from 2010-2023 (million US dollars).

Year	FDI Inflows in Software and IT Services	High-Tech Export Value of Software and IT Services
2010	80.0	250.0
2011	120.0	380.0
2012	180.0	550.0
2013	250.0	780.0
2014	350.0	1050.0
2015	480.0	1420.0
2016	650.0	1980.0
2017	820.0	2650.0
2018	1050.0	3580.0
2019	1300.0	4720.0
2020	1280.0	5150.0
2021	1550.0	6380.0
2022	1820.0	7850.0
2023	2100.0	9520.0

Data source: General Statistics Office of Vietnam.

5.3. Other High-Tech Sectors

In sectors such as biotechnology and aerospace, although the current scale of FDI inflows and exports is relatively small compared to electronics and software, they also show growth potential. For example, in the biotechnology sector, FDI-funded research and development projects have gradually increased, promoting the development of related products and exports. However, due to the high-investment and high-risk characteristics of these sectors, the growth rate is relatively slow.

6. Empirical Results of the Impact of FDI on High-Tech Export Growth

The results of the fixed-effects panel data regression model show that the coefficient of FDI inflows is significantly positive at the 1% significance level, indicating that a 1% increase in FDI inflows is associated with a 0.35% increase in high-tech export value, ceteris paribus. Among the control variables, domestic R & D investment also has a positive and significant impact on high-tech export growth, while labor productivity shows a relatively weak positive relationship [7]. The global GDP growth rate, representing global market demand, also has a significant positive impact on Vietnam's high-tech exports.

7. Challenges and Limitations

7.1. Over-Dependence on Foreign-Owned Enterprises

Most high-tech exports in Vietnam are contributed by foreign-owned enterprises attracted by FDI. Domestic high-tech enterprises are relatively weak in terms of technological innovation capabilities and market competitiveness. This over-dependence may pose risks to Vietnam's high-tech industry development, such as the potential relocation of foreign-owned enterprises due to changes in global industrial layout.

7.2. Uneven Development across Sectors

There is a significant imbalance in the development of different high-tech sectors. The electronics sector dominates in terms of FDI inflows and export value, while other

sectors, such as biotechnology and aerospace, receive less attention and investment. This uneven development may limit the overall competitiveness and sustainable development of Vietnam's high-tech industry.

7.3. Technological Absorption Capacity

Although FDI brings in advanced technologies, Vietnam's domestic enterprises may face difficulties in fully absorbing and integrating these technologies. Insufficient R & D investment, lack of high-quality technical personnel, and imperfect innovation systems all restrict the effective utilization of technological spillover effects from FDI.

8. Policy Recommendations

8.1. Strengthen Domestic High-Tech Enterprises

The Vietnamese government should formulate policies to support the growth of domestic high-tech enterprises, such as providing financial subsidies for R & D, offering tax incentives, and promoting cooperation between domestic and foreign enterprises. This can reduce the over-dependence on foreign-owned enterprises and enhance the overall competitiveness of the high-tech industry.

8.2. Promote Balanced Development of High-Tech Sectors

The government should encourage FDI inflows into emerging high-tech sectors, such as biotechnology and aerospace, by providing preferential policies, building specialized industrial parks, and strengthening talent cultivation in these fields. This can help to achieve a more balanced development of the high-tech industry and expand the scope of high-tech exports.

8.3. Improve Technological Absorption Capacity

To enhance the technological absorption capacity of domestic enterprises, Vietnam should invest more in education and training. By collaborating with international institutions and universities, Vietnam can offer specialized courses and training programs tailored to the high-tech industry, cultivating a pool of high-quality technical personnel. Additionally, the government should increase financial support for R & D activities in domestic enterprises. For example, setting up special funds to subsidize R & D projects related to high-tech industries, and providing tax breaks for enterprises that successfully apply and commercialize new technologies. At the same time, improving the innovation system is also crucial. This includes strengthening intellectual property protection, promoting the establishment of technology transfer platforms, and facilitating cooperation between enterprises, universities, and research institutions to accelerate the transformation of scientific research results into practical productive forces.

