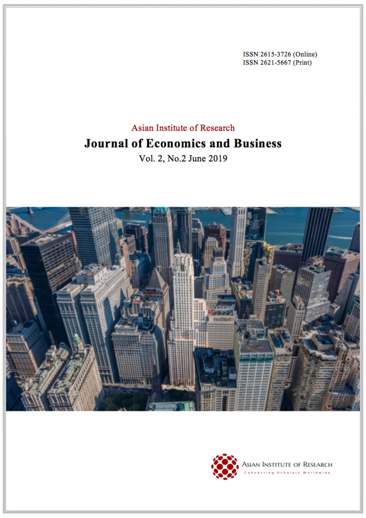

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Measuring the Scale Efficiency of Agricultural SMEs Exporting in Vietnam

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Abstract
The paper uses data envelope analysis model to measure the scale effect of agricultural SMEs exporting in Vietnam in the period of 2010 - 2015 and use the Tobit regression model to assess the impact of factors such as region, domain, inventory, salary, capital, tax to affect the scale of enterprises in research. Results from the model show that in the 2010-2015 period, the number of enterprises reaching the optimal scale is very small. Businesses operating at the increasing return to scale accounted for more than 90%. In addition, enterprises operating in an efficient scale are mainly in the Southern region, factors such as wages/labor and capital/labor ratio have a positive impact and tax and survival factors. The warehouse has a negative impact on the scale efficiency of businesses. Since then, the author analyzes and draws conclusions and some policy recommendations for the Government and small and medium-sized agricultural exporters.

Keywords: Data Envelopment Analysis (DEA), Tobit Regression, Scale Efficiency, Small Medium Enterprise, Export Agricultural Products.

1. Introduction

The term "scale efficiency" is mentioned a lot in economics, which is a concept that shows the level of efficiency when businesses change the scale of operations. When businesses make decisions operate with how much inputs and outputs, they will encounter 3 situations: scale efficiency: achieved when the amount of input increases n times and the output increases more than n times; non-effective scale: achieved when the input volume increases n times and the output increases less than n times; Constant effect on scale: achieved when the input volume increases n times and the output also increases to n times.

Evaluating scale efficiency by the econometric model is a relatively new assessment of efficiency in Vietnam. Currently, most researchers around the world use quantitative methods to measure the scale efficiency of businesses or industries by two econometric models, the data envelope model (DEA) and Random boundary analysis parametric model (SFA). In particular, DEA model is most commonly used due to the flexibility of using input and output variables, including the flexibility of the number of variables. Therefore, the author selected the DEA model to evaluate the efficiency of small and medium-sized exporters in the agricultural sector. From that assessment, the author has a basis to come up with measures to improve the efficiency of the scale of businesses in the industry, contributing to promoting the development of agricultural exports in Vietnam. The selection of small and medium-sized exporters in the agricultural sector for research is explained by a number of reasons. Firstly, in Vietnam, small and medium enterprises play a very important role in the economy. According to the General Statistics Office (2015), among the total number of enterprises in the country, SMEs account for nearly 98% of enterprises, employing nearly 60% of the labor force, producing more than 40% of consumer goods and contributing 47% of GDP and 40% of the State budget. The proportion of exports of small and medium enterprises accounts for 25% of the total export turnover of the whole country; investment of this sector accounts for about 35% of the total social investment capital; contributing 40% of GDP; 30% of the total state budget revenue (state budget); For many countries around the world, including developed countries, the role of small and medium enterprises is still highly appreciated.

