

Scale of investment capital and performance of foreign direct investment: The case of Vietnam FDI enterprises



Nguyen Phuc Hai, Vu Ngoc Xuan*, Truong Nhu Hieu

Center for Analysis, Forecasting and Sustainable Development, National Economics University, Hanoi, Vietnam

ARTICLE INFO

Article history:

Received 21 January 2020

Received in revised form

27 April 2020

Accepted 28 April 2020

Keywords:

Foreign direct investment

Manufacturing enterprises

Technology enterprises

ABSTRACT

This article is based on data of annual enterprise surveys and surveys on the use of technology in production by manufacturing enterprises to analyze the relationship between the scale of foreign direct investment capital and the performance of FDI enterprises in Vietnam during 2008-2019. The authors analyze data from 6200 FDI enterprises in the 2008-2019 period. Stata 14.0 and SPSS 20.0 software are used to process data. Statistical analysis shows that Vietnam's policies on attracting and using FDI capital need to focus on attracting high-invested projects, especially in services with high-tech knowledge and copper content. At the same time, there are measures to reduce the number of small-scale FDI projects investing in low-content market service industries or low-tech manufacturing industries. The results show that the trend of small FDI projects investing in Vietnam creates risks to the development of the FDI enterprises sector as well as in the implementation of Vietnam's sustainable development strategy during the period next time.

© 2020 The Authors. Published by IASE. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

In recent years, the amount of foreign direct investment (FDI) in Vietnam has tended to decrease. Besides the decrease in total investment capital, the average capital of a project also tends to decrease. There are many opinions that this is a remarkable phenomenon because when the size of FDI projects is small, the equity capital of foreign investors is low, not promoting the potential of FDI capital. On the other hand, there is a concern that small FDI enterprises in Vietnam are only satellites, the suppliers of larger FDI projects, thereby creating a crowding-out effect to domestic suppliers, preventing the return of domestic enterprises to the value chain. In addition, the small size of capital on a project creates concern about the technology used is outdated. However, is the quality of FDI really positively related to the size of foreign capital contribution? Does Vietnam need a policy of prioritizing projects with large capital and limiting small FDI projects?

The research is based on data from the enterprise Survey 2008, 2012, and 2019 combined with data from the survey on the use of technology in manufacturing for manufacturing enterprises in 2019 by the General Statistics Office. The Vietnam research recently lacks the general of Vietnam's foreign direct investment. Therefore, to focus on the gap research, the authors analyze the change in the size of foreign capital contribution, as well as the performance, technology, and linkages with domestic enterprises of FDI enterprises according to the scale of capital contribution in the period 2008-2019. Since then, the article gives some comments to answer these two questions.

2. Literature review


When conducting research on foreign direct investment, [Lei and Chen \(2011\)](#) said that enterprises make direct investment abroad when meeting 3 conditions: (i) enterprises must own advantages compared to other businesses: Such as scale, technology, marketing network, access to capital with low productivity; (ii) localization: It is more advantageous to use those advantages within an enterprise than to sell it to other businesses or to other businesses; (iii) production in the host country has lower costs than production in the host country.

[Lei and Chen \(2011\)](#) also showed the choice decision of Taiwan firm's FDI in Vietnam. [Hunady](#)

* Corresponding Author.

Email Address: xuanvn@neu.edu.vn (V. N. Xuan)

<https://doi.org/10.21833/ijaas.2020.08.003>

 Corresponding author's ORCID profile:

<https://orcid.org/0000-0003-4364-9785>

2313-626X/© 2020 The Authors. Published by IASE.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

and Orviska (2014) also showed the factor affected the FDI in EU countries.

Jabri et al. (2013) and Jabri and Brahim (2015) also showed the determinants of FDI in the MENA region. This is the basis for my research in this paper.

The theory of investment behavior of Jensen (2003) and Jouili (2018) showed that investor behavior is directly affected by (i) changes in demand; (ii) interest rates; (iii) the level of development of the financial system; (iv) public investment; (v) human resources; (vi) other investment projects in the same industry or in connected industries; (vii) the situation of technology development, the ability to absorb and apply technology; (viii) the stability of the investment environment; (ix) procedural regulations and (x) completeness of the information.

Kumar (1994) referred to the determinants of export of foreign products in the United States of America. Kwiatkowski et al. (1992) used the time series to test the null hypothesis.

Tran (2009) and Parker et al. (2005) showed the relationship between the infrastructure and FDI attraction in Vietnam.

There is some research related to FDI in the world, such as Loree and Guisinger (1995) showed the determinants of United States FDI. Louail (2019), Mina (2007; 2012), and Moosa (2009) referred to determinants of foreign direct investment in Arab countries. Nnadi and Soobaroyen (2015) showed the financial statement standards and FDI in Africa. Rogmans (2013) referred to the FDI and adoption of international financial report standards in poor countries.

Pesaran (1997), Pesaran and Shin (1998) and Pesaran et al. (1999) showed that business satisfaction indicates the level of satisfaction of businesses when investing in a country affected by three factors: (i) attribute group about the infrastructure; (ii) attribute group of business policy,

service support (SS); (iii) attribute group of living and working environment. Xuan et al. (2020a, 2020b) and Zouita et al. (2019) also mentioned the impact of national small and medium-sized enterprises on FDI attraction in developing countries.

Factors affecting foreign direct investment: Evidence at foreign technology enterprises in Vietnam referred to the main factors influencing the FDI in Vietnam and have evidence from the technology FDI firms (Xuan, 2020).

3. Structure of FDI enterprises according to the size of foreign capital contribution

Table 1 shows the structure of FDI enterprises by the total accumulated investment capital of foreign partners in the 2008-2019 periods. It can be seen that the proportion of enterprises with investment size. The increase in the number of small-sized enterprises, especially enterprises with a total investment capital of less than US \$ 100 thousand, increased at a steady pace from 12.12% in 2008 to 14.68% in 2012 and 18.23% in 2019. For enterprises with capital from US \$ 100,000 to the US \$ 500,000, although there was a slight decrease in proportion in 2012 compared to 2008, then the proportion of these businesses increased rapidly and reached 27.79%, and became the highest proportion of total FDI enterprises in 2019. Group of foreign-owned enterprises from 500 thousand to 1 million USD, accounting for 17.12% in 2008, reduced to 12.69% in 2019. In 2008, enterprises with foreign capital from 1 to 5 million accounted for nearly one-third of total FDI enterprises but then decreased to 24.56% in 2019. The proportion of large-scale enterprises contributed capital from 5 million USD or more increased in the first phase but then decreased after 2012 and accounted for 16.73% in 2019.

