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ECONOMIES OF SCALE ON THE NATIONAL MARKET OF INPUTS FOR AGRICULTURE

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Abstract

The purpose of this paper was to find a useful correlation between the costs and the size of the economic unit involved in the agricultural input supply. This relationship was analysed in the current paper in order to verify if the the practical situation on the agricultural input market in Romania allows to perform economies of scale, according to the conditions in which the economic units are operating. The research methodology consisted of analysing the first 10 firms that are agricultural input suppliers, in correlation with another 15 firms of smaller size than the first ones. The sampling was not representative for the agricultural input supply in Romania, but it allowed to highlight the impact of economies of scale on the value of costs and the management of improving and stabilizing the position on the market of these economic actors. The obtained results showed that the agricultural input suppliers take advantage of economies of scale, but they choose to use these advantages towards securing some benefits for clients (agricultural farms), in order to maximize their market share and to consolidate their brand image.

***Key words*:** *economies of scale, input suppliers, agriculture*

INTRODUCTION

The benefits deriving from the growth in the workload depend on the efficiency of the use of factors [15, 16], this being possible to be evaluated by analyzing the modification of average costs in each production stage [10, 23]. Economies of scale are the benefits of developing major sectors [11, 20, 18]. The superior efficiency of scale includes the advantages of the positive externalities obtained by companies as a result deriving from the development of an industry or of the whole economy [21]. The operating potential on a large scale, as well as a higher technical efficiency seem to lead to the increase in size of the agricultural holdings [3, 19]. The external diseconomies are costs occurring beyond the control of firm alone and they are the result stemmed from a specific industry increase [26]. The internal economies and the diseconomies of scale are associated with the growth in the volume of firm's workload [1, 23]. Purchase-related savings are obtained when the larger enterprises purchase in bulk and they obtain better prices. The administrative savings may arise when the large firms are allocating the administrative and management costs to all sectors [5].

The large enterprises can support more efficient the business risks than the smaller firms [4, 9, 23]. A high fragmentation of the farms does not allow to obtain the benefits derived from the superior efficiency of scale [28, 29], therefore the alternative of agricultural cooperatives can be a viable method for farmers to take advantage of economies of scale [22, 25, 30].

Economies of scale are in many situations the fundamental rationale for the management of local administration [12, 13], even if, sometimes, it does not highlight clear results, mainly due to the particularities of the public systems [17, 27]. This fact occurs due to their dependence on the structure of public services-related costs, local administration structure and the governance framework at local level [5, 17].

Zetterholm J. revealed that the economic performance of the supply chain may be increased by industrial integration and growth in size [31].

Still, some studies have shown that the small-scale agriculture has the same potential to stimulate the production increase, social equity and integrated local economic development as the large-scale agriculture [6, 7]. This type of agriculture allows for the land and crop consolidation [8] and sustains a sustainable development [2, 14].

MATERIALS AND METHODS

The present paper aims to show that there are several reasons why the economies of scale generate smaller costs per unit, but also the fact that this does not occur each time.

The purpose of the current study consisted of identifying the economies of scale-related impact on the activity of the agricultural input suppliers. The research objectives have been represented by the brief diagnosis of the studied units and the determination of the impact of yield efficiency on their activity.

The assumption sustaining the conducted research has been stated as follows: if economies of scale are identified, then the ratio between expenses and sales decreases as the size of the companies increases. The value of sales has been estimated by turnover and company size has been measured by the volume of total assets.

The implications of this assumption consist in the fact that, if there is evidence of it, the barriers to entry on the agricultural input market are particularly high. Thus, the small investors cannot be competitives on this market and, consecquently, they cannot achieve performance at small sizes. On the other hand, the economies of scale may generate positive externalities on the branch where they are registered.

The reseach material consisted of two parts: the bibliography, based on which was explained the topic that represents the object of the analysis, and the information related to the analyzed companies, which formed the basis for evaluating the relation between efficiency and firm's size.

Thus, the conducted research included several research methods: scientific documentation, comparison, statistical analysis, economic analysis and case study.

The research involved a number of 25 economic units operating in the delivery of agricultural input on the Romanian market. SPSS software was used to determine the determination of the relation existing between certain economic indicators and the business economic size. The units' economic size has been assessed using the market shares owned by the analyzed companies. The market shares have been determined based on the turnover. The used economic information has been taken out from the online database of the Ministry of Public Finances for the period 2015-2018 [24].