According to data published by the European Commission (EC), the number of small and medium enterprises accounts for the absolute majority in the total structure of enterprises, usually from 90% - 98%. In EU countries, about 90%, in the US: 98%, in the Asia-Pacific region: 96%, in Japan: 98% and in Vietnam is about 98%. The number of employees that small and medium enterprises use is also quite large. In the Asia-Pacific region, small and medium-sized enterprises employ over 60% of workers, about 75% in Japan. The contribution of small and medium enterprises to economic growth is quite high. In the EU region, these businesses generate about 65% of total sales; in the US, it is over 50% of the total GDP. In Vietnam, small and medium enterprises also use a lot of labor, especially local and rural workers (accounting for nearly 60%). The importance of small and medium-sized enterprises is undeniable. Among them, many businesses have the potential to become large-scale businesses and operate much more efficiently. To motivate these businesses to expand their production scale appropriately, the Government needs to take effective measures to support them. These specific measures will be discussed in more detail in the study. Secondly, Vietnam's agricultural exports are considered to be key points in the country's priority export policies. The export of agricultural products contributes significantly to the accumulation of capital for the industrialization process of the country, settling jobs for workers, reducing the trade deficit, reducing stress in the balance of bars. Math as well as foreign currency demand. The export of agricultural products directly affects the lives of farmers in many ways. With exporting, a surplus of agricultural products on the domestic market will be resolved, re-establishing supply and demand relations at higher prices, farmers not only sell agricultural products but also sell prices. This activity makes farmers have a higher income, thereby increasing the purchasing power of the population in the vast rural market with the majority of the population. This is a driving force behind the domestic production process. Moreover, the export of agricultural products will maximize the advantage of Vietnam in terms of climatic conditions, national resources, human resources ... New economies such as farm economy, small-scale rubber, voluntary cooperative groups, new-style cooperatives ... the export of agricultural products become more important than ever, and this activity will contribute an important part to promote new economic models to develop. It can be said that agricultural exports are also an advantage of Vietnam with more than two-thirds of the population living in rural areas, nearly 50% of workers working in the agricultural sector, contributing nearly 20% to GDP, approximately 17% of total export turnover. The labor rate of the sector accounts for nearly 50% of the total number of employees in the country, particularly agricultural exports account for nearly 18% of the total export value (OECD (2015)). In 2016, agriculture accounted for 13% of GDP, 45% of jobs, and 20% of exports (according to the General Statistics Office). The role of agricultural exports is very clear, and in order to carry out export activities, the importance of export enterprises in the industry must be mentioned. These businesses can be export processing enterprises or trading in agricultural products. Most of these enterprises in Vietnam are operating at small and medium scale. Third, these small and medium-sized enterprises face many obstacles in increasing the scale of operations. These are policies that support the expansion of production scale, and businesses themselves need to have awareness in governance about when to expand their scale. In addition, government policies need to focus more on factors that affect the scale efficiency of businesses. Therefore, it is necessary to have an assessment through the econometric model to quantify and increase the persuasion of the efficiency of the scale of enterprises. The econometric model will only show how these businesses operate, effective or ineffective by scale. At the same time, it is also possible to point out the factors that have positive or negative impacts on the scale of business activities. Since then, the author has analyzed to make conclusions more reliable, and the solutions given will be more convincing.

2. Methodology

Data Envelopment Analysis (DEA) was first introduced in 1978 by Charnes, A., Cooper, WW, and Rhodes, E. This model was developed from Farrell's technical efficiency measures in 1957. DEA is Non-parametric methods can solve a problem with multiple inputs and multiple outputs at the same time, this method focuses on determining the relative best operating boundary, not focusing on the characteristics of the middle trend. So it can identify the potential that Decision-making units (DMUs) are ineffective can improve efficiency. Currently, the DEA model is widely used when measuring or determining the efficiency or scale of business performance.

Purwanto (2014) publishes the research "Efficiency of Small- and Medium-sized Tofu Enterprises (SME) in Salatiga using Data Envelopment Analysis (DEA)" (Using data envelope analysis method for the effectiveness of businesses small and medium enterprises produce tofu in Salatiga). Main content: the rise of the US dollar price against the Rupee in September 2013 has affected all industries in Indonesia, especially tofu businesses. Increasing raw material prices is a big challenge for businesses. DEA analysis helps to assess the productivity of small and medium enterprises (SME) relatively. These samples are from 31 of 66 small and medium tofu businesses in Salatiga. The results show that 4 of the businesses selected for research have scale efficiency, 8 are technically efficient, and 23 are ineffective. Thus, in order to increase the productivity of these enterprises, it is necessary to reduce the input factor and maximize the output factor.

S. Azra Batool (2011) published the article "The Performance and Structure of Small & Medium Enterprises: An Empirical Evidence from Pakistan" (Experimental from Pakistan on the operation and structure of small and medium enterprises). The purpose of the study is to find out the performance, employment structure, and productivity of small and medium enterprises of a populous country like Pakistan.

