

Government's Interventional Training Impact on Farms Competitiveness

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Abstract: The agricultural sector, in most cases is supported in developed countries and one of the support measures (government interventions) is training of the sector's actors. The research was carried out to determine the training as a research object for competitiveness theories, analyze the impact of these interventions on farms' competitiveness and its reflection in indicators that farms' competitiveness is described with. The study was based on the counterfactual impact evaluation method, scientific literature as well as data from year 2008 and 2012 Lithuanian government's interventional farmers training, linked with respondent's data provided by Farm Accountancy Data Network. During the research, eligibility for counterfactual impact evaluation method was confirmed, similarity criteria of farms were developed, according to these criteria, nearest neighbor matching performed and impact detected. The study shows that informal professional training of farmers as a government intervention affects competitiveness of family farms and how these effects can be measured. It was found that the farmers that participated in this training achieved higher productivity and thus increased their farms' competitiveness. The findings of this study contribute to the discussion on the importance of the public support for the farms' competitiveness. Informal professional training can be a governmental instrument to foster farms' competitiveness development.

Key words: Competitiveness, intervention, informal professional training, family farm.

1. Introduction

A review by Man et al. [1] pointed out that the "competitiveness" is an attractive concept at various levels of study, such as firm, industry or country (including the individual farm level as well), holds the view that the competitiveness can also be treated as a dependent, independent, or intermediary variable, depending on the perspectives from which the issue is approached. All this shows the wide applications of competitiveness concept. In various studies, researchers answer the questions: what the sources of competitiveness in farms are, how the governments can influence the farm competitiveness developments, how efficient different government interventions on resources (human, financial and capital) are, what determines the behavior of farmers, can informal professional training cause change in behavior of

farmers, whether farmers training can cause changes in farm competitiveness. There is a lack of objective evaluation of informal professional training effectiveness or its impacts due to common problem of data availability and quality. Studies usually are based on farmer's surveys, lacking tools for connecting trainings with farms development indicators. However, Hill et al. [2] emphasize that, survey of beneficiaries of the intervention brings associated problems of achieving meaningful responses (do farmers know what the impact is and the proportion attributable to the Rural Development Programme (RDP)-funded activity?) and of "optimism bias" (such as when beneficiaries wish to show that their past decisions have been correct or assume benefits to justify the time and effort expended by themselves or their advisors). According to authors, conclusions about the impact of intervention programmes based on asking farmers about their perception of the changes they had made may be very optimistic due to the possibility

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that the farmer perceptions are simply wrong.

The aim of study was to analyze how the informal professional training of farmers, supported under the measure “Vocational Training and Information Actions” of RDP for Lithuania 2007-2013, influences competitiveness of family farms. The aim of this intervention form was to increase the competitiveness of agriculture sector by strengthening human capacities and implementing advanced technologies and innovations [3, 4]. Research concerns question whether financial support for informal professional training of farmers from RDP funds helped to increase farms’ competitiveness through behavioral change in farmers.

R. Jasinavicius and N. Jasinavicius [5] linked competitiveness as opportunity to fight against competitors with the ability to produce and sell products, withstand competitive pressure, by increasing the return on (inputs) used resources. According to Griffiths and Zammuto [6], the company’s competitiveness refers to the ability to manage their own resources, such as finance, personnel, technology, marketing, production, knowledge and resulting full potential. Productivity and efficiency are often seen as a factor in competitiveness, it is the most reliable indicator of long-term competitive advantage [7].

Latruffe [8] in agricultural competitiveness study, states that the training effect is positive, because better educated farm managers have the skills to effectively manage farms. Agricultural market participants’ training should be encouraged by the state. Boyle [9] notes that if government does not provide these public goods (training), the private sector would not provide them enough or does not provide at all.

While evaluating support measures, it is important to determine whether the benefits remain in the business for which it is awarded. It is thought that the benefits can be expressed in profit. There is no doubt that the support can increase revenues, but the support also may increase the costs and cause redistribution of the provided benefits to the other market participants.