Table 1: Structure of FDI enterprises by scale of foreign investment capital

	2008	%	2012	%	2019	%
Total FDI enterprises	5229	100	7743	100	12598	100
Less than US \$ 100,000	634	12.12	1137	14.68	2296	18.23
From 100 to under USD 500 thousand	1338	25.59	1910	24.67	3501	27.79
From VND 500,000 to less than USD 1 million	895	17.12	1066	13.77	1599	12.69
From 1 to less than 5 million USD	1591	30.43	2192	28.31	3094	24.56
From 5 million or more	771	14.74	1438	18.57	2108	16.73

Note: Foreign investment is the nominal value of the total accumulated capital that foreign investors contributed to the company as of December 31 in the survey year. The value in parentheses is the proportion of total FDI enterprises (%)

Economic sectors are classified into industry groups according to the statistical classification of economic activities in the European Community (NACE) (Appendix A, Table A1). From Fig. 1, it can be seen that the industry structure of FDI enterprises has changed positively. The proportion of manufacturing and processing industries decreased, increasing the proportion of service industries. However, this change is not significant; economic sectors with low technology and low content of knowledge still account for a high proportion.

For manufacturing and processing industries, a positive trend can be seen when the proportion of low-tech enterprises sharply decreases, while the share of hi-tech manufacturing enterprises decreases in the total FDI enterprises reduce to a lesser extent. If only calculated on the total number of FDI enterprises in the manufacturing industry, this positive trend can be seen more clearly. In 2008, there were 1856 FDI enterprises in the low technology sector, accounting for nearly 50% of the total number of FDI enterprises in the manufacturing industry, and this proportion decreased to 44.7% in

2019. In contrast, in 2008, there were 906 enterprises. FDI enterprises in the high-tech manufacturing industry accounted for 24.3% of total

FDI enterprises in the manufacturing industry and then increased to 24.4% in 2013 and 27.6% in 2019 (see more in [Appendix A, Table A2](#)).

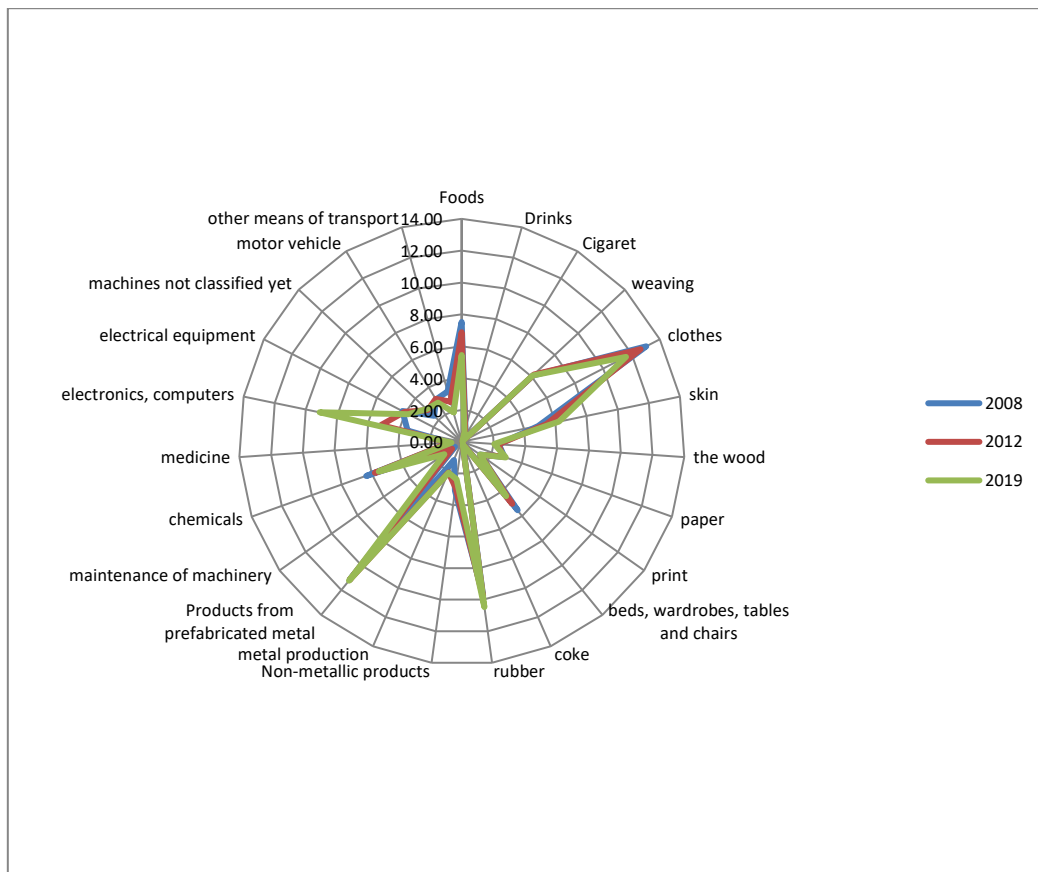


Fig. 1: Structure of FDI enterprises by industry

For the service sector, the number of market service enterprises accounts for the majority and has the highest increase, especially service groups with low knowledge content. Calculated on the total number of FDI enterprises, the service industries with a lot of high-tech knowledge content, financial services with a lot of knowledge, and other

knowledge-rich services have not changed significantly. If only calculated on the total number of service-sector FDI enterprises, the proportion of these sectors tends to decrease. This shows that the change in the service area is negative. [Table 2](#) shows the industry structure of FDI enterprises in 2019 (%).