RESULTS AND DISCUSSIONS

The sampled economic units are characterized by non-current assets that registered a maximum level of 136,7 mil. lei and a minimum level of 0.8 mil. lei, resulting in an average value of 35.9 mil. lei. The current assets registered a maximum level of 553.5 mil. lei, with a minimum level of 1,3 mil. lei and an average of 137.9 mil. lei. Hence, the total assets have been determined as having a maximum value of 644.8 mil. lei and a minimum of 2.2 mil. lei, resulting in an average of 173.8 mil. lei.

The net turnover had an average value of 334.3 mil. lei, with a maximum level of 2,661.7 mil. lei and a minimum of 1.3 mil. lei. The maximum total income reached 2,695.3 mil. lei and the minimum one 0.3 mil. lei, the registered anverage being about 343.4 mil. lei. Under these conditions, the total expenses registered a maximum level of 2,672.1 mil. lei and a null minimum, resulting in an average value of 336.6 mil. lei.

Consequently, the highest gross profit obtained during the last 4 years on the input suppliers' market in Romania amounted to 34.5 mil. lei, while the highest loss reached 12.7 mil. lei. As average per year and per sampled economic unit has been registered a

gross profit of 6.8 mil. lei, at an average number of employees of 150.3 persons.

From the analysis of the relatio between the total expenses and the turnover, the polynomial function in the form of f(x) = 1.01x - 0.22, with R^2 0.999 and the Pearson coefficient 1.00**, indicates the possibility to reduce expenses after a maximum level of the turnover of 2,661.7 mil. lei, as it is graphically displayed in the Fig. 1.

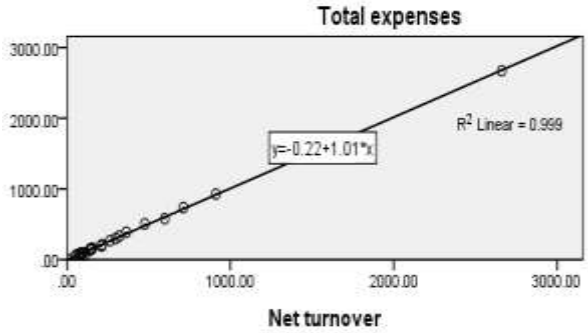

Fig. 1. Relation between the total expenses and the turnover (mil. lei)
Source: own calculation.

Still, we consider that this correlation is due especially to the fact that the obtaining of a certain turnover's level should be sustained by expenses. In other words: the firms should pay more to obtain higher income.

For this reason, there has been undertaken the determination of the correlation among the turnover, total expenses and total assets. For the correlation between the turnover and the total assets (Fig. 2), the Pearson coefficient was 0.840**.

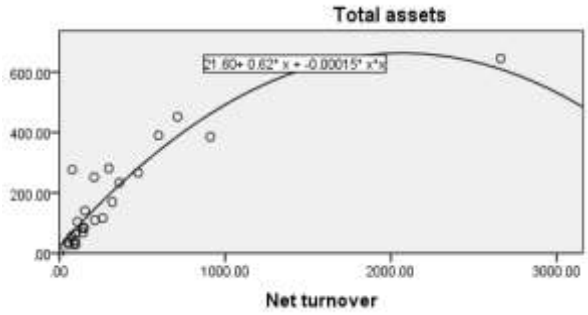

Fig. 2. Relation between the total assets and the tunrover (mil. lei)
Source: own calculation.

The value of regression coefficient was 0.852. The regression function in the form of f(x) = $0.00014x^2$ + 0.62x + 21.6 shows that the minimum threshold to qualify for a real increase of turnover is given by the free coefficient of 21.6 mil. lei.

This value is representative for at least 95% of the 25 firms studied within the sample. From this threshold, the turnover increases significantly and the maximum level is not obvious yet at the sample under consideration.

In order to establish the relation between the total expenses and the total assets (Fig. 3), it has been established the Pearson coefficient with a value of about 0.86, similar with the previous one, and a regression coefficient with a value of 0.845**. The regression function in the form of f(x) = $0.00014x^2$ + 0.60x + 25.42 is very similar to that of the turnover in relation with the total assets, but this expresses the dependence between the necessary consumption and the potential of economic unit.