It was found that production subsidies and investment support of gain (excluding it received production subsidies) are very weak, but the average gains (subsidies) are marked. This suggests that both production subsidies and investment help to cover the costs and affect the return, but the real benefit of these support measures for farmers is not received [10].

Training is used as a public market intervention; this is evidenced also in the Organization for Economic Co-operation and Development (OECD) producer support calculation manual, because training in the agricultural sector is financed from the budget counts as support for the sector [11]. Government’s intension to increase farms’ competitiveness in comparison with other forms of support, is most useful to support the dissemination of knowledge, because this support gives highest returns (in comparison with other forms of support: investment support and production support (subsidies), which are aimed directly at farms). Support for the effective dissemination of knowledge, also has negative characteristics, such as higher administrative costs rate than other instruments and fictitious support risk, because of low tangibility [10].

2. Materials and Methods

Scientific literature discusses a variety of methods, for farmers’ non-formal education impact assessment. Focus group studies were carried out, training effects were evaluated using indicators and data, by econometric tools. The training is a governmental intervention, so to assess its effects, the same methods and methodologies can be adapted as well as for other interventions (e.g., capital interventions, etc.).

Evaluation of rural development programs requires types of indicators as a contribution rate in relation to the budget or other resources allocated at each level of the assistance (e.g. the declared costs incurred in the implementation of the measure); capacity indicators to measure the direct implementation of the program actions (e.g., training sessions organized, number of

farms receiving investment support, total amount of investment); result indicators, which measure the direct effects of the intervention. From them you can learn about, e.g., the direct beneficiaries of behavior, capacity or performance changes. They are measured in physical or monetary units (e.g., investment implementation, training successfully completed the number of farmers). Impact indicators related to the program's benefits, both at the level, but also more generally in the program area. Impact indicators linked to the wider objectives of the program (e.g., more jobs in rural areas, increased productivity of agricultural sector, and increased production of renewable energy) [12, 13].

To measure the impact of informal professional training of farmers, supported under the RDP measure "Vocational Training and Information Actions", on farms competitiveness, three ratio indicators for the assessment of farm performance were used:

Labor productivity: dividing farm gross value added by total hours worked (euro per hour);

Land productivity: dividing farm total output by

utilized agricultural area (euro per hectare);

Cost to revenue ratio (inversely related with profitability): dividing total costs by total revenue.

As used herein, counterfactual impact assessment method enables to evaluate governmental intervention impact, excluding other factors' (e.g., macroeconomic situation, foreign investment) effects. In other words, this approach responds to the question "Does the intervention work?" and "What are the effects?" It compares two situations: the implementation of public policy and its failure to implement the measure. It measures what happened to intervention experienced operators and compares this situation with a hypothetical situation in which they are to themselves, if intervention is not implemented. The net impact of the intervention shows the difference between the real situation and what would have been "situation". Determination if intervention effect can be measured by using counterfactual impact assessment method is done according to Word Bank's methodology developed by Gertler et al. [14], as shown in Table 1.

Table 1 Interventions' (farmers' informal training) suitability for counterfactual impact evaluation.

Necessary condition	Feature that allows saying that the impact of the intervention can be applied to determine	Feature that allows saying that farmers training intervention satisfies the condition
Intervention leads to behavioral change	Possible to identify clear criteria to determine whether a change in the target group entities behavior	Competitiveness indicators change in farms that experienced intervention
Intervention is homogeneous	Entities involved in the same or similar activities, which are based on the same causal chain	All trainees are farmers keeping agricultural holding registered in Lithuanian agricultural and rural business register
Intervention is repeatable	The intervention can be re-implemented in the future	Farmers' training regularly conducted and funded by the Rural Development Program
Interventions involved enough subjects	At least 100 subjects participated in intervention	Analyzed training had about 20,000 participants
Suitable impact analysis variables (indicators)	Impact analysis variables are closely related to measures of intervention logic and to supported activities	The training aims to increase the competitiveness of farms. Impact analysis of selected variables reflecting changes in farm competitiveness
Directly comparable target group and control group	A clear difference between the target and the control group (strong indicator of whether the entity has suffered the impact of the intervention or not) Integrated interventions monitoring system, especially if the target group or the control subjects experienced the impact of other interventions	It is possible accurately to identify farmers participated in training
Monitoring and administrative data availability	Sufficient and available administrative data (or data can be collected by surveys) needed to set up the target and control groups (additional analysis variables) and calculate the net impact of the intervention (impact analysis variables)	Training and Farm Accountancy Data Network (FADN) data availability and entanglement

