Efficiency of Foreign-Invested Transport Companies

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ABSTRACT

The paper estimates technical performance of foreign-invested and local companies by analyzing a dataset for 11,210 companies in transport, warehousing and communication sector established by the GSO in 2010 and SFPF parameters. The results show that the average efficiency score of companies in this industry is 53.46%.

These results also challenge the argument that performance of foreign-invested companies is always higher than that of local ones. On the contrary, type of companies is the main factor that affects the performance of foreign-invested companies in Vietnam

JEL classification: F23, D24, C23.

Keywords: Foreign-invested companies, technical efficiency, stochastic frontier production function (SFPF), Vietnam

1. INTRODUCTION

There have been numerous researches on efficiency of foreign direct investment, and many of them, such as Xiaming Liu (2000) and Nurhan Aydin (2007), found that foreign-invested companies in developing countries gained a better performance than local ones.

Many others, however, saw no difference in business performance between foreign-invested and local companies. Peter Rowland and Banco de la Repyusblica (2006) surveyed 7,001 companies in Colombia and found that marginal profit of foreign-invested companies is lower than that of local ones. Employing data about 186 listed companies and TFP, Eyup Basti and Ahmet Akin (2008) also found no difference in productivity between foreign-invested and local companies. Combining parametric approaches to data for 25,411 industrial companies in 2005-2009, Ngô and Phan (2011) [1] demonstrated that not all foreign-invested companies gained better performance in comparison with local ones, and the difference was determined by type of companies [2] and sub-industry groups

In the coming years, Vietnam should accelerate its economic growth rate to move away from the group of low-income countries. This objective requires the best use of all possible potentials and resources both at home and abroad. This paper tries to provide policy makers with a suggestion about ways to attract and employ effectively foreign direct investment

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2. DATA AND METHODOLOGY

a. Data:

Dataset from the GSO Enterprise Survey 2009 comprises 248,718 observations with principal information about operations and characteristics of enterprises and their owners. The research, however, only employs data from 11,210 companies in transport, warehousing and communication.

b. Methodology:

- Theory of production function: The paper uses the most common production function in traditional theory, the Cobb-Douglas one:

$Y = AL\alpha K\beta$

where Y = total production, L = labor input, K = capital input, A = total factor productivity; while α and β are the output elasticities of labor and capital, respectively. These values are constants determined by available technology. If α + β = 1, the production function has constant returns to scale, α + β > 1, returns to scale are increasing; and if α + β < 1, returns to scale are decreasing.

When perfect competition exists, α and β could be seen as shares of labor and capital in output.

- Factors affecting corporate activities and performance:

To estimate factors that affect performance of companies in transport, warehousing and communication sector, we should estimate the stochastic frontier production function. This model is developed by Aigner et al. (1997) [3] and Meeuseng & Van Den Broeck (1997) [4]:

$$Y_i = (X_i, \beta)e^{v_i - u_i}$$

where Y_i is value of production for the firm i, X_i is a vector of N inputs used by the firm i, , β is a vector of technology parameters to be estimated, v_i is a two-sided random normally distributed variable, u_i is the non-negative technical inefficiency component, $N(0,\sigma_v^2)$ → with zero mean and variance σ_v^2 assumed as independently distributed of the u_i.

Factors that produce certain effects on technical efficienct of Vietnamese companies are (i) characteristics of firms (ownership, size, operating years), (ii) characteristics of firm owners (age, nationality, and education).

To analyze determinants of technical inefficiency, μ_i is considered as a function of the following explanatory variables (Coelli et al., 1998):

$$\mu_i = \delta_0 + z_i\delta + \omega_i$$

where z_i is a vector of explanatory variables associated with the technical inefficiency, δ is a vector of unknown coefficients, ω_i is defined by the truncation of normal distribution with zero mean and variance σ_v^2 , or $N(0,\sigma_\omega^2)$, and point of truncation is $-(\delta_0 + z_i\delta)$ (Battese & Coelli, 1995) [5].

The model can be re-written in a form of translog as follows:

$$\ln Y_i = \beta_0 + \beta_1 \ln K_i + \beta_2 \ln L_i + \beta_3 \ln K_i \ln L_i + \beta_4 (\ln K_i)^2 + \beta_5 (\ln L_i)^2 + v_i - u_i$$

where Y_i is the total value of output by the firm i; and K_i, L_i are two factor inputs (capital and labor) for the firm i.