Table 2: Industry structure of FDI enterprises in 2019 (%)

classification Industry by NACE	Scale of foreign capital contribution				
	Under 100 thousand USD	100 to less than 500 thousand USD	500 thousand to less than 1 million USD	from 1 to less than 5 million USD	From 5 million USD and above
Agriculture, forestry and fishery	0.17	0.57	1.13	1.26	1.19
Mining, electricity, water	0.13	0.26	0.63	0.71	1.09
Construction	6.93	7.17	3.63	2.65	1.33
Low-tech manufacturing industry	7.45	19.71	31.39	34.78	33.63
manufacturing average technology	5.23	13.25	21.14	21.88	16.79
High-tech manufacturing industry	3.40	12.60	18.89	21.43	21.96
Knowledge-rich market services	27.35	9.80	5.00	2.17	1.33
High-tech knowledge services	18.82	6.31	2.56	1.13	0.57
Financial services with high knowledge content	0.26	0.11	0.13	0.19	4.36
Services many other knowledge content	3.66	2.26	1.19	1.13	1.28
little market knowledge content	26.61	27.96	14.32	12.67	16.46
Total (%)	100	100	100	100	100

There are clear differences in the sectors in the groups of enterprises by the scale of foreign capital contribution. The enterprises with small capital contributions mainly focus on the service sector, while the majority of enterprises with large capital contributions operate in the manufacturing and processing industry (Table 2). In 2019, 76.7% of FDI enterprises with a capital contribution of less than US \$ 100 million operating in the service sector, and mainly market services. The distribution of services and manufacturing industry is quite even among the enterprises with a capital contribution of 100 to 500 million USD. However, a large proportion of enterprises in this group operate in low-tech manufacturing industries (19.71%) and market services with low knowledge content (27.96%). In enterprises with a higher capital contribution, over 70% of enterprises operating in manufacturing industries, of which the majority are still low-tech manufacturing industries. The high-tech

manufacturing and processing industry attracts more and more enterprises with a large capital contribution, while services with a high content of high-tech knowledge mainly attract small-scale enterprises.

From 2012 to 2019, there were nearly 6200 newly established FDI enterprises. In which, the accumulated capital up to the end of 2019 is less than 500 thousand USD, accounting for 56.89%, the scale from 1 to less than 5 million USD accounts for 17.75%. Regarding industries, these enterprises are still mainly operating in the market service industry with low knowledge content (25.27%) and low technology manufacturing industry (19.07%). Meanwhile, the high-tech manufacturing industry and high-tech services only accounted for 13.7 and 7.4% of the newly established FDI enterprises after 2012 (Appendix A, Table A3). Fig. 2 shows the regional distribution of enterprise groups by size of foreign capital contribution.

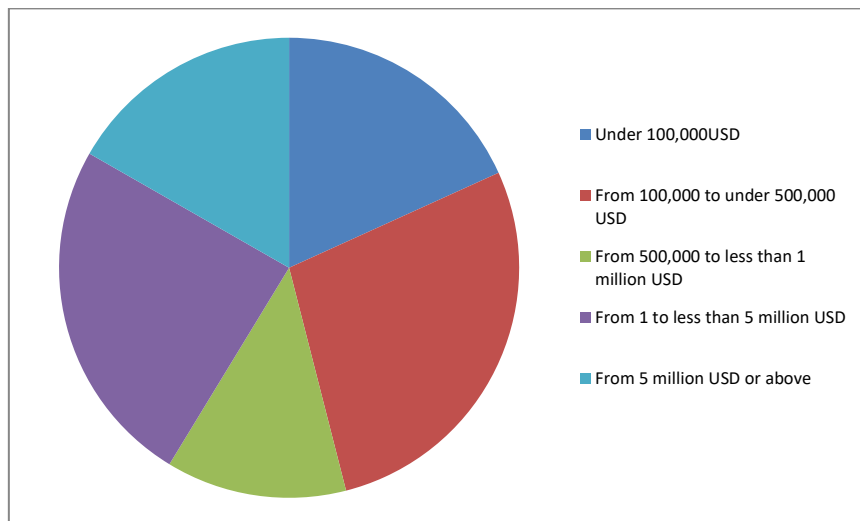


Fig. 2: Regional distribution of enterprise groups by size of foreign capital contribution. Note: Provinces not It is shown that the proportion of FDI enterprises in the province is 0.5% lower than the total number of FDI enterprises in the group. Small capital contribution: less than 500 million USD), average capital contribution: from 500 million to less than 5 million USD, large capital contribution: 5 million USD or more

With a small capital, contribution has a very high level of concentration. More than 44% of FDI enterprises with less than the US \$ 500,000 capital operate in Ho Chi Minh City, and about 22% operate in Hanoi (Fig. 2a). Enterprises with higher contributed capital are more dispersed, but still concentrated in provinces and cities in the Southern key economic region and the Northern key economic region (Fig. 2b, and Fig. 2c).

Fig. 3 shows the average size of capital contribution per enterprise with capital flows from key partners. It can be seen that there is not much difference in the size of capital contribution between countries. Scales of between US \$ 100,000 and the US \$ 500,000 and from the US \$ 1 to under the US \$ 5 million are still popular with most partners. In particular, investors from the United States, the United Kingdom, Singapore, and South Korea tend to contribute capital on a smaller scale than other countries. Investors from Taiwan, Thailand, Hong

Kong, and China tend to contribute capital with a larger and medium scale. The notable difference in the source of capital is that the proportion of Taiwanese enterprises having a capital contribution greater than the US \$ 1 million is higher than in other countries. 40% of total FDI enterprises from Taiwan operating in 2019 were capitalized at greater than the US \$ 1 million and operating in low and medium technology manufacturing industries.

4. Operational efficiency of FDI enterprises by the scale of foreign capital contribution

It is easy to see that the larger the capital scale, the bigger the average value of VAT per enterprise (Fig. 4a). In general, the average business value of enterprises by groups of foreign capital contributions increased in the period 2008-2019. However, enterprises with average capital contributions have a faster growth rate. Average VAT

of enterprises with capital contribution from over 500 thousand to less than 5 million USD increased, on average 10%/year in the period 2008-2019.

Meanwhile, the remaining groups increased by only 6-8% / year.