Chuanli Wei (2014) published the document "SME technical efficiency and scale calculation methods and selection of indicators" (Technical efficiency of small and medium enterprises and selection of indicators). The main content of the article is to estimate the scale and technical efficiency of SMEs by DEA method. Through this study, calculating the scale and technical efficiency of SMEs increases with the theoretical approach and econometric model.

Nguyen Khac Minh (2002) published the study "Comparative analysis of the effectiveness of manufacturing industries in Hanoi and Ho Chi Minh City," Vietnam Development Forum - Research project between the National Institute Graduate of Policy Studies (GRIPS), Japan and National Economics University, Vietnam. The study made the comment: Manufacturing industries in Vietnam, especially in Hanoi and Ho Chi Minh City, are of prime importance to the national economy. After the crisis caused by the collapse of the former Soviet Union, these industries recovered and grew at an average rate of 10% per year, and they contributed significantly to the growth of the total product. Domestic (GDP). These industries are also on the list of top export industries. In addition, they also contribute to reducing unemployment, taking advantage of the competitive advantage of labor-intensive industries. Although the activities of enterprises in these sectors have improved much, in general, efficiency is still low. Based on the results of the SFPF and DEA approaches (using the input optimization model) with 32 sectors in the two cities, if these sectors are considered to have the same production line, then the current level of activity These industries can reduce the current input level by 30% to 40% to produce the current output level. Many manufacturing industries in Hanoi and Ho Chi Minh City have low technical efficiency, and this may be due to a number of fast-growing industries due to their high opportunity costs and a lucrative labor market. Move. Some other causes may lead to inefficiencies in these industries, such as workers not being able to adapt to new technologies or the strategic difference of an industry company making the industry competitive advantage. Big change. These causes may suggest appropriate policies for planners.

Quan Minh Nhut (2007) with the document "Profitability and efficiency analysis according to the production scale of a three-crop monoculture model and rotation of two-color rice crops in New Market - An Giang in 2005" used tissue DEA model to focus on evaluating the economic efficiency and efficiency by production scale for the two selected farming models in Cho Moi district in An Giang province. The profit and efficiency analysis by scale is done using the corresponding Cost-Benefit Analysis (CBA) and data-based membrane analysis (DEA) methods based on data. Data were collected independently from two groups of farmers: 1, applying the monoculture model of three rice crops and 2, applying the rotation model of the one-crop soybean crop. The analytical results show that the economic efficiency and scale efficiency of the households in the two-rice-crop crop rotation model are higher than that of the three-rice-monoculture households.

3. Data and results

Data

The data includes 22,341 data (from 2010, 2011, 2012, 2013, 2014, 2015) small and medium-sized exporters in the agricultural sector, from GSO, Vietnam. In particular, the types of businesses are also quite well listed: state-owned enterprises, joint-stock enterprises with the state capital, collective enterprises, private enterprises, partnerships, and liability enterprises. The term, joint stock enterprises without state capital, enterprises with 100% foreign capital and joint ventures with foreign countries. Each enterprise in the data set has the following criteria: Provincial code, Business ID, Tax code, Year of data, Type of business, Main business and production sector, Business year, Profit before tax, Tax VAT, Export Tax, Import Tax, Labor, Capital, Revenue ... In addition, the data set divides the enterprises of each industry by code, and the agricultural sector has codes 15 and 16.

For the purpose of analyzing scale efficiency, the output of the model has a variable, which is revenue (R); The input consists of two variables, namely labor (L), capital (K). The input and output variables are described as follows. The output is revenue (R) including sales of goods and services and revenue from financial activities of enterprises and is calculated in million dong. Labor (L) is measured by the number of people, and it represents the total number of employees of the business in a year. The net amount of capital (K) is calculated in a million dong. The author chooses enterprises with industry codes 15 and 16 (agricultural sector) and has an export tax of more than 0. For businesses entitled to tax exemption and reduction, and noted that export enterprises can enjoy tax exemption or reduction. Filtered into research data in this study. At the same time, select enterprises with labor (L) greater than 10 and less than 300 (satisfying small and medium enterprises conditions).