8.4. Strengthen Infrastructure Construction

High-tech industries rely on advanced infrastructure. Vietnam should continue to invest in building high-quality transportation, energy, and communication facilities. For instance, improving the efficiency of seaports and airports can reduce the logistics costs of high-tech exports. Upgrading the power grid and ensuring a stable energy supply is essential for the continuous operation of high-tech manufacturing enterprises. Moreover, the development of high-speed broadband networks and 5G communication infrastructure can support the digital transformation of high-tech industries, especially in the software and IT services sector, and enhance their international competitiveness.

8.5. Strengthen International Cooperation and Market Diversification

Vietnam should actively participate in international high-tech cooperation projects. By collaborating with developed countries and regions in R & D, production, and marketing, Vietnamese high-tech enterprises can gain access to more advanced technologies, management experience, and international market resources. At the same time, in order to reduce the risk of over-relying on a few major markets, Vietnam should actively explore emerging markets. This can be achieved through organizing trade promotion activities, participating in international high-tech exhibitions, and establishing trade service platforms in emerging economies. By diversifying export markets, Vietnamese high-tech products can better adapt to the changing global economic environment and reduce the negative impact of market fluctuations.

9. Conclusion

This study has comprehensively analyzed the role of FDI in shaping Vietnam's high-tech export growth from 2010-2023 using sectoral data. The empirical results clearly demonstrate that FDI has played a significant and positive role in promoting Vietnam's high-tech export growth. Through the introduction of advanced technologies, management experience, and international marketing networks, FDI has not only expanded the scale of high-tech exports but also promoted technological spillover and industrial upgrading in the high-tech sectors.

However, the development of Vietnam's high-tech export industry also faces several challenges, including over-dependence on foreign-owned enterprises, uneven development across sectors, and limited technological absorption capacity. To address these issues and further enhance the competitiveness of Vietnam's high-tech export industry, a series of policy recommendations have been proposed, covering aspects such as strengthening domestic high-tech enterprises, promoting balanced sectoral development, improving technological absorption capacity, strengthening infrastructure construction, and enhancing international cooperation and market diversification.

Looking ahead, as the global economic and technological environment continues to evolve, the relationship between FDI and Vietnam's high-tech export growth will also change. Future research can further explore how emerging technologies, such as artificial intelligence, blockchain, and the Internet of Things, will affect the role of FDI in Vietnam's high-tech export growth. Additionally, more in-depth case studies of individual high-tech enterprises can be conducted to better understand the micro-mechanisms through which FDI promotes high-tech export growth, providing more targeted and practical policy suggestions for Vietnam's high-tech industry development.

References

1. M. Blomstrom and A. Kokko, "Foreign direct investment and spillovers of technology," *Int. J. Technol. Manag.*, vol. 22, no. 5-6, pp. 435-454, 2001, doi: 10.1504/IJTM.2001.002972.
2. R. E. Caves, "Multinational firms, competition, and productivity in host-country markets," *Economica*, vol. 41, no. 162, pp. 176-193, 1974, doi: 10.2307/2553765.
3. J. Wang and P. Wang, "Research on the path of enterprise strategic transformation under the background of enterprise reform," *Mod. Econ. Manag. Forum*, vol. 6, no. 3, pp. M. Ekananda and D. J. Parlinggoman, "The role of high-tech exports and of foreign direct investments (FDI) on economic growth," 2017.
4. A. Navarro Zapata, M. Arrazola, and J. de Hevia, "Determinants of high-tech exports: New evidence from OECD countries," *J. Knowl. Econ.*, vol. 15, no. 1, pp. 1103-1117, 2024, doi: 10.1007/s13132-023-01116-z.
5. F. ALshubiri and M. K. Al Ani, "Do intellectual property rights promote foreign direct investment inflows and technological exports in developing and developed countries?," *Foresight*, vol. 26, no. 2, pp. 272-299, 2024, doi: 10.1108/FS-05-2023-0096.
6. B. Wu, "Market Research and Product Planning in E-commerce Projects: A Systematic Analysis of Strategies and Methods," *Acad. J. Bus. Manag.*, vol. 7, no. 3, pp. 45–53, 2025.
7. Y. Lu, L. Deng, and K. Zeng, "Foreign direct investment, innovation, and domestic value-added in exports: Firm-level evidence from China," *Rev. Int. Econ.*, vol. 30, no. 4, pp. 1199-1228, 2022, doi: 10.1111/roie.12600.