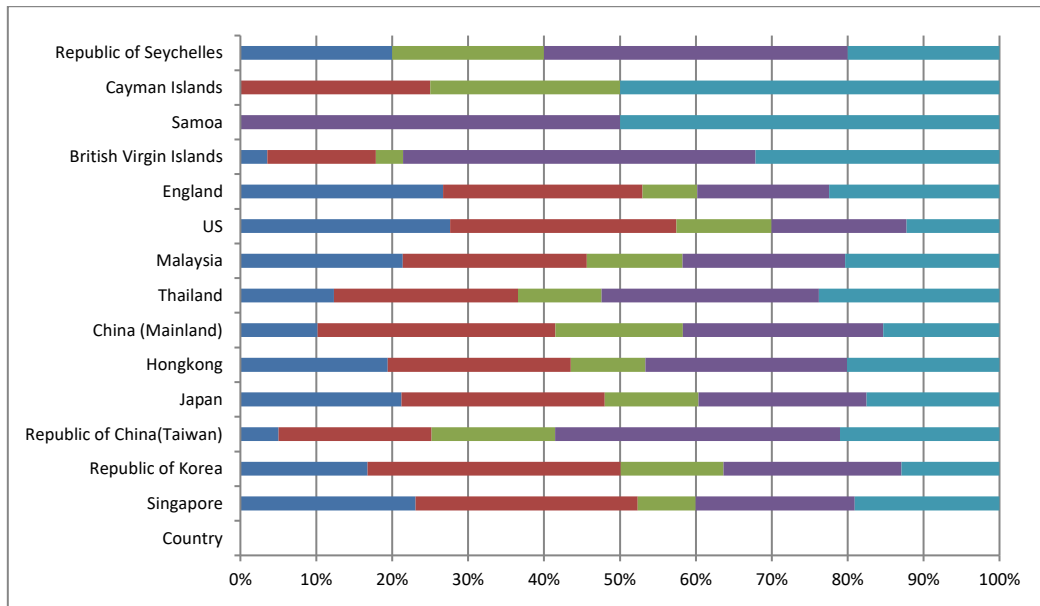


Fig. 3: Scale of capital contribution from key partners in 2019

Considering labor productivity calculated by the added value generated per unit of labor, Fig. 4b does not show a clear link between capital size and labor productivity in the period 2008-2019. Average productivity tends to increase for enterprises with an average capital contribution (from 1,000 thousand to less than 5 million USD). In particular, the group with capital contribution from 500 thousand to 1 million USD has a higher level of

productivity increase than other groups and becomes the second most productive group in 2019. In contrast, the productivity of the business group contributed capital of less than USD 100 thousand, and the group of enterprises with a large capital contribution (over USD 5 million) increased in the period of 2008-2012 but tended to decrease in the period of 2012-2019.

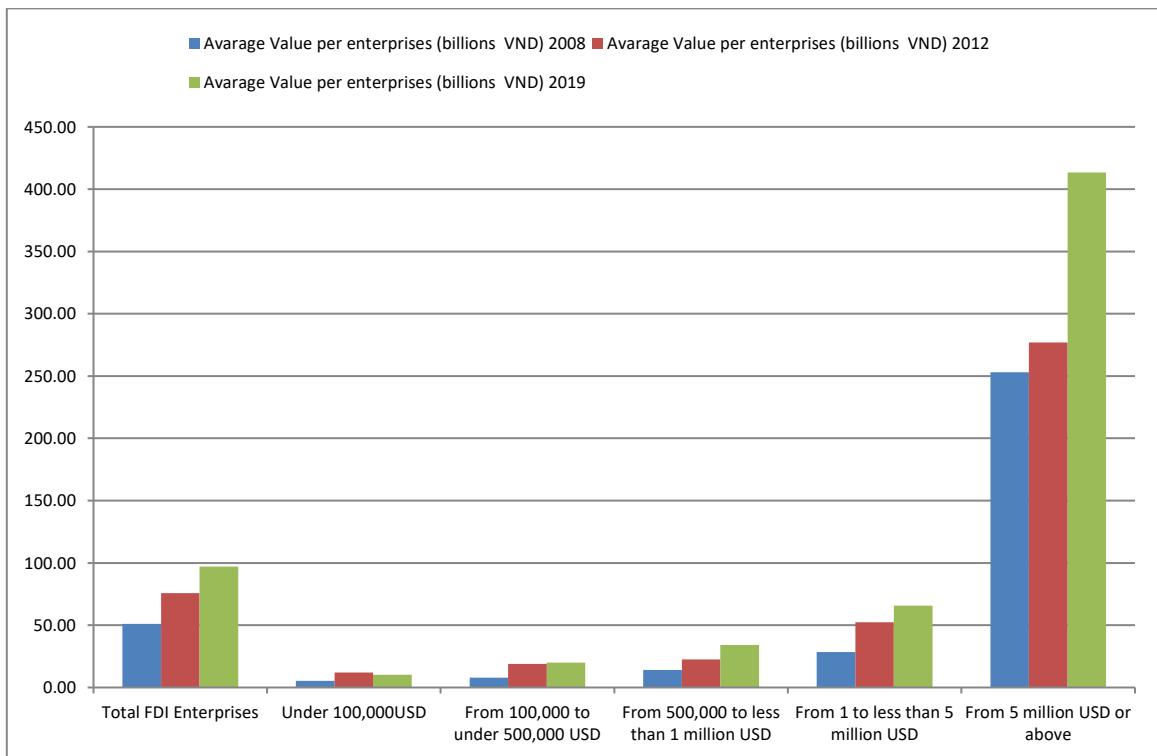


Fig. 4: Average value of 1 enterprise and average product capacity by capital contribution

For a more detailed assessment of changes in labor productivity, FDI enterprises are divided into

four groups (quadrant): (i) low initial levels, low growth (lagging groups); (ii) low initial levels, high

growth rates (emerging groups); (iii) high initial level, low growth (stable group); and (iv) high initial level, high growth rate (excellent group), with the 2008 productivity level and the average productivity growth rate for the period of 2019-2008 used to divide the XY space into four parts. From the 2008

enterprise survey and 2019 enterprise survey, the remaining observation sample of 3082 FDI enterprises operating in 2008 and 2019 had business results. Fig. 5 shows the distribution of these businesses.