If interaction coefficients and those of squared variables equal zero, the model has features of Cobb-Douglac function. To test exactitude of the model, the likelihood ratio is employed. The model for factors affecting the technical efficiency is as follows:

$$\mu_i = \delta_0 + \delta_1 fdi + \delta_2 fdi\_nn + \delta_3 fdi\_tn + \delta_4 dntn + \delta_5 nho + \delta_6 vua + \delta_7 lon + \delta_8 year\_hd + \delta_9 age + \delta_{10} quoctich\_vn + \delta_{11} tren\_dh + \delta_{12} cd\_tc + \delta_{13} daynghe + \omega_i$$

where fdi, fdi_nn, fdi_tn, nho, vua, lon, year_hd, age, quoctich_vn, tren_dh, cd_tc, daynghe are variables representing forms of ownership (foreign-owned company, joint venture between state-owned and foreign companies, and joint venture between local and foreign companies), size of firms (small, medium, and large), log of operating years of the firm; age and nationality of firm owner, education of firm owner (post graduate, graduate, technical secondary education, and vocational school).

3. RESULTS OF ESTIMATION

a. Results of Analysis of Revenue:

Table 1: Regression of factors affecting the revenue

Revenue	Result
Capital (logarithm)	0.382 (9.64)**
Labor (logarithm)	1.152 (25.10)**
Capital square (logarithm)	0.004 (1.03)
Labor square (logarithm)	-0.084 (10.65)**
Labor (logarithm) * Capital (logarithm)	0.009 (1.00)
Constant	2.476 (19.30)**
Observations	11,210
σ_u	.8881613
σ_v	.9166683
$\lambda = \sigma_u/\sigma_v$	.9689015
σ^2	1.629111

Note: **, *: statistically significant at 1% and 5% respectively

Table 1 shows that both labor and capital have positive effects on revenue of the firm as regression coefficients are positive and statistically significant. Labor, however, has a greater effect in comparison with capital. Quadratic regression coefficient of labor is negative and statistically significant, implying that the return to scale is decreasing (inverted-U relation).

Return to scale equals the sum of two output elasticities of inputs, the average economic scale of transport, warehousing and communication sector is pretty high (1.534) implying that companies in this sector gain a very high efficiency.

As shown in Table 1, these companies gain coefficient $\lambda = 0.9689$, revealing that inefficiency is mostly caused by non-technical noise.

- Factors affecting technical efficiency:

Table 2: Regression of factors affecting technical efficiency of companies in transport, warehousing and communication sector

Technical efficiency	Result
Foreign-owned companies	0.001 (0.03)
Joint ventures between state-owned and foreign companies	0.031 (1.19)
Joint ventures between private and foreign companies	0.075 (3.80)**
Private companies	-0.003 (0.35)
Small-sized companies	0.016 (4.81)**
Medium-sized companies	0.006 (0.49)
Large-sized companies	0.062 (6.00)**
Operating years of the company	0.011 (3.67)**
Company owner's age	-0.041 (4.87)**
Owner with Vietnamese nationality	-0.022 (1.33)
Owner with tertiary education	0.006 (1.36)
Owner graduating from 3-year colleges and technical high schools	-0.021(4.02)**
Owner taking vocational courses	-0.022 (4.68)**
Constant	0.692 (18.32)**
Observations	11,210
R^2	0.02

Note: **, *: statistically significant at 1% and 5% respectively

Table 2 shows that except for two variables presenting firm owner's education, most variables have expected signs and statistical significance at 1% and 5% levels.

Variable "Joint ventures between private and foreign companies" is positive and statistically significant implying that this class of companies gains better performance than state-owned ones do. On the other hand, the research finds no difference in performance between state-owned companies and private ones, and joint ventures between state-owned and foreign companies

In their research, Koen De Backer and Leo Sleuwaegen (2001) [6] find that foreign-invested companies in Belgium gain a better performance than local ones do. Phan Thị Liên and Ngô Quang

Thành (2011) also find that state-owned companies in Vietnam tend to be less efficient than joint venture between private and foreign companies.

The results show that companies with workforces of 10 to 200 and larger than 300 enjoy a higher efficiency than companies with less than 10 employees. This reveals that most surveyed companies are labor intensive. Companies of large size usually enjoy better public image and competitive advantages the the small-sized do.

Variable 'Operating years" is positive and statistically significant at 1% implying that older companies enjoy a better technical efficiency than the younger ones. Similarly, Jovanovic (1982) and Packes & Ericson (1987) find that older large-sized firms obtain a better performance than the newly established large-sized ones do.

It is possible that the older companies have gained a stable market share and workforce and enhance successfully their public images. In recent years in particular when more attention have been paid to safety and quality of products, famous and prestigious brands have attracted more customers.

My research also finds that companies of young owners tend to gain a high performance in comparison with firm with loder owners. It is possible that young businesspersons usually better adjust to changes in the market. Moreover, they are alert to changes in customers' tastes, and ready to take risks and opportunities, thereby gaining big profits. With better language skills, young businesspersons can also develop relation with foreign partners to improve their business performance.

