Efficiency measurement of Kosovo crop farms Data Envelopment Analysis

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INTRODUCTION

Efficiency as a criterion, it serves as bedrock for policy and planning approaches towards sustainable development. Efficiency within economics context can be found in two main bodies of theory such as production theory (technical efficiency, production efficiency) and the welfare economics (allocative efficiency, intertemporal efficiency).[1]

Improving productivity and efficiency of farms is considered as one of the core component for increasing competitiveness.

OBJECTIVE OF THE STUDY

The main objective of this study was to estimate efficiency of the Kosovo farms oriented in crop production.

Within this context the study aimed to achieve the following specific objectives:

Estimate technical efficiency of the crop farms

Estimate scale efficiency of the crop farms

METHODOLOGICAL APPROACH

Technical efficiency measure was estimated using **Data Envelopment Analysis** (DEA).

It is a *non-parametric* technique

It is a *non-stochastic* approach

It fits a piece-wise linear frontier using a linear programming technique

MODEL ORIENTATION

Input oriented model under Constant Returns to Scale (CRS) and Variable Returns to Scale (VRS) assumption for technical efficiency estimation.

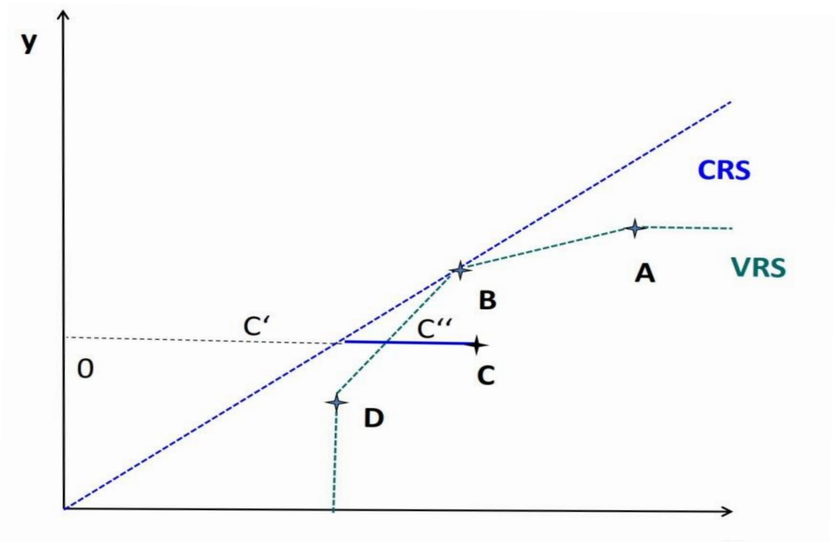

Figure 1: Technical efficiency; **TE** = 0C'/0C [2]

DATA

Efficiency estimation based on FADN data 2013.

Inputs
Total labour input
Total utilized agricultural area
Total inputs
Average farm capital

Farm

Output
Total output

RESULTS

The average TE score for crop farms under the assumption of VRS was estimated to be 0.578, which indicates that on average crop producers could further reduce the level of inputs used and still remain at the same level of the output produced.

Table 1: Input oriented of technical and scale efficiency scores for crop farms

Efficiency	Mean	SD	Min	Max
TE_{CRS}	42.13	24.23	10.12	100
TE_{VRS}	57.81	27.19	21.25	100
SE	70.50	11.00	47.62	100

Table 2: Bias-corrected technical efficiency scores for crop farms

Orientation	Bias-corrected efficiency $score_3$	Bias-corrected 95% CI†	SD of bias-corrected efficiency score
TE_{CRS}	34.31	23.76 - 43.09	23.79
TE_{VRS}	51.69	41.36 - 58.10	29.06

Note: CI-confidence interval; † 2000 replications were used for bootstrapping.

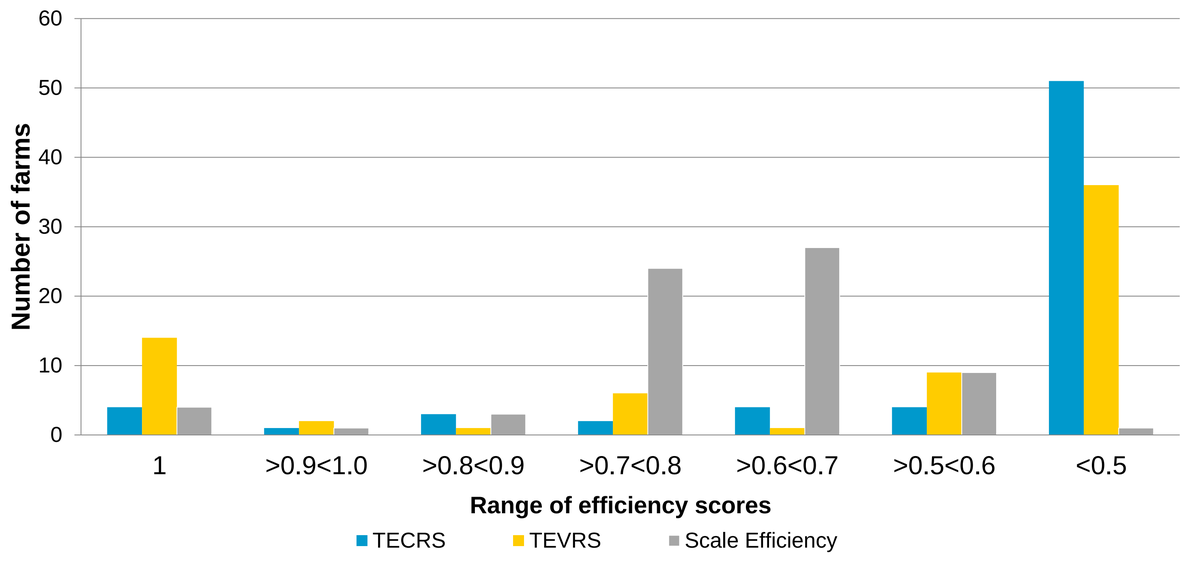

Figure 2: The distribution of technical and scale efficiency scores

CONCLUSIONS

- The majority of crop farms were not operating at maximum efficiency and there was considerable potential for technical efficiency improvement.
- Based on the slacks calculation it was revealed that total inputs was most excessively used by farmers.
- The mean of technical efficiency scores under CRS and VRS assumption was not equal, indicating the existence of scale inefficiency.
- For most of the farms included in the sample the inefficiency of scale was mainly present due to being a too small farm.

References:

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