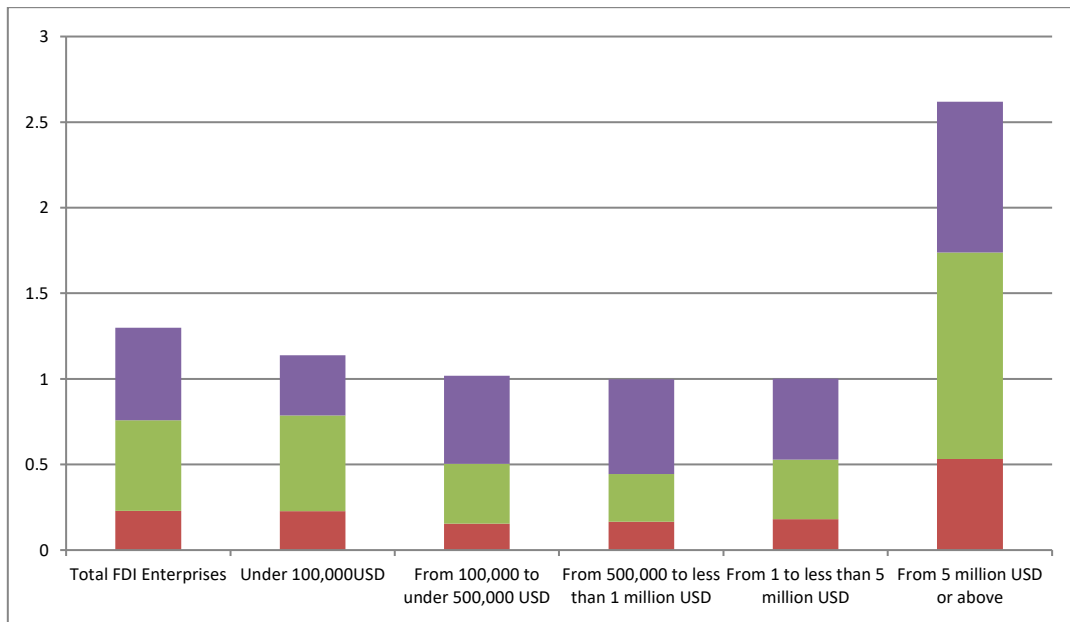


Fig. 5: Productivity efficiency of FDI enterprises in the period of 2008-2019

Over 65% of enterprises operating since 2008 are in the “lagging” group, and only 21% are in the emerging group. Stable and excellent groups accounted for only about 11% and 1.2% of the observed FDI enterprises, respectively. The remarkable point is that for nearly 10 years, FDI enterprises often tend to have a less sudden increase in contributed capital. Out of 3082 enterprises considered, 2046 (66.4%) of the enterprises were still in the same group of capital contributions. Only 827 (accounting for 26.7%) moved to the higher capital contribution group, and 209 (accounted for 6.7%) of the enterprises transferred to the lower foreign capital contribution group.

Although the majority of firms are in the “lagging” group, if we compare the proportion of the size group in the sample and the proportion in each

group by productivity performance, we can see that the productivity performance of the group Small and large scale of capital contribution is better than small and medium-sized groups. The large group only accounted for 14.47 in the total sample but accounted for more than 41% in the excellent group, while the proportion in the lagging group was only 12.74%. The small group accounted for 32.12% of the total observed sample, accounted for 32.18% in the lagging group, and accounted for 33.28% in the emerging group. Meanwhile, enterprises with capital contribution from the US \$ 500 to less than 5 million accounted for 53.41% of the total sample but only accounted for 55.08% in the lagging industry group, and accounted for 52.28% in the emerging group. Table 3 shows productivity by the scale of foreign capital contribution.

Table 3: Productivity by the scale of foreign capital contribution

Scale of foreign capital contribution 2008	Group				Total
	Lagging	Emerging	Stability	Excellent	
Less than USD 100,000	8.28	7.75	10.87	7.69	8.47
From 100 to under 500 thousand USD	23.9	25.53	20.11	12.82	23.65
From 500 thousand to less than 1 million USD	18.79	18.24	13.04	12.82	17.91
From 1 to less than 5 million USD	36.29	34.04	34.78	25.64	35.5
From 5 million USD and above	12.74	14.44	21.2	41.03	14.47
	100	100	100	100	100

The rate of enterprises with less than the US \$ 100,000 contributed capital and reported profits over the years maintained at less than 50%. However, the return on capital (ROA) and the return on equity (ROE) is the highest among the FDI enterprises. It can be seen that the percentage of enterprises reporting higher profits, but the profit rate tends to be lower in FDI enterprises with a

higher capital contribution. In general, for FDI enterprises, ROA does not change significantly, and there is no clear change trend. In contrast, the changing trend of ROE can be seen more clearly. ROE of enterprises with capital contribution from 100 thousand USD to less than 5 million USD tends to increase significantly in the period of 2008-2019, while ROE of enterprises with capital contribution

less than 100 thousand USD and larger 5 million USD are in a downward trend. Even so, the group of small-sized enterprises still has a higher ROE than

large-scale enterprises. Table 4 shows the performance of FDI enterprises by type of capital contribution.

Table 4: Performance of FDI enterprises by type of capital contribution

	Rate of enterprises with profit (%)			ROA (%)			ROE (%)		
	2008	2012	2019	2008	2012	2019	2008	2012	2019
less than USD 100 thousand	45.1	49,3	45.7	26.08	21.31	23.19	49.38	40.88	42.24
100 to less than 500 thousand USD	47.2	52.6	51.2	16.41	14.73	16.99	34.23	32,63	36.22
500 thousand to less than 1 million USD	49.9	54.7	57.7	12.20	12.12	13.21	24.52	26.14	27.55
from 1 to less than 5 million USD	48.0	58,0	58.6	10.51	10.55	11.63	20.97	23.46	24.57
from 5 million USD and above	56.2	62.7	63.2	10.89	9.46	11.24	23.50	20,76	22,46

Note: ROA and ROE are calculated for profitable businesses

5. Machinery qualifications and linkages with domestic enterprises

The analysis in this section is based on an observation sample of 1398 FDI enterprises in the manufacturing industry based on the data.

Enterprise surveys and surveys on the productivity of the manufacturing and processing industry 2019 were conducted by the General Statistics Office. The structure of capital size and technology level is shown in Table 5.