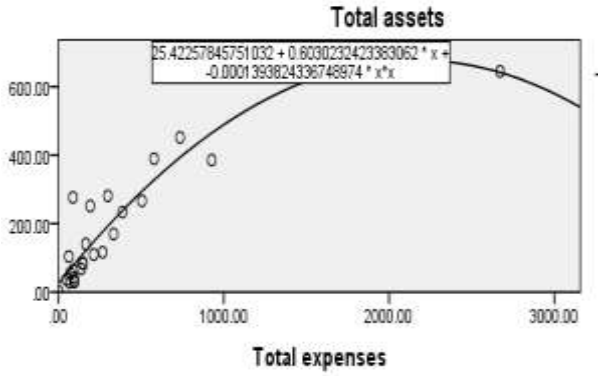

Fig. 3. Relation between the total assets and the total expenses (mil. lei)
Source: own calculation.

The graphic suggests that the volume of fixed expenses could register values of about 25.42 mil. lei, while the variable expenses have a multiplication degree of about 0.6. These relations indicate that the used data are correct and in line with the economic principles.

It is further necessary to establish if the volume of the average consumption per sold unit decreases in the same time with the increase in size of the economic unit.

Under these conditions, it has been determined the average cost per charged currency unit, after the relation:

Average cost = Total expenses / Turnover

In this case, the Pearson coefficient of correlation between the average cost and the total assets registered a value of 0.24, and this indicates a very weak correlation. The regression relation does not suggest any real dependence between the two economic indicators. Thus, the obtained results can not be used.

For safety, determination between the total assets and all the other economic indicators has been undertaken. The Pearson correlation coefficient for different parameters were as follow: non-current assets 0.22; current assets 0.23; total assets 0.24; stocks 0.14; claims 0.26; company cashier and bank accounts 0.18; advance expenses 0.11; debts 0.24; advance income 0.15; provisions 0.11; total capitals 0.11; paid-in capital 0.04; net turnover 0.14; total income 0.15; total expenses 0.15; gross profit 0.01; average number of employees 0.29. The obtained values show the existence of very weak correlations.

On the other hand, has been determined the relations between the number of employees and other economic indicators, when the Pearson coefficient registered values were as: non-current assets 0.83; current assets 0.71; total assets 0.78; stocks 0.63; claims 0.64; company cashier and bank accounts 0.37; advance expenses 0.38; debts 0.78; advance income 0.13; provisions 0.20; net turnover 0.52; total income 0.53; total expenses 0.53. These correlations are strengthening the assumption that the performance of agricultural input suppliers is dependent on the number and performance of employees.

Under these conditions we can appreciate the yield efficiency with respect to the most important capital: the human resources. Thus, it was necessary to determine the economic efficiency of the sampled companies in correlation with the number of employees (Fig. 4).

For the correlation between the profit rate and the average number of employees, the Pearson coefficient was 0.54 and the regression coefficient had a value of 0.49**, indicating a weak but significant dependence, having regard to the reduced size of the sample. Despite that fact, during the analyzed period, some economic units registered losses, very likely determined by the increasing evolution of the level of capitalization.

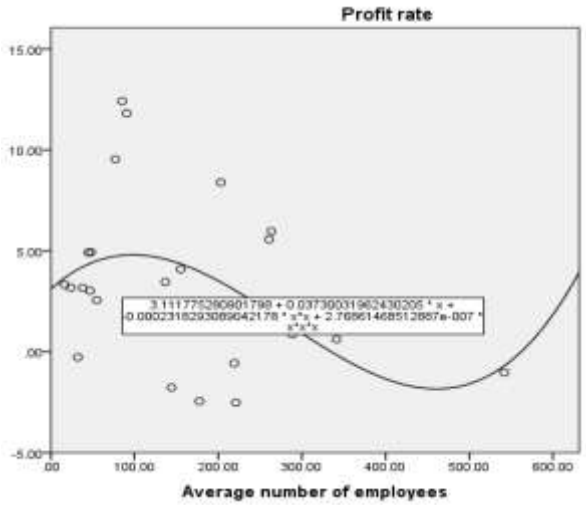

Fig. 4. Relation between the number of employees and the profit rate (%)
Source: own calculation.

The previous result recommends increasing the number of employees and their potential performances.

This phenomenon is also highlighted by the correlation between the turnover and the number of employees, where the Pearson coefficient was 0.68 and the regression coefficient was 0.63 ** (Fig. 5).