It is worth noting that education background of firm owners has no effect on performance of companies in transport, warehousing and communication sector. No difference is found in performance between companies whose owners have university degrees and those only attaining secondary education. Moreover, some companies whose owners are graduates from 3-year colleges, technical high schools or vocational training centers have a poorer performance than companies whose owners only attain secondary education to a certain degree.

It is possible that several firm owners are skilled workers who gain a good knowledge of market demand and tastes before deciding to form companies of their own. On the other hand, graduates from universities are usually reluctant to take risks while many employment opportunities are open to them, and as a result, they tend to take job in banking, education or research sectors.

To have a better understanding of performance of companies in the surveyed sector, we examine the efficiency of these companies in terms of their ownership, size and sub-industry

Table 3: Technical efficiency of companies by their ownership (%)

Type of companies	Average efficiency	Observations
State-owned companies	56.95	289
Private companies	53.20	10,619
Foreign-owned companies	56.76	59
Joint venture between state-owned and foreign	60.65	47
Joint venture between private and foreign companies	63.46	124

Joint ventures are enjoying a higher efficiency than local companies do while joint venture between private and foreign companies enjoy the highest efficiency (their average technical efficiency score is 63.46%). On the contrary, efficiency of foreign-owned companies is lower than that of state-owned ones. It is possible that foreign-owned companies can only invest in a limited number of industries and they have not grasped tastes of local consumers while joint ventures can make the best use of strengths of both local and foreign partners to develop effective strategies to enhance their efficiency.

Another reason is the difficulty that the government faces in controlling foreign-owned companies without its representatives working there while foreign-owned companies usually make their cost swell up by praticing transfer pricing. This allows the foreign-owned companies to declare losses and avoid corporate income taxes while their parent companies gain huge profit.

Limited sources of capital, technologies, managerial skills and small size reduce competitiveness of local private companies in both domestic and foreign markets. As a result, their efficiency is the lowest, only 53.10%.

Table 4: Technical efficiency of companies by sub-industry (%)

Type of companies	Average efficiency	Observations
Railroad transport	51.66	10
Road transport	54.08	6,263
Pipeline transport	95.92	1
Coastal and sea shipping	47.10	519
Waterway transport	48.11	546
Air transport	62.26	15
Transport support services	55.13	2375
Tourism	52.46	1,118
Post	55.53	131
Telecommunication	49.77	232

Table 4 shows that companies supplying coastal and sea shipping and waterway transport services have the lowest efficiency, 47.10% and 48.11% respectively. Companies in this business suffer higher degrees of risk and higher maintenance cost for their ships in comparison with suppliers of road transport services.

Table 4 also shows that the highest efficiency (62.26%) is found in suppliers of air transport services besides pipeline transport companies. Convenience, high speed, and relatively decreased fare make air transport a favorable option for customers. Additionally, Vietnam is increasingly open to foreign tourists and businesspersons, and competition between airlines is not keen, which allows them enjoy very high profits.

3. CONCLUSIONS AND RECOMMEMDATIONS

a. For Transport and Warehousing Companies:

Private companies in this sector are suffering a low efficiency in comparison with their competitors, they therefore should improve quality and professionalism of their services, develop service packages, and enhance support services to strengthen connections between different means of transport and reduce intermediary agents. Additionally, they should provide their employees with training courses in managerial and technical skills and import new technologies to improve service quality, supply large-scale logistics services and enhance customers' confidence in their services. Cooperation with foreign partners is also an effective way to secure new technology, source of finance and business experience.

To compete against well-established foreign companies, newly formed companies should analyze market segmentation and target groups of customers neglected by other companies. Their services and products should be of high quality, well differentiated, and more user-friendly than those supplied by other companies. Proper attention should be paid to customer care and competitive pricing.

b. For the Government:

The Government should improve policies on this sector and avoid overlaps between various policies and regulations that may hinder business operations. Incentives and other support measures (such as supply of business information, easier access to land stock, preferential treatment, etc.) can be taken to encourage foreign investment in transport services, especially in foreign-owned companies that are suffering a poor efficiency in comparison with that of state-owned companies and joint ventures. Private suppliers of warehousing and transport services should be encouraged to engage in joint ventures with foreign partners while state-owned transport and warehousing companies can be privatized to improve the business performance of the whole sector.

Plans to develop the infrastructure should be well-designed and properly implemented to serve development of logistics services. Such plans should be made at the national level and based on a long-term vision to make the best use of Vietnam's advantages to enjoy an overall effeciciency and avoid overlaps between investment plans■

Notes:

[1] Ngô & Phan (2011), "Do FDI enterprises work more efficiently than domestic ones in Vietnam? Evidence from panel data analysis", presented at VEAM conference, 2011: available at http://www.depocenwp.org/

[2] Foreign-invested companies are divided into: foreign-owned companies, joint venture between local private companies and foreign partners, and joint venture between state-owned companies and foreign partners

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