Table 5: Structure under capital and technology level of FDI enterprises processing industry built 2019

Scale foreign capital contribution	Technology level			Total
	Technology Low	Technology Average	Technology High	
Less than 100 thousand dollars	13	3	2	18
100 to less than 500 thousand USD	114	51	47	212
500 thousand to less than 1 million USD	93	66	58	217
from 1 to less than 5 million USD	304	169	128	601
from 5 million USD and above	164	85	101	350
Total	688	374	336	1,398

From Table 6, it can be seen that the rate of automation will be higher than in enterprises with contributed capital bigger. The rate of automation for enterprises with capital contributions under the US \$ 1 million is very low. For high-tech industries, the automation rate in FDI enterprises with foreign capital is more than 1 million USD, which is more

than two times higher than enterprises with a lower capital contribution scale. Meanwhile, for the medium technology industry, enterprises with a capital contribution of more than US \$ 5 million have significantly higher automation rates than enterprises with a smaller capital contribution.

Table 6: The level of the machinery manufacturing business in 2019 manufacturing and processing

	Automation rate (%)			
	Average	Low tech	Average Tech	High tech
100 thousand USD Under	5.56	7.69	0	0
100- to less than USD 500,000	12.74	15.79	5.88	12.77
From VND 500,000 to less than USD 1 million	12.90	10.75	16.67	12.07
From 1 to less than USD 5 million	19.47	17.43	18.93	25.00
From 5 million USD and above	28.00	22.56	36.47	29.70

Assessing the linkage of FDI enterprises with domestic enterprises is expressed through input supply. Table 6 shows that enterprises with small capital contributions have closer links with domestic enterprises. This linkage decreases gradually with the increasing size of capital contribution. For enterprises with a capital contribution of 5 million USD or more, the proportion of raw materials and domestic suppliers accounts for only 42.52%, of which, the number of long-term suppliers is Vietnamese enterprises, male accounts for only 43.05%. This shows that a significant proportion of small FDI enterprises in Vietnam are suppliers to larger FDI enterprises. (Table 7).

6. Conclusion

The statistics show that the small trend in FDI investment in Vietnam is increasing. After 2012, the

proportion of enterprises with small FDI capital increased rapidly, while enterprises with large FDI capital decreased. That comes from both operating businesses and new projects. The majority of enterprises operating before 2012 did not have a significant increase in foreign capital, while new projects were mainly small-scale and focused on low-knowledge market services and low tech manufacturing industries. In addition, businesses with small FDI capital of less than US \$ 1 million often have very low automation rates. This suggests that the concerns about the small scale of capital associated with outdated technology are well-founded.

On the other hand, the distribution structure is too focused on localities in the Northern key economic region and the Southern key economic region, especially in and adjacent to Ho Chi Minh City and Hanoi. This creates an imbalance in regional development, does not create the spread of FDI

enterprises to less advantageous localities. Enterprises with a small scale of FDI have the highest concentration. Therefore, if the downward trend of FDI projects continues to increase, the

concentration of FDI will likely increase. That poses challenges for local economic development, as well as increasing demand for socio-economic infrastructure in and around the two major cities.

Table 7: Input sources for FDI enterprises in 2019

	Ratio of domestic raw materials purchased (%)	Ratio of long-term supply partners is Vietnamese enterprises
Under 100 thousand USD	84.78	100
From 100 to less than 500 thousand USD	64.16	60.56
From 500 thousand to less than 1 million USD	56.25	57.61
from 1 to less than \$ 5 million	50.89	52.11
from \$ 5 million upwards	42.52	43.05

A positive point in attracting FDI in the period of 2008-2019 is the change in the structure of the industry with a positive trend with the increase of the proportion of high-tech manufacturing industries and high-content services high-tech knowledge. However, this change is slow. On the other hand, large FDI projects often focus on the manufacturing and processing industries. Although the proportion of projects in the low-tech sector is always the highest, it is not too different from the investment rate in the high-tech industry. On the contrary, there are few medium and large-scale projects, but mainly small-scale projects investing in high-tech knowledge service industries. This is a point to note because in addition to high-tech manufacturing industries such as electronics manufacturing, computers, electrical equipment, high-tech services such as telecommunications, computer programming, operations Information services, and research and development activities are also important in the Industry 4.0 era.

Regarding the performance of FDI enterprises, it can be seen that although the percentage of profitable enterprises is usually higher for the group with larger FDI scale, in the profitable FDI enterprises, enterprises have Small capital size maintains higher profit-to-equity ratio than large-scale enterprises. This may be one of the reasons for the increase of small FDI projects in Vietnam and the low proportion of enterprises increasing their capital contribution. In addition, the paper does not see clear statistical evidence of the relationship between capital source and project size.

In the period 2008-2019, 65% of FDI enterprises were in the group with low labor productivity and low productivity growth rate. Statistics show that large-scale FDI enterprises are often more productive. However, productivity tends to converge

when the average capital contribution group increases, so the average productivity of the large capital contribution group decreases after 2012.

Large-scale FDI enterprises Small capital contribution is more closely linked with domestic enterprises. This linkage decreases with the scale of FDI, in which large FDI enterprises have a large proportion of suppliers who are other FDI enterprises. Thus, it can be seen that a large number of small-scale FDI enterprises are satellites for other large FDI enterprises. This may be an obstacle for domestic enterprises to participate in the value chain of large FDI enterprises' products.

From the above conclusions, it can be seen that the trend of small FDI projects investing in Vietnam creates risks to the development of the FDI enterprises sector as well as in the implementation of Vietnam's sustainable development strategy during the period next time. Therefore, in the policy of attracting and using FDI capital, it is necessary to take measures to restrict small-scale projects, especially and small-scale projects investing in small market service industries, low content of knowledge, and technology manufacturing. In addition, large-scale projects in service industries with high levels of high-tech knowledge need to be encouraged and encouraged.

In summary, the strengths of this research are studied big FDI firms in Vietnam and showed that the FDI enterprises mostly are small and focus the low tech, polluted environment, low-income tax rate in the past time. This is opposite to [Hunady and Orviska \(2014\)](#) showed that the barriers to attract EU FDI are the high-income tax rates and labor costs. However, the weakness of this research still lacks the analysis of the high tech and large FDI firms, green FDI in Vietnam.