At present, use of EU support for impact measurement indicators is a major drawback—they measure not only specific intervention, but also other factors influencing the result. Counterfactual impact assessment method eliminates the influence of other factors, and thus “purifies” the impact of the intervention and provides more accurate exposure readings. Although even if method has important advantages, it is important to emphasize that it cannot answer the question “Why did the intervention work or does not work?” [15].

In ideal case, the most important target group members and control characteristics should be identical, they should only differ by the presence intervention fact. When preparing the target and control groups, it is important to assess whether the intervention in question experienced operators could be exposed to other interventions. When preparing the target group, it is often assumed that all subjects experienced the same impact of the intervention. However, some entities may participate in intensive intervention, while others—not so intense. This determines the intervention and sustained impact strength. The target and control groups can be made up of different interventions seasoned. The control group and target group subjects are important to choose, so both of their observable and invisible properties were as similar as possible [16].

The main challenges in achieving a consistent evaluation of the outcomes of agricultural policy interventions are the heterogeneity of the participating (as well as non-participating) farms. A similar view is held by Pufahl and Weiss [17] and Kirchweger et al. [18]. Propensity score matching [19] is used in this study to predict the impact of trainings for both controlled and target groups of farms. The method balances the observed covariates between the targeted group and a control group based on similarity of their predicted probabilities of competitiveness drivers.

As the probability of observing two units with the same value of the propensity score is zero the

estimation of desirable effects requires the use of appropriate matching algorithms which define the measure of proximity to define farmers' nonparticipants who are acceptably close to farmers, training participants [20].

According to nearest neighbor matching method, for each target group farm, nearest similar control group farm was selected by algorithm [15]:

$$C(P_i) = \min_j \|P_i - P_j\| \quad (1)$$

where, $C(P_i)$ —the distance between the similarity of the estimate P (propensities score) between farms i and j .

While matching for a farm is found in only one match among the remaining farms data, the biggest disadvantage is that method does not ensure compliance with the wrong case when the closest neighbor of the control group is relatively far away from the target group.

While target and control groups of farms are constructed and available both “before” and “after” periods in this study the conditional difference in different estimator [21] is used to determine intervention effect. This allows measuring intervention effect more properly. Probability of having different development trajectories increases if already before the trainings (intervention) observed heterogeneity of both farms groups is large. While propensity score matching can be applied as a control for the selection bias on observables before the intervention, a combination of propensity score matching with difference in different methods allows better controlling observable and unobservable factors [20] which are influencing competitiveness development of analyzed farms.

The net effect of intervention for each competitiveness variable in this study is determined as follows by Eq. (2):

The net effect of the intervention = difference before and after the intervention in the target group – difference before and after the intervention in the control group (2)

During the research, around 20 thousand farmers were selected that have been participating in trainings during period 2009-2011 as well as non-participants. Next step was to identify which of the participants are respondents of FADN after the intervention in year 2012. It was around 200 of such farms identified. Last step is to identify which farmers were FADN respondents before the intervention in year 2008. During the research around 100 farms were selected, control and target groups were formed. The main observable features of control and target group farms are presented in Table 2.

While selecting farms and forming control and target group, each farm was described by features that are collected in FADN forms according to European Commissions methodology. To carry out propensity score matching and perform farms nearest neighbor matching five similarity criteria were formed. The similarity criteria chosen were observable in control

and target groups, as well in each farm taken into study. These criteria for each farm were: area of arable land distributed by soil fertility score; ratio of own land in total operated land area; ratio of arable land in total operated land area, labor costs, number of relative livestock units.

