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THE IMPACT OF SOCIAL CAPITAL ON ECONOMIC PERFORMANCE OF AGRICULTURAL PRODUCERS IN THE CZECH REPUBLIC

Axel Wolz*, Jana Fritzsche*, Jitka Pencáková**

**Department of External Environment for Agriculture and Policy Analysis,
Institute for Agricultural Development in Central and Eastern Europe (IAMO),
06120 Halle (Saale), Germany*

*** Institute of Agricultural Economics (VUZE)
Mánesova 75
120 58 Praha 2, Czech Republic*

Tel.: ++49 345 2928114

Email: wolz@iamo.de

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Abstract

In the Czech Republic, agricultural production is still dominated by corporate farms. Private farms have been established since the change of the political regime, but their role is not that relevant as originally anticipated. Among both groups some have been economically more than others. In general, a varying adoption of production factors is identified as being of influence. Whether their ability to collaborate with other farms is an additional factor which has been discussed under the concept of social capital since quite some time will be analyzed in this paper. Based on the findings of a survey among a sample of 62 farms by adopting factor and multiple regression analysis it can be deduced that social capital is indeed a significant factor determining the level of agricultural income.

JEL classification: C31, P32, Q12, Z13

Key words: corporate farms, private farms, social capital, cross sectional models, Czech Republic

1 Introduction

Conventionally, in economics, growth and development are based on the efficient adoption of the major production factors, i.e., in general, land, labor and capital, and since its recognition in economics during the 1960s human capital. However, during the last years it has become more and more realized that similar endowments with production factors do not necessarily lead to similar patterns of economic growth and development. When analyzing economic performance it had been argued that social capital might constitute an independent, and hitherto under-appreciated, factor of production (Woolcock, 2002: 20-21). The idea is based on the assumption that social networks are vital in managing one's daily life. These networks, however, are not naturally given but must be constructed through investment strategies oriented to the institutionalization of group relations, usable as a source of other benefits (Portes, 1998: 3). There had been a lot of criticism about the vagueness of the concept, as simply too many meanings are associated with it and a consensus about a commonly

acknowledged one is still missing. Therefore, some economists are very skeptical about the concept (e.g. Manski, 2000: 121-123), while others urge to go on with the debate (e.g. Durlauf, 2002: F418).

As a consequence of this discussion, there had been calls for a more tightly focused micro definition of social capital and a ‘lean and mean’ conceptualization focusing on the sources – that is, primarily social networks – rather than its consequences. The focus is on the micro level and the structural elements. The upside of this approach is that it is more or less clear about what is, and what is not, social capital, making for cleaner measurement and more parsimonious theory building; the downside is that it tends to overlook the broader institutional environment (Woolcock, 2002: 22).

In our analysis we will follow this more pragmatic approach. In line with other authors (e.g. Sobel, 2002: 139) we use a quite narrow definition of social capital. We refer to Rose (2000: 1) who defines social capital as follows: “Social capital consists of informal social networks and formal organizations used by individuals and households to produce goods and services for their own consumption, exchange or sale”. In this respect, the focus is laid on membership on formal organizations, i.e. the structural side. Closely linked with the discussion about the definition is the question of how to quantify and measure social capital. In line with the call for a more tightly focused definition the number of relevant indicators is supposed to be reduced. In our analysis we could make use of a limited range of indicators, only, and concentrate on membership in formal organizations.

2 Data Analysis

In this analysis, we assume that membership in organizations will lead to higher economic performances. We could test this hypothesis in making use of the data of an empirical survey among agricultural producers in the Czech Republic. The survey was developed by VUZE

(Prague) and had been executed during late summer of 2003 referring to the figures of 2002. It included 42 corporate farms as well as 20 private ones.

2.1 *Descriptive Statistics*

Ten recorded variables could be put together under six categories (i.e. labor, land, capital, social capital, legal form and production intensity) in analyzing their influence on economic performance. These categories were used in the quantitative analysis below. As the dependent variable we applied gross farm income. We did not use variables describing human capital in our multivariate analysis as the analysis showed that they neither formed an independent factor in factor analysis nor had they high factor loadings on any other extracted factor. This is caused by a number of significant, but low correlations between all collected variables. All the calculations were done with the software package SPSS. In the following we describe the variables separated according to the legal form of the farm, i.e. corporate and private farms, and as a pooled sample:

Labor: The labor input is measured as the sum of the total annual working time calculated from the total number of the work force multiplied by 2,000 hours for full-time workers and 1,000 hours for part-time workers. The median labor input comes up to 148,000 hours per corporate farm and 4,000 hours per private farm, respectively.

Land: This indicator covers the total land area operated by the farm including permanent pastures, perennial crops, and land under buildings. Corporate farms amounting to an average size of 1,723.5 ha are remarkably larger than private farms operating about 112.0 ha. These figures almost double the national average of corporate farms and are about four times larger than those of private ones. Therefore, we have to admit that our sample is more biased with respect to larger agricultural producers.

