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Market Integration of Household Plots in Ukraine – The Impact of Social Capital

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Abstract— Following the two rounds of land reform in Ukraine since independence, household plot farmers emerged as the major suppliers to agricultural production. But they form a very heterogeneous group. Not all of them are equally successful, economically, and integrated to markets. In general, a varying adoption of production factors is identified as being of influence. In this paper, we argue that social capital is an additional factor contributing to higher agricultural incomes. We tested our thesis using primary evidence from a survey in Ukraine among 255 household plot farmers in 2006. Based on 24 social capital indicators we deduced four separate index variables linking the social capital dimension of form, i.e. structural and cognitive, with the social capital dimension of relationship, i.e. bonding and bridging. By adopting multiple regression analysis we show that social capital of its bridging structural type is indeed a significant factor determining the level of agricultural income. However, the findings also underline the multidimensional side of social capital. Both bonding and cognitive social capital have no impact on agricultural income. We conclude that social capital can be identified as a significant production factor but its underlying indicators do not seem to point to the same direction and have to be analysed in their specific contexts.

Keywords— production factors, social capital, Ukraine

I. INTRODUCTION

Up to the break-up of the Soviet Union and independence, agricultural production in Ukraine was characterised by state and collective farms. After two rounds of reform the agricultural sector is dominated by about 17,700 large-scale corporate farms cultivating on average about 1,400 ha on the one side, and about 5.5 million (more subsistence oriented) household farmers cultivating on average about 2.5 ha on the other. In-between comes the relatively small group of peasant farmers amounting to about 43,000, only. But even after the spectacular economic recovery since 1999 [1] agricultural production is still dominated by so-called household plot farmers. Business-oriented farms play a minor role. However, the respective focus on production is different. While household farmers concentrate on labour-intensive crops, such as potatoes and vegetables as well as meat and milk production, corporate farms specialise in grain, oilseed and sugar beet production.

The main reason for the strong role of household farms seems to be the necessity of securing the family's food consumption. Moreover, surplus production forms an important source of income and helps to improve the living standard of the rural population [2]. But household farmers do not form a homogeneous group. Some of them seem to be economically more successful than others. In general, a varying adoption of production factors, i.e. land, labour and capital is identified in economics as being of influence. Additional factors might be the level of human capital, particularly age and educational level. However, it has been observed that similar endowments with production factors do not necessarily lead to similar economic results [3,4]. Similarly, some household farmers are more market-oriented while others mainly produce for own consumption. Therefore, it can be concluded that there might be an additional, so far under-rated factor of production which is being analysed under the concept of social capital.

II. CONCEPT OF SOCIAL CAPITAL

The concept of social capital has been adopted rather recently in economics. In broad terms, it can be defined as networks, norms and trust which facilitate information sharing, collective decision-making and collective action. Its usefulness has been derived from the observation that social networks are vital in managing one's daily life. Following other sciences, economists increasingly recognise that human actors exist within social and cultural contexts. These contexts affect how resources are allocated to competing ends. There has been an expanding literature if and how social capital matters for economic growth [5,6]. However, despite this immense amount of topical research, there is no common consensus about its meaning. In an review article [7: 1643] it is complained that "the success of social capital as a federating concept may result from the fact that no social science has managed to impose a definition of the term that captures what different researchers mean by it within a discipline, let alone across fields".

Therefore, the major challenge has been to develop a 'lean and mean conceptualisation' when applying the concept [8] or to follow a 'narrow focus' [9]. One option is to focus on its sources. In this way, social capital is

understood as a set of resources that inhere in relationships of trust and cooperation between people [10]. Like capital in general, social capital represents a stock of assets that yields a flow of benefits, like e.g. income streams. We follow this approach by defining social capital as “the sum of the actual and potential resources embedded within or available through a network of relationships that is possessed by an individual or a firm” [11: 3]. To improve the operationalization of social capital, we propose to focus on its dimensions [12]. Basically, three major ones can be distinguished: They are its scope (or unit of observation), its forms (or manifestations) and its type of relationship through which social capital affects development:

- With respect to *scope*, the micro, meso and macro levels of analysis can be distinguished.
- With respect to *forms* two types can be distinguished: structural and cognitive [13].
- With respect to *relationship*, again two major types can be distinguished: bonding and bridging [14].

All dimensions are essential for the improvement of one’s well-being. In our analysis we will adopt the ‘narrow focus’ and concentrate on the micro level, i.e. individuals of farm households. The two other dimensions, i.e. the structural and cognitive side as well as bonding and bridging ties are considered in as far as they are helpful in better interpreting the micro results. In this way it is also assumed to cover most facets of social capital and to limit the number of indicators in measuring the various dimensions of social capital. Like with human capital, proxy indicators have to be applied.

III. METHODOLOGY

In this contribution, we want to analyse the impact of social capital in promoting agricultural development in transition economies. We assume that it, particularly the bridging ties, will lead to higher economic returns. Therefore, our analysis is based on the central hypothesis that, besides the provision of the major production factors, like land, labour and capital, social capital can be identified as a significant factor influencing the level of farm income.