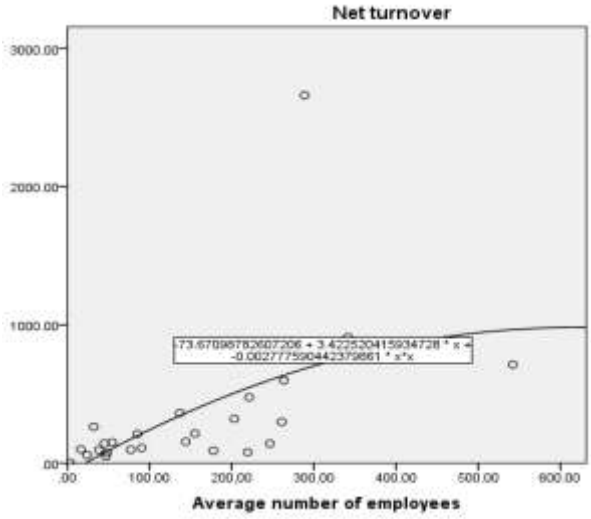

Fig. 5. Relation between the number of employees and the turnover (mil. lei)
Source: own calculation.

Still, the assumption supporting the cost theory has not been confirmed, in this situation being necessary to verify several derived assumptions:
a. the agricultural input market does not benefit from the efficiency of the scale yields;
b. this market is characterized by efficiency of the scale, but advantages are used to reach other performance objectives of the company, such as market position.
These assumptions shall be mutually exclusive and, for this reason, we simulated possible tools for using yield efficiency as: financing of agricultural production, sales strategies with credit instruments and price strategies correlated with the purchase level. These has led to the reduction of total expenses (by decreasing claims and stocks from the volume of expenses) and, consequently, to a decrease in average cost. The Pearson coefficient of correlation between the corrected average cost and the total assets has the value of 0.67, displaying a close relation between these two indicators (Fig. 6), while the regression factor R^2 had a value of 0.64 at an error of 5%.

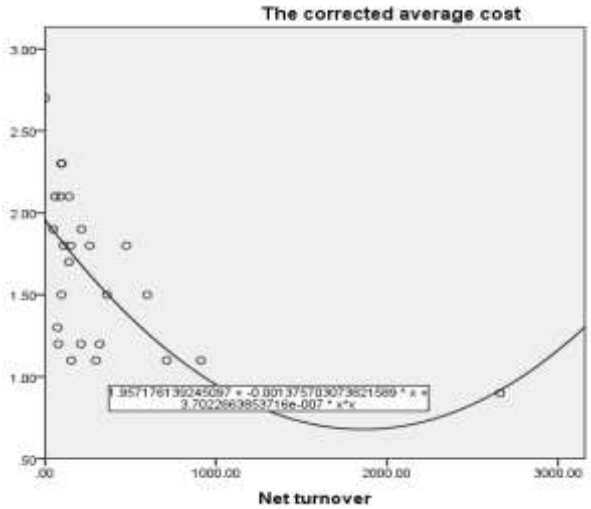

Fig. 6. Relation between the corrected average cost of stocks and of claims (lei expenses/lei total assets) and the total assets (mil. lei)
Source: own calculation.

The function in the shape of $f(x) = 3.702x^2 - 0.0014x - 0.196$ indicates the possibility to reduce the price according to the increase in size of the economic unit. But these economies are used to finance the farmers, to secure advantageous prices and other strategies aimed to lead to the increase in turnover. These results lead to the conclusion that the firm performance may be improved and the market advantages may be more efficiently used.

CONCLUSIONS

Close correlations have been obtained between total expenses and turnover, on the one hand, and between total assets and turnover, on the other hand. The correlations between total assets and average cost are non-significant.
Therefore, at first sight, there is no evidence to confirm the assumption according to which the increase in size of the economic unit determines savings at the level of average costs. In contrast, strong correlations were obtained both between the average number of employees and turnover, as well as between the average number of employees and the profit rates.
Then, after correcting the level of expenses with claims and stocks, a satisfactory correlation has been obtained between the average cost and the total assets. The obtained regression function indicates the possibility to reduce costs according to the increase in size of the economic unit. The research assumption is finally confirmed.
In turn, these economies of scale obtained by the agriculture input suppliers are probably used to finance farmers, to secure advantageous prices and other strategies leading to the increase in turnover.

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