DEA model

The data analysis uses knowledge of linear model, and the goal is based on available data to build a non-parametric space. Meanwhile, the performance of organizations and businesses will be calculated based on this space. Based on the characteristics of the production system, DEA is divided into two types of models: minimizing input with the assumption of unchanged output and maximizing output with the assumption of constant input. The DEA model minimizes input with unchanged output assumptions, including the basic steps outlined below.

Assumption:
- Y is a matrix (MxN) of outputs with yij being the ith output of the jth enterprise.
- X is a matrix (PxN) of inputs with xkj being the kth input of the jth enterprise.

Therefore, the firm's scale efficiency formula is written by the formula:

$$\lambda_n^j = \min \lambda, z^\lambda \; \lambda_n^j = \min_{\lambda,z} \lambda$$

with:

$$y_m^j \leq \sum_{i=1}^{N} z_i y_m^i \quad \text{when } j = 1,2,\ldots,N. \text{ và } m = 1,2,\ldots,M$$

$$\sum_{j=1}^{N} z_j x_k^j \leq \lambda x_k^j \quad \text{when } j = 1,2,\ldots,N. \text{ và } k = 1,2,\ldots,P$$

$$z_j \geq 0 \quad \text{with all j.}$$

When λ is a scalar value of 0 <λ <1, then giảm reduces the proportion of all inputs in the enterprise. When λ is a scalar value representing a reduction rate of inputs for 0 <λ <1, and is the minimum value of λ therefore. xj represents input vectors for ith businesses. The maximum scale effect is achieved when consolidating. DEA builds a unique standard for every business. And the benchmark of firm j is built from vector z. The ith factor of the vector shows the contribution of the ith enterprise to the best performance of the enterprise i. The NRS input measures of scale efficiency for an enterprise are calculated as the following solutions:

$$\lambda_c^j = \min \lambda, z^{\lambda}\ \lambda_n^j = \min_{\lambda,z} \lambda$$

s.t.

$y_m^j \leq \sum_{i=1}^{N} z_i y_m^i$ when $j = 1,2,\dots,N.$ and $m = 1,2,\dots.,M$

$\sum_{j=1}^{N} z_j x_k^j \leq \lambda x_k^j$ when $j = 1,2,\dots,N.$ and $k = 1,2,\dots,P$

and $\sum_{j=1}^{N} z_j \leq 1;$

$z_j \geq 0$ with all j = 1,2, …, N

VRS input measure of scale efficiency for a business is calculated:

$$\lambda_v^j = \min \lambda, z^{\lambda}\ \lambda_c^j = \min \lambda, z^{\lambda}\ \lambda_n^j = \min_{\lambda,z} \lambda$$

s.t.

$y_m^j \leq \sum_{i=1}^{N} z_i y_m^i$ when $j = 1,2,\dots,N.$ and $m = 1,2,\dots.,M$

$\sum_{j=1}^{N} z_j x_k^j \leq \lambda x_k^j$ when $j = 1,2,\dots,N.$ and $k = 1,2,\dots,P$

and $\sum_{j=1}^{N} z_j = 1;$

$z_j \geq 0$ with all j = 1,2, …, N

Inputs of scale efficiency measures are defined by:

$$SE^j = \lambda_c^j / \lambda_v^j \quad SE^j = \lambda_c^j / \lambda_v^j$$

If Sj = 1: optimal scale efficiency

If Sj < 1 non- scale effeciency

If Sj < 1 and $\lambda_c^j = \lambda_v^j$: enlarge operating scale

Nếu Sj < 1 và $\lambda_c^j \neq \lambda_v^j$: narrow operating scale

Results

Results from DEA model are shown in the table below. Businesses operate at an optimal scale when the scale is 1. When the scale is less than 1, the enterprise operates in DRS (decreasing return to scale) or IRS (increasing return to scale).