Appendix A: Industry classification and proportion of FDI enterprises by industry group

Table A1: NACE industry classification industry

Group (NACE)	Industry name according to VSIC 2007
Agriculture, forestry and fishery	Agriculture and related service activities Forestry and related service activities Fishing, aquaculture the
mining, power, water	mining of coal and lignite mining of metal ores other mining activity support services, mining and ore

	production and distribution of electricity, gas, hot water, steam and air-conditioning Exploiting, treating and supplying water Drainage and waste water treatment Waste collection, treatment and disposal activities; recycling scrap Building houses of all types Construction of civil engineering works Specialized construction activities Manufacture of medicines, pharmaceutical chemicals and medicinal materials Manufacture of electronic products, micro-machines and optical products Manufacture of chemicals and chemical products
Construction	Manufacture of electrical equipment Manufacture of unclassified machinery and equipment Manufacture of motor vehicles and trailers Manufacture of other means of transport Manufacture of coke, refined petroleum products Manufacture of rubber and plastic Manufacture of products from other non-metallic minerals Manufacture of metal Manufacture of products from prepared metal processing (except machinery and equipment) repair, maintenance and installation of machinery and equipment manufacturing and processing food and beverage production Manufacture of tobacco products Textile
High-tech industry	production Manufacture of clothing Production of leather and related products Wood processing and production of wood and bamboo products, cork (except beds, wardrobes, tables, chairs); producing products from straw, thatch and plaited materials Producing paper and paper products Printing, copying of records of all kinds Producing beds, wardrobes, tables, chairs Other processing and manufacturing Air transport Legal, accounting and auditing Activities of office buildings; management consultancy activities Architectural activities; technical testing and analysis Advertising and market research Other professional, scientific and technological activities Labor service activities and employment Security investigation activities Cinematographic activities, television program production, recording and music publishing Radio and television broadcasting Telecommunications Computer programming, consulting services and other computer-related activities computer activity information service scientific research and development of Activity financial services (excluding insurance and social insurance), insurance, reinsurance and social insurance (except compulsory social security) Other financial activities Publishing activities of travel agencies, tour operators and support services Education and training Medical activities Concentrated care and nursing activities Creative, artistic activities and recreation Libraries, archives, museums and other cultural activities Lottery, betting and gambling Activities Sports, recreation and recreation Activities of associations and organizations other Veterinary Activity Sale, repair of automobiles, motors, motorbikes and other motor vehicles Wholesale (except automobiles, motors, motorcycles and other motor vehicles) Retail sale (excluding automobiles, motors, motorcycles and Other motor vehicles) Rail transport, road transport and pipeline transportation Warehousing and support activities for postal and delivery transportation Accommodation services Food service Real estate business Cho hire machines and equipment (without operators); personal and family equipment rental; rental of non-financial intangible assets Services of cleaning houses, buildings and landscapes Administrative activities, office assistance and other business support activities Repair of computers, fish products and family service activities other personal service
Processing industry technology creation	
manufacturing low-tech	
industries Market services knowledge content	
Service of high levels of public knowledge hi-tech	
financial services more content knowledge	
Services with a high level of knowledge c Other	
Service market little content knowledge	

Table A2: Number and proportion of FDI enterprises by industry group

	2008	2012	2019
Entire FDI enterprises	5229	7743	12598
Of which:			
Agriculture, forestry and fishery	89	94	106
Mining, Electricity, water	37	55	67
Construction	141	316	578
Manufacturing industry	3724	4756	7048
In which:			
Low-tech manufacturing industry	1856	2260	3148
	(49.84)	(47.52)	(44.67)
Manufacturing industry Medium technology	962	1286	1953
	(25.83)	(27.03)	(27.71)

High-tech manufacturing industry	906 (24.33)	1210 (25.45)	1947 (27.62)
Services	1238	2522	4799
In which:			
Services with knowledge-rich market	288 (23.26)	610 (24.19)	1146 (23.88)
High-tech knowledge services	216 (17.45)	386 (15.31)	741 (15.44)
Financial services with high knowledge content rich financial services	61 (4.93)	92 (3.65)	110 (2.29)
Other knowledge-	110 (8, 89)	171 (6.78)	244 (5.08)
Market with low knowledge content	563 (45.47)	1263 (50.07)	2558 (53.31)

Note: in () is the ratio % of total FDI enterprises in manufacturing industry, and % of total FDI enterprises in service industry in the year.

Table A3: Business structure starting operation after 2012

	Under USD 100,000USD	From 100 to under USD	500,000 From VND to less than 1 million USD	From 1 to less than 5 million USD	From 5 million USD and above	Total
Number of businesses	1576	2089	676	1086	691	6118
%	(25.76)	(34.15)	(11.05)	(17.75)	(11.29)	(100)
Of which:						
Agriculture, forestry and fishery	3 (0.19)	13 (0.62)	5 (0.59)	11 (1.01)	9 (1.30)	40 (0.65)
Mineral, electricity, water	3 (0.19)	5 (0.24)	5 (0.74)	7 (0.64)	12 (1.74)	32 (0.52)
Construction	111 (7.04)	168 (8.04)	30 (4.44)	35 (3.22)	19 (2.75)	363 (5.93)
Low-tech manufacturing industries	110 (6.98)	336 (16.08)	179 (26.48)	325 (29.93)	217 (31.40)	1167 (19.07)
Average technology manufacturing	84 (5.33)	259 (12.40)	136 (20.12)	224 (20.63)	109 (15.77)	812 (13.27)
High-tech manufacturing industry	58 (3.68)	262 (12.54)	143 (21.15)	237 (21.82)	139 (20.12)	839 (13.71)
Market-based services with high levels of knowledge	406 (25.76)	205 (9.81)	37 (5.47)	34 (3.13)	20 (2, 89)	702 (11.47)
DV of high-tech knowledge	290 (18.40)	126 (6.03)	15 (2.22)	13 (1.20)	8 (1.16)	452 (7, 39)
Financial services with a lot of knowledge	4 (0.25)	3 (0.14)	0 0.00	3 (0.28)	26 (3.76)	36 (0.59)
Services with a lot of knowledge Other	52 (3.30)	42 (2.01)	9 (1.33)	17 (1.57)	9 (1.30)	129 (2.11)
Low market knowledge	455 (28.87)	670 (32.07)	118 (17.46)	180 (16.57)	123 (17.80)	1546 (25.27)
Total	1576 (100)	2089 (100)	676 (100)	1085 (100)	691 (100)	6118 (100)

Acknowledgment

This research is a product of the National Research Project KX01.28/16-20 “Developing foreign direct investment sector in implementing Vietnam's sustainable development strategy.”

