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RASTI I KOSOVËS

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THE IMPACT OF SUPPORT POLICIES ON THE PERFORMANCE OF AGRICULTURE SECTOR IN TRANSITION COUNTRIES:

THE CASE OF KOSOVO

DOCTORAL THESIS

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Mentori: Prof. Dr. VALENTIN TOÇI

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Falënderimet

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ABSTRAKTI

Bujqësia ka qenë gjithmonë një nga sektorët më të rëndësishëm për ekonominë e një vendi ose të paktën sektori me historinë më të gjatë sepse përmirëson konkurrencën e sektorëve dhe ndihmon në arritjen e qëndrueshmërisë së rritjes ekonomike. Për shkak të rëndësisë që ajo ka, qeveritë e secilit vend ofrojnë mbështetje në formë të subvencioneve/pagesave direkte, granteve dhe llojve e tjera të mbështetjeve për të rritur të ardhurat e fermave, punësimin dhe konkurrencën e tyre. Edhe pse këto mbështetje janë një barrë e rëndë për buxhetin e një vendi, qeveritë ofrojnë shuma të mëdha të këtyre mbështjeve financiare sepse besohet se pa ndonjë lloj forme të asistencës, fermerët nuk mund të konkurrojnë me importet e huaja. Megjithatë, nga ana tjetër, efektet e këtyre mbështetjeve financiarë në performancën e fermës nuk janë gjithmonë pozitive, ato mund të jenë edhe negative. Efekti i politikave mbështetëse në performancën e fermës mund të jenë pozitive nëse paratë e marra do të shërbejnë si një motiv për të inovuar ose për të kaluar në përdorimin e teknologjive të reja ose mund të jenë negative në qoftë se paratë e marra rrisin të ardhurat e fermave dhe si rezultat fermerët preferojnë të kenë më shumë kohë të lirë dhe të mos angazhohen në aktivitetet bujqësore.

Prandaj, qëllimi i kësaj teze të doktoratës është që të matë performancën e fermave, e cila mund të matet përmes efiçencës teknike, dhe të identifikohen shkaqet e mundshme të joefiçencës duke u përqendruar në politikat mbështetëse (subvencionet). Për të matur efiçencën teknike të secilën ferme, janë përdorur të dhëna të kryqëzuara (cross-sectional) për 394 fermë nga e gjithë Kosova dhe të tipologjive të ndryshme që rrjedhin nga një studim i kryer nga Ministria e Bujqësisë, Pylltarisë dhe Zhvillimit Rural në vitin 2014 në kuadër të FADN-së për rastin e Kosovës. Më pas, përmes modelit të joefiçencës teknike është identifikuar ndikimi i subvencioneve dhe variablave të tjera ekzogjenë në efiçncën teknike të fermës. Kjo teknike njihet si analiza stokastike e kufirit-SFA (Stochastic Frontier Analysis). E njejta analizë u krye edhe për 11 ekonomi të tranzicionit.

Në ekonomitë e tranzicionit efiçenca mesatare teknike u gjet të jetë 86%, ndërsa në Kosovë vetëm 17.7%, duke sugjeruar se një fermer mesatar në Kosovë prodhon vetëm 17.7% të prodhimit të mundshëm. Në këtë nivel të efiçencës teknike subvencionet sugjerohen të kenë efekt negativ si në rastin e Kosovën ashtu edhe në rastin e ekonomive të tranzicionit.

Fjalët kyçe: ferma, performanca, efiçenca teknike, subvencionet, SFA, Kosova, ekonomitë në tranzicion.

EXTENDED ABSTARCT

The purpose of this thesis was to assess the performance of the agricultural sector by measuring technical efficiency of farms through the SFA model and the incorporation of exogenous variables in the model of technical inefficiency for transition countries, focusing on Kosovo's case. More specifically, the impact of various factors on the performance of the agricultural sector was studied by paying particular attention to supporting policies proxied by subsidies.