Capital: The questionnaire did not collect data about the value of capital (buildings, machines, animals, etc.). But it had been asked about the value of annual depreciation per farm

which is used as a proxy indicator for farm capital. On average, depreciations amount to 5.61 million CZK¹ with respect to corporate farms and 350.0 thousand CZK for private ones.

Production intensity: The intensity of production has an undisputed effect on economic performance. As almost all farms cultivate cereals, we decided that the average yield of cereals can be seen as a viable proxy of production intensity. Nevertheless, we are aware that production intensity is not only dependent on economic and human factors, but also reflects natural conditions. Average yields came up to about 3.5 t/ha among corporate farms and about 3.8 t/ha among private ones. The difference is statistically not significant (Mann-Whitney-Test).

Social capital: The focus of this paper is on social capital. We had to restrict the analysis on its structural form and five different variables could be analyzed. With respect to formal organizations, four different types could be distinguished: (a) the Chamber of Agriculture, (b) political lobbying organizations, (c) professional organizations, and (d) marketing organizations. Membership in the Chamber is for both, corporate farms as well as family farms, very high in our sample. 83.3 % (35 of 42 farms) of the managers of corporate farms and 80.0 % (16 of 20 farms) of the heads of private farms stated that they are members. Membership in lobbying organizations, i.e. the Agricultural Association with respect to corporate farms and the Association of Private Farmers with respect to private farmers, is a bit lower. About two thirds of the corporate farms and about one third of the private farmers had joined their respective organization. Again, corporate farms were better organized, but when compared with the national level, the organizational degree of both forms in the sample is very high.

Since membership in lobbying organizations focuses more on the representation of interests with respect to policy makers, it is therefore not directly connected with farm production as

¹ CZK: Czech Koruna, 1 US\$ = 32.81 CZK, 1 € = 30.91 CZK in 2002 (OANDA, 2005).

such. In order to get professional information and to improve technical knowledge, farmers join specialized organizations. Membership seems to be motivated by the production profile of a farm. Since corporate farms have a more diversified production profile, they are members in more professional organizations (up to 5 in our sample) than private farms (up to 3 in our sample). Only 26.2 % of the corporate farms are not members in at least one professional organization whereas 44.4 % of the private farms did not join any.

The used marketing channels are a good proxy-indicator for the ability of managers to build up networks promoting their economic situation. We are concentrating on two marketing channels, only. Joint marketing through marketing organizations based on voluntary membership forms the one side. As quite a number of them failed during the 1990s, their image is not that good anymore. All sales by other marketing channels are seen as own sales and stand for the second marketing channel in our survey. While marketing through joint marketing organizations requires the build-up of social capital with other farms, own sales do not need this type of capital. Therefore, we see high shares of sales by joint marketing organizations as a proxy for a high level of social capital. In our survey, both marketing channels amount, on average, to about two fifths of the total sales and are of the same importance. The differences between corporate farms and private farms are not significant (Mann-Whitney-Test).

Legal form: The survey includes corporate farms as well as private farms. In total, 42 corporate farms and 20 private farms responded to the questionnaire. For our regression analysis, we coded corporate farms with 0 and private farms with 1.

Economic performance: We used one indicator to measure economic performance (as the dependent variable). This indicator refers to the gross farm income calculated as the total output (including not only the turn-over of agricultural production but also other types of income, i.e. services and tourism) minus the intermediate consumption, i.e. specific costs and

farming overheads. On average, the gross farm income amounted to 11.5 million CZK for corporate farms and 600 thousand CZK for private farms, respectively.

2.2 *Factor Analysis*

The focus of this paper is to test the influence of social capital on gross farm income as our performance indicator. Therefore, it is necessary to make sure that social capital is not correlated in the sample with other influencing variables like the value of capital or the amount of used land. The factor analysis is a multivariate procedure that extracts independent factors from a set of correlated variables. The extracted factors can be used in further, more advanced calculations. As input data a matrix of correlation coefficients (Kendall's tau) was used. The Kaiser-Meyer-Olkin criterion (MSA: measure of sampling adequacy) came up to 0.69 proving the matrix as mediocre but suitable for factor analysis (Backhaus et al., 2003: 276). By principal component analysis with varimax rotation and Kaiser normalization four factors could be extracted from the set of nine variables explaining 79.2% of the total variance in the included variables. Only factors with an eigenvalue greater than 1 are used in the further analysis (Kaiser criterion).

Table 1: about here

Table 1 summarizes the results of the calculations by showing all factor loadings and those greater than 0.6 or less than -0.6 in bold letters for the nine variables on four factors. We labeled the four factors according to the variables that have factor loadings greater than 0.6 or less than -0.6. Factor 1 summarizes the three variables that describe the classical production factors land, labor, and capital. Two factors indicate partial aspects of social capital. We named them marketing through joint marketing organizations (factor 2) and membership in supporting organizations (factor 3). Factor 4 stands for the production intensity.