3. Results and Discussion

Detected intervention effects are stated in Table 3. The results of the study have shown that governmental interventions such as informal farmers training have positive effect on farms competitiveness. The analyzed five-year period intervention caused increase of labor productivity by around 29%, land productivity by around 14% and decrease of cost-to-revenue ratio by around 3%. This confirms what Latruffe [8] states that better educated farmers achieve better results. Behavioral change, caused by training which Nuthall [22] addresses, was

Table 2 Analyzed farm characteristics.

Farm features		The structure of the target respondents (%)	The structure of the control respondents (%)
Farming type	Crop	33	30
	Mixed	67	70
Utilized agricultural area	Below 250 ha	75	73
	251-1,000 ha	19	22
	Above 1,000 ha	6	5
Staff employed	Yes	81	86
	No	19	24
According to the hours worked in agriculture	Below 3,000	20	19
	3,001-6,000	73	71
	Above 6,000	7	10
According to the soil fertility score	Below 33	8	11
	34-43	71	68
	Above 43	21	21

Table 3 Detected intervention effects.

Variable	Measurement units	Type of group	Value before intervention year 2008	Value after intervention year 2012	Counterfactual situation	Intervention effect
Labor productivity	Euro per hour	Control group	6.7	5.8	7.4	3.0
		Target group	8.4	10.4		
Land productivity	Euro per hectare	Control group	1,294.0	1,314.3	625.6	106.0
		Target group	605.3	731.6		
Economic efficiency	Cost-to-revenue ratio	Control group	1.01	0.91	0.97	-0.03
		Target group	1.07	0.94		

detected during research and it leads to different development of competitiveness for target group of farms that received in intervention from control group of farms who were absent from training.

Study results in some extent deny what is stated by Jasinskis [10] that benefits of farmers trainings have difficulties in measurement which is caused by low tangibility, even more, during the research the way to connect farms interventional training aspect with competitiveness evolution indicators of farms was developed. However, it was emphasized by Hill et al. [2] that conclusions about the impact of intervention programmes based on asking farmers about their perception are simply wrong, it needs further development to argue that research should be supplemented with subjective input from farms through questionnaires or etc.

It is still unclear, what could be development pathways of farms competitiveness if there were no such public goods (interventions) as trainings available as stated by Boyle [9], because for long time it was never the case in European Union. The question is open what would be cost-benefit ratio, if trainings were purchased by farms in market. Anyway, trainings are a governmental intervention that is aimed for policy implementation purposes by developing competitiveness, but also influencing farmer's behaviors.

4. Conclusions

Over time the sources of competitiveness as well as the concept have changed, but the concepts of competitiveness and competitive sources are still relevant research object. Competitiveness is a relative measure. Companies, countries need to be compared with each other. Production in absolute terms for a country or industry, is meaningless. If two players have reduced the costs of production that does not mean that they improved competitiveness, increase of competitiveness occurs when an entity reduces its costs compared to those faced by competitors.

Assessing competitiveness to obtain a more detailed assessment should include several elements or indexes, but the question remains open how to evaluate the weight of each component. Assessing the competitiveness of the sector is necessary to consider the state support, this is especially the case in the agricultural sector. Competitive advantages can be created or encouraged to change the behavior of market actors. This is particularly inconceivable without government intervention.

The most important aspect of competitiveness assessment, modeling and management is that the higher the level of competition does not necessarily correlate with the welfare or other social indicators. Investment in human capital is not less important than investment in physical capital. Their aim is to increase productivity. Human resources are one of the factors of competitiveness, training changes the quality of these resources, so the effect can be, should be and is analyzed. Most of the competitiveness index systems include as an indicator the training and education. Some indices even emit continuous training as a separate criterion or factor of competitiveness. Competitiveness change can be informal continuing vocational training effect.

The research shows that measurement of training impact for competitiveness can be performed overcoming subjectivity of farmers, which is conditioned by surveys. The results of the study confirm that government's trainings interventions can foster competitiveness development of farms and can be a measure to support policy implementation as well influencing farmers' behaviors.

Acquisition of data necessary for the research, as well the primary data collection, validation, compliance is still a challenge researchers face.

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