Table 1: Scale effect of small and medium-sized agricultural export enterprises in Vietnam from 2010 – 2015

Scale efficiency 2010	**scale**	**condition**	**enterprise**	**recommendation**
Scale = 1	CRS		75	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3631	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	23	Decrease
Scale efficiency 2011	**scale**	**condition**	**enterprise**	**recommendation**

Scale = 1	CRS		71	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3440	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	18	Decrease
Scale efficiency 2012	**scale**	**condition**	**enterprise**	**recommendation**
Scale = 1	CRS		84	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3791	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	32	Decrease
Scale efficiency 2013	**scale**	**condition**	**enterprise**	**recommendation**
Scale = 1	CRS		82	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3536	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	26	Decrease
Scale efficiency 2014	**scale**	**condition**	**enterprise**	**recommendation**
Scale = 1	CRS		81	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3807	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	21	Decrease
Scale efficiency 2015	**scale**	**condition**	**enterprise**	**recommendation**
Scale = 1	CRS		93	Optimal scale
Scale < 1	IRS	$\lambda_c^j = \lambda_v^j$	3991	Increase
Scale < 1	DRS	$\lambda_c^j \neq \lambda_v^j$	25	Decrease

(*Source: Results from DEA model by the author)*

In general, in the 2010-2015 period, the number of enterprises reaching the optimal scale is very small. Businesses operating at the scale need to increase the scale to increase operational efficiency accounted for over 90%. From the results table shows the relationship between Scale efficiency (SE), increasing returns to scale (IRS) and decreasing returns to scale (DRS) from 2010-2015. In these six years, 75, 71, 84 respectively, 82, 81, and 93 businesses (Scalei = 1) operate at the optimal scale. Therefore, businesses need to keep the scale of operations to get the best results. In addition to the enterprises operating on the optimal scale, the remaining businesses do not operate at the optimal scale, for six years of research, respectively 3654, 3458, 3823, 3562, 3828, 4016 businesses. Then these businesses will fall into two cases:

Case 1: That enterprise has $\lambda_c^j = \lambda_v^j$ the reason for the firm to operate at an optimal scale because the efficiency increases by scale, which means that small and medium-sized exporters can increase efficiency. Use the inputs by increasing the size of the business and thereby reducing operating costs. Observing the results from the table above, it can be seen that from 2010 to 2015, there are 3631, 3440, 3791, 3536, 3807, 3991 businesses operating at not optimal scale and these enterprises need to increase the scale of operation

Case 2: The enterprise has $\lambda_c^j \neq \lambda_v^j$, so the reason why the enterprise is not operating at the optimal scale is because the efficiency is reduced by scale, which means that these enterprises can increase the efficiency of using the first factors. Enter by reducing the size of the business. Results from the DEA method show that, from 2010 - 2015, there are 23, 18, 32, 26, 21, and 25 businesses that need to reduce the scale of operations.

Factors affecting scale efficiency

Regional factors
In this study, the region in Vietnam is divided into three regions: North, Central, and South. Characteristics of each region and number of businesses are different. Below is a table of results for scale performance in each region. For D1 (Region 1) is the North, D2 (Region 2) is Central and D3 (Region 3) is the South.

Businesses operate at an optimal scale when the scale is 1. When the scale is less than 1, the enterprise can operate at Drs or Irs.

Table 2: Scale efficiency by region

Year	Region	Obs	Crste	Vrste	Scale
2010	Region 1	608	0.03	0.17	0.39
	Region 2	651	0.04	0.41	0.2
	Region 3	2395	0.08	0.48	0.25
2011	Region 1	459	0.01	0.15	0.31
	Region 2	591	0.02	0.39	0.18
	Region 3	2408	0.04	0.45	0.2
2012	Region 1	620	0.06	0.17	0.56
	Region 2	659	0.08	0.47	0.29
	Region 3	2544	**0.16**	**0.57**	0.25
2013	Region 1	510	0.05	0.15	0.54
	Region 2	627	0.07	0.41	0.3
	Region 3	2425	0.13	0.49	0.35
2014	Region 1	550	0.03	0.15	0.41
	Region 2	586	0.05	0.38	0.23
	Region 3	2692	0.08	0.49	0.26
2015	Region 1	546	0.03	0.17	0.39
	Region 2	632	0.04	0.41	0.2
	Region 3	**2838**	0.06	0.37	0.36

(Source: Results from DEA model by the author)

With the highest efficiency level of 1 and the lowest level of 0, there are some comments given as follows:

From the table of data, the South accounts for the majority of small and medium-sized agricultural exporters. Over the years in the research period, the number of enterprises is mainly located in the Southern region. This number is over 2000 enterprises out of over 3000 businesses each year. In the other two regions, there are differences in the North and Central regions, but not many, mainly in the range of 500 to 600 enterprises. Overall efficiency reached the best in 2012 with Crs and Vrs of 0.16 and 0.57.