We could test this hypothesis by analysing primary data from a farm household survey in Ukraine with the support of the Agricultural University in Zhytomyr in autumn 2006. The survey area is located in the Zhytomyr Region. A random sample of 255 household plot farmers had been interviewed in the years 2000, 2002 and 2004 about their

farm management activities. In a fourth survey round in 2006 a questionnaire module concerning social capital could be attached. Thus, the data of 2006 are analysed here.

The questionnaire module on social capital covers the whole range of social capital at the household level with respect to its form, i.e. structural and cognitive and its type of relationship, i.e. bonding and bridging. In total, eleven independent variables could be identified which had an influence on agricultural income on the household plot farmers (as the dependent variable). Four of them represent social capital derived from 24 indicators. The other seven variables are made up by the other production factors. The data analysis starts with descriptive statistics to give an overview of the sample. Multiple regression analysis is then applied to test whether the four social capital variables have a significant impact on the annual agricultural income. All calculations were done with the software package SPSS.

A. Descriptive statistics

The eleven independent variables could be put together under six categories (i.e. labour, land, capital, production structure, human capital and social capital). These variables were used in the quantitative analysis below. As the dependent variable for agricultural income the gross agricultural value added in 2005 was used which is made up by the total value of agricultural production minus the variable production costs. On average, it stood at about 8,093 UAH (1 EUR = 7.24 UAH [15]) in 2005. The variables in the model can be described as follows (Table 1):

Labour. The labour input is measured as the sum of the total working time of all household members. The total median labour input comes up to about 3,600 hours per farm.

Land. This indicator covers the total size of arable land operated by the farm including land for annual crops, fruits and vegetables. The median farm size is 0.42 ha. Compared to the national average, our sample is focusing on the smaller household plot farms.

Capital. Unfortunately, respondents were not in a position to come up with reliable estimates of the value of their buildings, tools and livestock. Therefore, two proxy indicators were asked; first the number of cattle including cows and, second, the number of pigs including sows. The respective median numbers stand at 2 and 1 heads.

Table 1 Descriptive statistics for the variables in the model

Variable	Unit	N	Min	Max	Median
<i>Independent variables:</i>					
Labour input: total annual working time	Hours	255	730.0	12,159	3,600
Total arable land	Hectare	255	0.06	13.42	0.42
Number of cattle, incl. milking cows	Heads	255	0	5	2
Number of pigs and sows	Heads	255	0	11	1
Production structure ¹⁾	%	255	5	80	21
Age of household head	Years	255	20	78	48
Educational level of household head ²⁾	Scale	255	0	5	2
Bonding cognitive social capital ³⁾	Scale	255	0.29	1.00	0.76
Bridging cognitive social capital ³⁾	Scale	255	0.00	0.71	0.24
Bonding structural social capital ³⁾	Scale	247	0.09	1.00	0.73
Bridging structural social capital ³⁾	Scale	255	0.32	0.95	0.64
<i>Dependent variable:</i>					
Gross agricultural value added	1,000 UAH	255	-1,959	44,988	8,093

Source: Own calculation with data from IAMO Ukraine farm survey

Notes: ¹⁾ Share of crop production in total gross agricultural value added,

²⁾ 0: not completed primary school, 1: primary school, 2: secondary school, 3: vocational training, 4: B.Sc., 5: M.Sc.,

³⁾ Index ranging from 0.0 to 1.0.

Production structure. This variable reflects the farming system adopted by presenting the share of crop production in total agricultural production. On average, about 21 percent of the gross value added is made up by the value of crops. This reflects the observation that these farms focus on more labour-intensive animal husbandry.

Human capital. Two variables reflect human capital of the household farmers. First, the age of the household head had been recorded. With an average age of 48 years, the figure is rather low. Therefore, household farmers cannot be equated with retired persons. In addition, it had been asked about the educational level of the household heads. This variable is measured on a scale ranging from zero (not completed primary school) up to five (completed M.Sc.). The median value comes up to two (completed secondary school).

Social capital. In total, the questionnaire covered 39 different aspects of social capital. Out of these, 24 indicators could be applied for further analysis. The major reason has been that almost no household farmer is member of a formal self-help organisation, e.g. service cooperatives or lobbying organisations. Out of the 24 indicators four index variables were deduced. The authors are aware of the problem that this approach requires strong and somewhat arbitrary assumptions about the weights for each indicator in the aggregation [16]. In our analysis, each indicator has equal weight. The four index variables were calculated by adding the figures for the single indicators belonging to that respective index and dividing the sum by the highest possible sum of answers. This procedure results in values between zero and one. Zero stands for no social capital at all

with respect to that index variable, while a higher value implies greater social capital.

The four index variables look as follows: The index *bonding cognitive social capital* concerns the questions trust to close family members, neighbours and friends as well as the possibility to borrow money (about one week's spending) from neighbours, friends and/or family members living outside of the household. The index *bridging cognitive social capital* concerns the trust to local government officials, input suppliers and traders as well as the possibility of borrowing money from a corporate farm, a bank and/or a credit union. The index *bonding structural social capital* concerns the option of getting help from neighbours, the personal relations to fellow household farmers, cooperation with their neighbours, working for the community and the attendance of village festivals. Finally, the index *bridging structural social capital* concerns the personal relations to managers of corporate farms, input suppliers, traders, food processors and local authorities. In addition, it includes the membership in a political party and the attendance of church services.