At this stage, it can be concluded that the factor analysis separated the classical production factors clearly from factors indicating social capital. The membership in supporting

organizations and the use of different marketing channels are independent from farm size or the volume of capital. Therefore, in a final step, the factor scores for the four independent factors were computed to replace the nine correlated variables in the multiple regression model and to test whether the two social capital factors have a significant effect on gross farm income.

2.3 *Multiple Regression Analysis*

In the last step of the analysis the following linear multiple regression model had been calculated to test whether there is any significant impact of social capital factors on gross farm income:

$$(1) \quad Z_GFI = legal_form + \sum_{i=1}^4 b(i) * factor(i)$$

Z_GFI : standardized gross farm income

$legal_form$: dummy variable (0=corporate farm, 1=private farm)

$b(i)$: coefficient for the i th factor, $i=1..4$

$factor(i)$: scores for the i th factor, $i=1..4$

In addition to the four factors a dummy variable was introduced with respect to the legal form of the farm. The calculation started with the full model which was backwards reduced thereby that non-significant factors were excluded step by step from the model. A factor was treated as non-significant if its level of significance was higher as 0.1. Table 2 summarizes the results of the regression analyses.

Table 2: about here

With respect to the results, the measurement of determination comes up to 0.52. Hence, our model lets about half of the variability in gross farm income unexplained. Nevertheless the model is significant. As expected by neoclassical theory the factor ‘land, labor, and capital’ is highly significant indicating that larger farms have higher farm outputs. Similarly, the factor

‘production intensity’ is significant showing that farms using modern technologies and/or operating under favorable conditions obtain higher outputs. The legal form of the farms shows no significant influence on gross farm income, so we cannot conclude that family farms are more or less successful than corporate farms.

As expected in our hypothesis, the social capital related factor ‘marketing through joint marketing organizations’ shows a significant impact on gross farm output. Its coefficient is negative. Since there is a negative factor loading of the variable ‘percentage of total agricultural sales by joint marketing organizations’ on this factor, the negative coefficient stands for increasing gross agricultural income for higher percentages of sales by joint marketing organizations. In this respect, our hypothesis has been confirmed by our results. On the other side, the second social capital related factor ‘membership in lobbying organizations’ does not show a significant impact on gross farm income. We suggest that it is not passive membership that increases economic performance but active participation in formal organizations which could not be covered in this survey.

3 Conclusions

In this paper we discussed the impact of social capital on farm performance. It could be shown that two social capital related factors, i.e. ‘marketing through joint marketing organizations’ and ‘membership in supporting organizations’ could be clearly separated from the classical production factors. Therefore, we continued in testing our hypothesis by running a regression analysis. As expected by neoclassical theory farm performance is significantly determined by the traditional production factors, i.e. land, labor and capital and by production intensity. The legal form of the farms, however, does not show any significant influence on economic performance.

The social capital related factor ‘marketing through joint marketing organizations’ had a significant impact. On the other side, it could not be shown that our second social capital

related factor ‘membership in supporting organizations’ had any significant influence on farm performance. In this way, it can be concluded that social capital does have a significant positive influence on farm performance in the Czech Republic. Our hypothesis has been approved by the analysis. Therefore, a first recommendation can be drawn: Both types of farms, i.e. corporate and private farms, can improve their income if they join marketing co-operatives.

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Table 1: Factor loadings for nine variables on four factors (principal component analysis, varimax rotation with Kaiser normalization)

Variable	Factor			
	1	2	3	4
Production intensity	-0.014	0.054	0.009	0.974
Total annual working time	0.908	-0.027	0.094	-0.008
Used land	0.888	0.017	0.160	-0.060
Membership in the Chamber of Agriculture	-0.106	-0.031	0.844	-0.060
Membership in lobbying organizations	0.300	0.113	0.716	-0.039
Membership in professional organizations	0.380	-0.020	0.608	0.289
Percentage of total agricultural sales by joint marketing organizations	-0.020	-0.947	-0.065	0.012
Percentage of total agricultural sales by own sale	-0.024	0.946	-0.015	0.073
Deprecations	0.875	0.008	0.089	0.074
Eigenvalue	2.63	1.81	1.64	1.05

Remarks: Relevant factor loadings greater than 0.6 or less than -0.6 are in bold letters.

Source: Own calculation with data from the VUZE farm survey 2003

Table 2: Results of the multiple regression analysis (N = 43)

factor(i) and legal form	Model with all factors		Model with significant factors only	
	b(i)	Level of significance[*]	b(i)	Level of significance[*]
Land, labor, and capital	0.601	0.000	0.647	0.000
Marketing through joint marketing organizations	-0.226	0.048	-0.177	0.093
Membership in supporting organizations	-0.034	0.775		
Production intensity	0.184	0.077	0.171	0.096
Legal form	-0.366	0.224		
Corrected R²	0.52		0.52	

Remarks: ^{*} A significance level lower than 0.1 stands for a significant effect of the factor on the dependent variable.

Source: Own calculation with data from the VUZE farm survey 2003