With scale effect, in the first 2 years of 6 years of study, this figure is low. Only in 2012, small and medium-sized agricultural exporters in the North achieved the best scale efficiency with 0.56. Enterprises in this industry still maintained good performance in 2013 but then declined gradually in the next two years. In the Central region, the scale efficiency is relatively low compared to the other two regions. This level of efficiency does not change much over the years. They maintain 0.2 to 0.3.

The South is the largest concentration of small and medium-sized agricultural exporters in Vietnam, and scale efficiency is also the best compared to the other two regions in the study. This area holds numbers ranging from 0.2 to 0.4.

Other factors affect scale efficiency

The author chooses to measure the effect of four factors, namely the ratio of capital to labor (kl); Wages on labor (wl), taxes on total revenue (tr) and inventory for revenue (ir) by Tobit model. At the same time, select the regional factor as a dummy variable to measure its impact on the scale efficiency of the selected enterprises for research. The factors affecting the scale efficiency of enterprises in the study are presented in the following tables. In some years, there are a few factors that do not have a significant impact on firm's scale performance that will not be included in the table, for example, 2010 and 2014 are not statistically significant for ir variables. kl affects the performance of businesses.

Table 3: Factors affecting the scale efficiency of small and medium agricultural export enterprises in the period of 2010 - 2012

Year	TE	Coef.	Std.Err.	T	P	[95% Conf.	Interval]
2010	Wl	0.0084317	0.0015982	7.331	0	0.0056502	0.0107032
	Tr	-0.3438077	0.1198095	-2.669	0.004	-0.5785513	-0.1095742
	d1	0.1752941	0.0285717	6.441	0	0.1195833	0.2304948
	d3	0.0363922	0.0202458	2.021	0.082	-0.0029809	0.0752554
	_cons	0.1572266	0.0177891	9.281	0	0.1226741	0.191269
	/sigma	0.289334	0.006876	0.221		0.2761959	0.301962
2011	Kl	0.0008046	0.0005823	-2.669	0.003	0.0000165	0.0010826
	Wl	0.0052408	0.0013157	5.801	0	0.0030136	0.0069579
	d1	0.1302751	0.0283125	4.881	0	0.0750734	0.1849669
	d3	0.0241142	0.0204107	1.391	0.236	-0.0155823	0.0633006
	_cons	0.138528	0.017491	8.341	0	0.1045607	0.1719852
	/sigma	0.291926	0.0069555	0.221		0.278632	0.3047099
2012	Kl	0.0008028	0.0005854	-2.499	0.008	8.7E-06	0.001087
	Wl	0.0081232	0.0014337	8.301	0	0.0056645	0.0100719
	Tr	-0.2603321	0.1463677	-1.569	0.069	-0.5471739	0.0259998
	d1	0.2557233	0.031917	8.341	0	0.1934516	0.3174849
	d3	0.0644912	0.0222295	3.151	0.003	0.021228	0.1072445
	_cons	0.2292615	0.0201919	11.841	0	0.1899962	0.2680167
	/sigma	0.3242959	0.0074781	0.221		0.3099772	0.3381047

(Source: Results from DEA model by the author)

In these 3 years, the tax/revenue factor has a negative impact on the efficiency of enterprises, in particular, in 2010 and 2012, these factors are correlated with negative values. In addition, the labor/wage ratio has a positive impact on the performance of businesses, with a level of significance of about 0%. That means the labor/wage ratio has contributed to improving the performance of businesses.

Among regional factors, only sector 1 affects the performance of businesses, with a significant level of 0%.

The results show that the impact of tax/revenue ratio has a negative impact on business performance in 2010. This means that these factors hinder the efficiency of enterprises. In addition, d3 has a positive impact on the performance of enterprises, with the significance level of 0.082 in 2010 and 0.236 in 2011. In this year, the capital/labor ratio also has a positive influence on business activities. This suggests that companies that use their capital for labor are effective.