B. Multiple regression analysis

In order to test our hypothesis that social capital enhances the level of gross agricultural value added we calculated the following multiple regression model:

$$GAVA = const + \sum_{i=1}^{11} b(i) * variable(i) \quad (1)$$

GAVA: gross agricultural value added
const: regression's constant

b(i): coefficient for the i^{th} variable, $i=1..11$
 variable(i): value for the i^{th} variable, $i=1..11$

Among the total number of observations ($N = 255$) there had been eight with missing values. These had been replaced by the median value of that respective variable. Table 2 summarises the results of the multiple regression analysis showing the variable coefficients and their significance level. At the left-hand side of Table 2 the influence of all eleven variables is reproduced while at the right-hand side, the significant explanatory variables are shown only. Seven out of the eleven variables were not significant in the first model. Just the variables (2) land, (3) number of cattle, (4) number of pigs and (5) production structure had been significant. On the other side, the

variables labour, the two human capital variables and all four social capital variables had not been significant. At this stage, our hypothesis has not been confirmed by the analysis.

In the following, the model had been reduced in a stepwise modus to a model comprising significant variables, only, i.e. the calculation started with the full model which was backwards reduced thereby that non-significant variables were excluded step by step from the model. A variable was treated as non-significant if its level of significance was higher than 0.1. Finally, only significant variables were left in the model. Both models are highly significant and explain more than 70% of gross agricultural value added.

Table 2 Results of multiple regression analysis ($N = 255$)

Variable (i)	Model with all variables		Model with significant variables only	
	b(i)*	Level of significance**	b(i)*	Level of significance**
Labour	-0.019	0.577		
Land	0.214	0.000	0.208	0.000
Number of cattle	0.593	0.000	0.588	0.000
Number of pigs	0.464	0.000	0.453	0.000
Production structure	0.081	0.026	0.079	0.029
Age of household head	0.018	0.587		
Educational level of household head	-0.047	0.173		
Bonding cognitive social capital	-0.021	0.567		
Bridging cognitive social capital	0.004	0.918		
Bonding structural social capital	0.017	0.636		
Bridging structural social capital	0.056	0.162	0.057	0.080
Constant		0.213		0.030
Corrected R²	0.737		0.740	

Source: Own calculation with data from IAMO Ukraine farm survey

Note: * Standardised coefficients, ** A significance level lower than 0.1 indicates a significant effect of the variable on gross agricultural value added.

In the final model, five variables remain, which have a significant impact on gross agricultural value added. They are (2) land, the two proxy variables for capital, i.e. (3) number of cattle, (4) number of pigs, (5) production structure and (11) bridging structural social capital. The coefficients of all five variables are positive, indicating that an increasing endowment with land, capital and structural bridging social capital increases gross agricultural value added among household plot farmers in Ukraine. The standardised values of the coefficients demonstrate that capital and land have the strongest effect on agricultural income followed by the production structure and social capital. This result is concordant with the theories of neoclassical economics. In addition, the results confirm our

hypothesis that social capital in form of its bridging structural type has a significant positive impact on agricultural income. This confirms the thesis that links connecting people from different backgrounds are important to “get ahead”. In the Ukrainian background these are mostly informal links as membership in formal organisations among these farmers is negligible.

However, all the other types of social capital do not show any significant impact. In this respect, we suggest that various facets of social capital do not run into the same direction but might even oppose each other. We conclude that both bonding and cognitive social capital are not promoting agricultural income. Actually, the coefficient of bonding cognitive social capital is negative, although not

significant, implying that strong ties with close kin might even hamper economic development as suggested, among others, by Sabatini [17] making use of data on Italy. In addition, we were surprised that two production factors, i.e. labour and human capital did not show any significant impact on agricultural income. Again, the coefficients of labour and educational level of household heads are negative. We suggest that these farmers might have overstated their time in agriculture and those household members with higher education might be engaged in non-farm activities.

IV. CONCLUSIONS

In this paper we discuss the impact of social capital on gross agricultural value added based on the hypothesis that social capital is an important factor of influence. With the help of data from an empirical survey among 255 household plot farmers in Ukraine executed in 2006, we tested our hypothesis. We developed four separate index variables reflecting different aspects of social capital. By running a multiple regression analysis we could show that social capital in its bridging structural form, in addition to the classical production factors, has a significant impact. Our hypothesis has been approved. However, the other three index variables reflecting social capital had no impact. The various indices do not seem to run into the same direction. We conclude that both bonding and cognitive social capital are not promoting agricultural income among household plot farmers in Ukraine. In this respect, our findings confirm the multidimensional and context-dependent nature of social capital. A first recommendation can be drawn: Household plot farmers can improve their agricultural income if they build up and strengthen links and networks with people from different backgrounds.

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