Initially was presented the economic and agricultural development of Kosovo and of 11 Transition Economies. It was indicated that even though the transition process has been challenging and with many difficulties, Kosovo has managed to have macroeconomic stability and high contribution of agriculture to GDP compared to transition economies, but it still faces crucial challenges especially in developing national policies. Some of these challenges were: low competitiveness of the agricultural sector, inadequate use of agricultural production potentials, and depopulation of rural areas. However, Ministry of Agriculture, Forestry and Rural Development (MAFRD has made progress in the development of national policies for agriculture, ARDP 2014-2020, by approximating the agricultural and rural development policies with the standards as provided by the EU. In this way, Kosovo has showed its willingness to reform and modernize domestic policy. Also the other countries considered in this thesis, were applying a more advanced agricultural policy, the Common Agricultural Policy as they were members of the EU.

In terms of subsidies, a large part of almost every budget spending's are headed for agricultural subsidies. Subsidies for transition economies range from €2,231 on average per farm (the case of Romania) to €162,522 on average per farm (the case of Slovakia). On the other hand, over the last years the Government of Kosovo and other donors have seriously increased their efforts for the support of the agriculture sector. The government budget for financial support/subsidies for the agriculture sector has increased significantly and is expected to further increase in the coming years. Also there is evidence for the increased interest to invest in agriculture by the private sector, to some extent stimulated by support schemes. Subsidies during the period 2014-2016, increased from €15.3 mil in 2014 to €26.1 million in 2016, indicating their high importance for the well-functioning of the farm. When added together, it results that the total amount of direct payments during this period was around €63 million and the biggest amount was allocated for wheat, dairy

cows, corn, vineyards and sheep. When considered average subsidies per farm, from the database available for this thesis results that it is €1,400 lower than any country considered in this thesis.

However, the focus of the thesis was to analyse the effect of these subsidies on performance of the farm, proxied by technical efficiency. In the literature it was well documented the effect of subsidies on agricultural production, input allocation and income distribution. The theoretical results on this subsidy–efficiency link are ambiguous in the literature and one can expect positive effect, negative effect, or no effect of subsidies on efficiency. Different authors have suggested different effects of subsidies on technical efficiency. However, in order to measure this effect, one needs to implement the right methodologies and techniques. Efficiency measurement involves the comparison of actual performance with optimal performance located on the relevant frontiers. As the true frontier in many cases was unknown, an empirical approximation was needed, also known as "best practice" frontier. With the development of frontier production functions, the measurement of technical efficiency of a decision making unit has become much more conventional. For the estimation of technical efficiency it has been assumptions that producers produce one single output from multiple inputs. They produce one output either because they actually do produce a single output or because they were able to aggregate their multiple outputs into a single output index.

Traditionally, there were three quantitative approaches that have been developed in order to measure the production efficiency: parametric (deterministic and stochastic), non-parametric based on Data Envelopment Analysis (DEA) and productivity indices based on growth accounting and index theory principles. Stochastic Frontier Analysis (SFA) and Data Envelopment Analysis were the most commonly used methods. Both methods estimate the efficient frontier and calculate the firm's technical efficiency relative to it however they differ on whether they rely on assumptions on the functional form of the production frontier or not. If the method relies on those assumptions, it is considered to be "parametric" while the ones that do not rely on the assumptions were considered to be "non-parametric". In this thesis, the SFA approach was preferred over nonparametric approach (e.g. DEA) because agriculture is characterized as unpredictable sector, meaning that factors such as weather and diseases may influence the production any time. Also the data from transition economies were generally noisy in comparison to the data from the other countries. In addition, compared to the deterministic approach where all the deviation from the frontier is attributed only to inefficiency, in the stochastic frontier the deviation from the frontier

is attributed to inefficiency as well as to random factors such as measurements errors, unspecified variables and even the hazard factors. The next procedures is to choose the function form and to make the distribution assumption for error term that deals with inefficiency marked as u_i.