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

References

- Hunady J and Orviska M (2014). Determinants of foreign direct investment in EU countries—Do corporate taxes really matter? *Procedia Economics and Finance*, 12: 243-250. [https://doi.org/10.1016/S2212-5671\(14\)00341-4](https://doi.org/10.1016/S2212-5671(14)00341-4)
- Jabri A and Brahim M (2015). Institutional determinants of foreign direct investment in MENA region: Panel co-integration analysis. *Journal of Applied Business Research*, 31(5): 2001-2012. <https://doi.org/10.19030/jabr.v31i5.9417>
- Jabri A, Guesmi K, and Abid I (2013). Determinants of foreign direct investment in MENA region: Panel co-integration analysis. *Journal of Applied Business Research*, 29(4): 1103-1110. <https://doi.org/10.19030/jabr.v29i4.7976>
- Jensen NM (2003). Democratic governance and multinational corporations: Political regimes and inflows of foreign direct investment. *International Organization*, 57(3): 587-616. <https://doi.org/10.1017/S0020818303573040>
- Jouili T (2018). Determinants of foreign investment in maritime nations. *International Journal of Advanced and Applied Sciences*, 5(5): 43-47. <https://doi.org/10.21833/ijaas.2018.05.006>
- Kumar N (1994). Determinants of export orientation of foreign production by US multinationals: An inter-country analysis. *Journal of International Business Studies*, 25(1): 141-156. <https://doi.org/10.1057/palgrave.jibs.8490196>
- Kwiatkowski D, Phillips PC, Schmidt P, and Shin Y (1992). Testing the null hypothesis of stationarity against the alternative of a unit root. *Journal of Econometrics*, 54(1-3): 159-178. [https://doi.org/10.1016/0304-4076\(92\)90104-Y](https://doi.org/10.1016/0304-4076(92)90104-Y)
- Lei HS and Chen YS (2011). The right tree for the right bird: Location choice decision of Taiwanese firms' FDI in China and Vietnam. *International Business Review*, 20(3): 338-352. <https://doi.org/10.1016/j.ibusrev.2010.10.002>
- Loree DW and Guisinger SE (1995). Policy and non-policy determinants of US equity foreign direct investment. *Journal*

- of International Business Studies, 26(2): 281-299.
<https://doi.org/10.1057/palgrave.jibs.8490174>
- Louail B (2019). Determinants of foreign direct investment in Arab countries during 1970–2016. *International Journal of Advanced and Applied Sciences*, 6(3): 102-110.
<https://doi.org/10.21833/ijaas.2019.03.015>
- Mina W (2007). The location determinants of FDI in the GCC countries. *Journal of Multinational Financial Management*, 17(4): 336-348.
<https://doi.org/10.1016/j.mulfin.2007.02.002>
- Mina WM (2012). The institutional reforms debate and FDI flows to the MENA region: The “best” ensemble. *World Development*, 40(9): 1798-1809.
<https://doi.org/10.1016/j.worlddev.2012.04.026>
- Moosa IA (2009). The determinants of foreign direct investment in MENA countries: An extreme bounds analysis. *Applied Economics Letters*, 16(15): 1559-1563.
<https://doi.org/10.1080/13504850701578819>
- Nnadi M and Soobaroyen T (2015). International financial reporting standards and foreign direct investment: The case of Africa. *Advances in Accounting*, 31(2): 228-238.
<https://doi.org/10.1016/j.adiac.2015.09.007>
- Parker S, Phan VQ, and Nguyen NA (2005). Has the US-Vietnam bilateral trade agreement led to higher FDI into Vietnam? *International Journal of Applied Economics*, 2: 199-223.
- Pesaran MH (1997). The role of economic theory in modelling the long run. *The Economic Journal*, 107(440): 178-191.
<https://doi.org/10.1111/1468-0297.00151>
- Pesaran MH and Shin Y (1998). An autoregressive distributed-lag modelling approach to cointegration analysis. *Econometric Society Monographs*, 31: 371-413.
<https://doi.org/10.1017/CBO9781139052221.011>
- Pesaran MH, Shin Y, and Smith RJ (1999). Bond testing approach to the analysis of long run relationship. *Journal of the American Statistical Association*, 94: 621-634.
<https://doi.org/10.1080/01621459.1999.10474156>
- Rogmans T (2013). Location and operation mode decision making in the Middle East: A case study approach. *Journal of Strategy and Management*, 6: 190-206.
<https://doi.org/10.1108/17554251311322440>
- Tran TQ (2009). Sudden surge in FDI and infrastructure bottlenecks: The case in Vietnam. *ASEAN Economic Bulletin*, 26: 58-76.
<https://doi.org/10.1355/AE26-1E>
- Xuan V, Thu N, and Anh N (2020a). Factors affecting support services in small and medium enterprises: Evidence from Vietnam small and medium information technology enterprises. *Management Science Letters*, 10(2): 303-312.
<https://doi.org/10.5267/j.msl.2019.9.001>
- Xuan V, Thu N, and Anh N (2020b). Factors affecting the business performance of enterprises: Evidence at Vietnam small and medium-sized enterprises. *Management Science Letters*, 10(4): 865-870.
<https://doi.org/10.5267/j.msl.2019.10.010>
- Xuan VN (2020). Factors affecting foreign direct investment: Evidence at foreign technology enterprises in Vietnam. *International Journal of Advanced and Applied Science*, 7(4): 21-28.
<https://doi.org/10.21833/ijaas.2020.04.004>
- Zouita MS, Louail B, and Mameche Y (2019). The impact of the local SMEs sector on FDI and the mediating effect of IFRS adoption in developing economies: The case of Algeria. *International Journal of Advanced and Applied Sciences*, 6(11): 120-129.
<https://doi.org/10.21833/ijaas.2019.11.015>