Similarly, in 2012, the tax/revenue factor is the only factor that has a negative impact. The remaining factors have a positive effect on the performance of businesses with high reliability.

This is followed by a table showing the influence of factors on firm's efficiency in the following years of the study period.

Table 4: Factors affecting the scale efficiency of small and medium agricultural export enterprises in the period of 2013 - 2015.

Year	TE	Coef.	Std.Err.	T	P	[95% Conf.	Interval]
2013	Wl	0.0067305	0.0012017	9.031	0	0.004727	0.008224
	Ir	-0.0377372	0.0311516	-1.039	0.019	-0.0985103	0.022526
	d1	0.2190892	0.0313647	7.301	0	0.157898	0.2797705
	d3	0.0413562	0.0221852	2.091	0.062	-0.0018224	0.0840249
	_cons	0.2184155	0.0192116	11.871	0	0.1810718	0.2552492
	/sigma	0.3172882	0.0074858	0.221		0.3029536	0.3311128
2014	Wl	0.0054606	0.0011134	8.161	0	0.0036303	0.0067809
	Tr	-0.1028508	0.0965103	-0.859	0.28	-0.2918812	0.0856697
	d1	0.1536973	0.0281218	5.761	0	0.0988678	0.2080169
	d3	0.0020087	0.0202612	0.281	0.896	-0.0373958	0.0409032
	_cons	0.1636085	0.0174822	9.821	0	0.1296573	0.1970498
2015	Wl	0.0079605	0.0024317	9.03223	0.00123	0.005957	0.009454
	Tr	-0.0365072	0.0323816	-1.03777	0.02023	-0.0972803	0.013756
	d1	0.2403192	0.0345947	7.30323	0.00123	0.159128	0.2820005
	d3	0.0425862	0.0234152	2.09223	0.06123	-0.0005924	0.0852549
	_cons	0.2196455	0.0204416	11.87223	0.00123	0.1823118	0.2564792
	/sigma	0.3185182	0.0087158	0.22223	0.00123	0.3041836	0.3323528

(Source: Results from DEA model by the author)

From 2013 to 2015, the impact of the salary/labor ratio (wl) and d1 is similar to the previous period, both positively impacting the scale efficiency of enterprises with a significance level of 0%. . This shows that salary policy in this period is effective. The d3 factor in these years has a positive effect on scale efficiency, with a significance level of more than 0%.

More detail, in 2013, ir had a negative effect, meaning that these variables did not achieve the expected value. In addition, in 2014 and 2015, there were negative impacts on business operations. This shows that the tax policy has a negative impact on the operation of the business.

4. Conclusion

Based on the results of the model, there are some conclusions about the current status of the scale efficiency of small and medium-sized exporters in Vietnam's agricultural sector as follows:

- Most businesses operate below the optimal scale, ie, need to scale up operations to get the best scale.

- Most businesses in this sector operate in the South of Vietnam, and the number of enterprises operating at good scale is also in this area.
- The biggest negative factor affecting the scale efficiency of enterprises is the tax/turnover ratio of enterprises. The second factor affecting negatively is the ratio of inventory/revenue.
- The most positive factor is the salary/labor factor, followed by the capital/labor ratio.
- For regional, northern, and southern factors, there is a positive influence on the scale of business activities. Central Vietnam is taken as a base for comparison.

From the results of the DEA model, the researched enterprises mostly operate below the optimal scale. These businesses need to expand their operations through increasing capital, increasing labor resources to improve the efficiency of their scale. The results also show that there are very few exporters in the agricultural sector operating at the optimal scale, although operating at a small and medium scale. This clearly demonstrates that not all businesses need to operate on a large scale to have the best effect. The most important thing here is that businesses need to operate at a scale that fits their inputs to achieve the best output. Another outstanding result from the model is that there are a few businesses that need to reduce the scale of operations to get an effective scale. These businesses are using a large input source compared to their operating level. The paper addresses factors affecting scale efficiency, such as regional, domain, tax, inventory, wages, and capital. The results show that firms with scale efficiency are mostly located in the Southern region, the tax and inventory factors negatively affect the scale efficiency of enterprises, so they need to be reviewed, wage factors and The assessed capital has a positive impact on the scale efficiency of the enterprises in the study.

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