There existed different functions form for the production frontier such as Cobb-Douglas, CES, Translog, generalised Leontief, normalised quadratic and its variants (Coelli, Rao, O'Donell, and Battese, 2005). It was recommended to estimate the production frontiers according to a number of alternatives and then to select a preferred model using the likelihood ratio test. Cobb-Douglas and the Translog functional forms were the most used forms in the empirical studies of production. After the conduction of the likelihood test ratio was decided to use the Cobb-Douglas function form for both cases, Kosovo and transition economies. In order to obtain the estimates, the Maximum Likelihood approach was used in the centre of which lies the choice of the distribution assumption for the random variable u_i. The v_i random variable has the zero-mean normal distribution while for the u_i can be assigned different distribution assumptions. The literature had identified many of such distributions. The most mentioned distributions were the: Half-Normal Distribution, Truncated- Normal Distribution, and the Exponential Distribution. In this thesis, the Half-Normal Distribution was assumed for the u_i as the most usual distribution suggested in literature (Kumbhakar and Lovell, 2004)

After the determination of methodology (SFA) and techniques (ML), there was needed to define the dataset and the variables. For the estimation of the production frontier for the case of Kosovo were used the data from European Community's Farm Accounting Data Network (FADN). FADN was considered as a consistent database for the estimation of the production frontiers of farms in Kosovo. This FADN dataset was provided by MAFRD and was available for 394 farms but only for 2014. As a result, this thesis dealt with cross-section data. Also for transition countries were gathered the data from FADN, but this dataset was panel and contain macro data. In terms of variables, as defined in literature on farm technical efficiency, there were three main groups of variables employed as determinants of technical efficiency in transition and western economies which were organized in output, inputs and exogenous variables. As Output (Y) was used only one output- Total Agricultural Output (value) (SE131). This variable measured the value in Euro of crops, livestock and livestock products and other output. As input variables (Xs) were considered three classical factor inputs and one variable factor. As classical inputs were taken into consideration Labour (AWU), Land (UAA), and Capital (value) while as variable input was

considered Intermediate Consumption (value). By employing the ML techniques on these variables, was able to estimated technical efficiency scores.

However, the analysis of efficiency continues, as the focus of this thesis was not only to obtain some efficiency scores but also to understand the effect of some firm-specific variables on the efficiency scores. There existed a large set of exogenous variables (Zs) that influence the mean and the variance of farm efficiency and that could potentially explain the differences of technical efficiency among the farms in the sample. These explanatory variables in the inefficiency model were related with the management strategies of the farm (financial management proxied by the ratio of debts to total assets) with the environment factors (such as location and specialization) structure of the farm (size, labour) as well as with socio-economic factors (public policies proxied by subsidies). In this analysis, 9 variables were considered as exogenous. This incorporation of exogenous variables, helped us to identify the factors which caused inefficiency. The interest increased even more, when we included also the variables of subsidization. The effect of subsidies on (in)efficiency scores was of high interest not only for researchers but also for the government. For this purpose, was allowed the variance of the inefficiency terms to be a function of some z variables which are also known as inefficiency explanatory variables.

Regarding the estimation of the production function, the results suggested that the classical inputs together with the variable input were all statistically significant at 1% significance level. The signs of the input coefficients were as expected for labour, land and intermediate consumption. For the labour variable input, a 1 % increase in labour input (AWU) increased the output for 0.46%, a 1% increase in total utilized area (UAA) increased the output by 0.12% and a 1% increase in intermediate consumption increased the output by 0.66%. The capital input, however, was found to have negative impact on output. Its interpretation is that for 1% increase in capital, the output is decreased by 0.46%. This negative impact can be due to outdated technology or overestimation of technology by the farmers.

Initially it was expected also capital to have the positive sign under the assumption that agricultural subsidies increase capital investments. However the negative sign of capital was found also in the study of Latruffe et. al. (2004) in the case of the Polish farm with the explanation as the transition countries have old machinery and as a result are less productive. Since also Kosovo is a transition countries and still in the developing stages, this negative sign of capital is due to the old technologies used by the farmers. Another reason for the negative sign found in capital may be

due to overestimation of the capital by the farmers. Instead of declaring the real value of capital, the farmers in Kosovo do overestimate this value and as a result may be reflected in the negative sign of capital in production function.

After the estimation of stochastic production function through ML, was possible also to generate the technical efficiency scores compared to this frontier for all the DMUs in the dataset. The average technical efficiency score was 0.177. This score indicated that from 395 observations, on average a farm produced 17.7 % of the maximum output. This low level of efficiency meant that the rest of the potential output, 82.3 %, was lost due to technical inefficiency. Majority of farms ranged between 0 and 20% of technical efficiency.

The second part, which provided the estimates of the inefficiency effect model, suggest that total subsidies to total output has a positive sign which means that an increase in this variable caused an increase in inefficiency as such any results in the inefficiency model that is a positive number means that it has negative effect on technical efficiency (because of $-u_i$). As many studies provided in the literature review, also in this analysis was suggested that subsidies negatively affected technical efficiency. However it is not significant and as a result does not have impact on technical efficiency. In addition, the share of total land to total labour positively affected the efficiency scores. The variable which presented the share of hired labour to total labour affected negatively the technical efficiency score. Both the mentioned variables were significant at 5% significance level. Also the variable of region is significant. The findings of this thesis suggest that efficiency scores for the case of Kosovo are very low and as such the Kosovar government should assist farmers to promote the production process by providing technical assistance and research and development activities, rather than providing subsidies without any kind of criteria and target.

However, the focus of this thesis was to generate the technical efficiency scores also for the transition economies and to compare them with Kosovo. As for the case of Kosovo, also in the case of transition economies were considered the same set of variables but with different dataset. However, as in Kosovo also in this case the input variables were found to be all significant at 1% significance level. In addition, it was found that the variables of Capital and Land significantly and negatively affected the production of the farm where as the Labour and the Variable Inputs effected the production function significantly and positively. Moreover, from 128 observations, it was found that on average a farm produces 86% of the maximum output while the rest of the potential

output, 16 %, was lost due to technical inefficiency. Most of the farms were located above 75% of technical efficiency.

Regarding the inefficiency model, is was suggested that subsidies had a significant positive sign, meaning that it increases inefficiency, meaning that it has negative effect on technical efficiency score. The increase of subsidies with 1%, decreases the output by 0.05%. The negative effect on efficiency was also observed in the share of rented land to total land as well as in the debt to asset ratio, meaning that an increase in rented land as well as in the total liabilities, decreased the technical efficiency. On the other side, the other variables of share of crop output to total output as proxy for specialization, total land to total labour, and share of hires labour to total labour affected positively the technical efficiency score but the last variables was not significant whereas the other two variables were significant at 1% significance level. In transition economies the average technical efficiency was 86% whereas in Kosovo is only 17.7%.

In the end, is suggested that all the objectives set in the thesis were realized. Regarding the first objective which was about the calculation of the technical efficiency score for the case of Kosovo, it was estimated that the average efficiency score was 0.177 that means that on average a farm produces 17.7% of the best possible output. This low level of efficiency means that the rest of the potential output, 82.3 %, is lost due to technical inefficiency. On this efficiency score have effect different factors, the second objective of the thesis, however the factors which were significant at 5 % level of significance were Share of Total Land to Total Labour and Share of Hired Labour to Total Labour. The first variable has a negative sign which means that an increase in share of total land to total labour increases technical efficiency while the other variable has a negative sign which means that an increase in share of hired labour to total labour decreases technical efficiency. Also the third and the fourth objectives of the thesis were achieved which dealt with the measurement of technical efficiency score for transition countries and the effect of subsidies on these technical efficiency scores, respectively. From the panel dataset with 128 observations for transition countries, on average a farm produces 86% of the maximum output, the rest of the potential output, 16 %, is lost due to technical inefficiency. When this data is compared with the technical efficiency scores for Kosovo, it can be observed a significance differences between these two sets of data. In transition economies the average technical efficiency is 86% whereas in Kosovo is only 17.7%, indicating that an average farmer in Kosovo produces 68.3 pp less of the potential output than an average farms in a transition countries.

In this analysis the variables of Capital and Land significantly and negatively affected the production of the farm where as the Labour and the Variable Inputs effect the production function significantly and positively. Regarding the inefficiency model, is can be suggested that total subsidies to total output as a proxy for the effect of subsidies have a significant positive sign, meaning that it increases inefficiency, meaning that it has negative effect on technical efficiency score. The negative effect on efficiency is also observed in the share of rented land to total land as well as in the debt to asset ratio, meaning that an increase in rented land as well as in the total liabilities, decrease the technical efficiency. On the other side, the other variables of share of crop output to total output as proxy for specialization, total land to total labour, and share of hires labour to total labour affect positively the technical efficiency score.