FARM INCOME AMONG HOUSUEHOLD PLOT FARMERS IN UKRAINE – THE IMPACT OF SOCIAL CAPITAL

*Wolz, Axel, *Jana Fritzsch, *Gertrud Buchenrieder, *Andriy Nedoborovskyy, **Vitaly Zinovchuk

Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO)
Theodor-Lieser-Str. 2
06 120 Halle (Saale), Germany
** Department of International Agribusiness Management
State University of Agriculture and Ecology
Zhytomyr, Ukraine

wolz@iamo.de

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FARM INCOME AMONG HOUSEHOLD PLOT FARMERS IN UKRAINE – THE IMPACT OF SOCIAL CAPITAL

Axel Wolz, Jana Fritzsch Gertrud Buchenrieder, Andriy Nedoborovskyy[*],
Vitaly Zinovchuk[**]

Summary

Following the two rounds of land reform in Ukraine since independence, household plot farmers emerged as the major suppliers of agricultural goods. But they form a very heterogeneous group. Not all of them are equally successful and integrated to markets. In general, a varying degree of access and 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 hypothesis using primary evidence from a survey in Ukraine among 255 household plot farmers. Based on 23 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 can 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: empirical survey, household farming, agricultural income, social capital, Ukraine

1   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 (Table 1). In-between comes the relatively small group of about 43,000 peasant farmers cultivating, on average, about 80 ha. But even after the spectacular economic recovery since 1999 (LERMAN et al., 2007: 2) agricultural production is still dominated by so-called household plot farmers. About 60 percent of the gross agricultural output is provided by these farms. Business-oriented farms play a minor role. However, the respective focus on production is different. While household plot 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.

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[*]   Dr. Axel Wolz, Dr. Jana Fritzsch, Prof. Dr. Gertrud Buchenrieder, Andriy Nedoborovskyy, Leibniz Institute of Agricultural Development in Central and Eastern Europe (IAMO) Theodor-Lieser-Str. 2 06120 Halle (Saale), Germany Email: wolz@iamo.de

[**] Vitaly Zinovchuk, Department of International Agribusiness Management State University of Agriculture and Ecology, Zhytomyr, Ukraine

Table 1:   Distribution of total farm number, size and production in Ukraine (2004)

	Corporate farms	Peasant farms	Household plots
Number of units	17,700	43,000	~ 5,500,000
Share of agricultural land (%) [a]	59.0	8.0	33.0
Average size (hectares)	1384.0	80.0	2.5
Share of gross agricultural output (%) [b]	35.8	3.9	60.3

Source: Lerman et al., 2007: 1-2, 21

Note: a) Total area: 42 million hectares

b) At 2000 prices

The main reason for the strong role of household plot farms seems to be the necessity of securing the family's subsistence food consumption. Moreover, surplus production forms an important source of income and helps to improve the living standard of the rural population (LERMAN et al., 2007: 5-6). But household plot 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 the educational level. However, it has been observed that similar endowments with production factors do not necessarily lead to similar economic results (SLANGEN et al., 2004: 246; SVENDSEN and SØRENSEN, 2007: 453). Similarly, some household plot farmers are more market-oriented while others mainly produce for subsistence 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.

A very comprehensive overview of research on social capital in Central and Eastern Europe (CEE) has been presented by MIHAYLOVA (2004). However, there are not that many studies about the impact of social capital on agricultural development in transition economies, like e.g. the Ukraine. The debate in agricultural economics and the empirical analysis concerning this issue has just started. We seek to contribute to filling this gap. In analysing empirical data from household plot farmers in Ukraine, we argue that social capital can be identified as an additional production factor, which influences the level of agricultural income significantly.

Our contribution is structured as follows: in the beginning we discuss the concept of social capital, its dimensions and definition. The major part of the study will be made up by the analysis of the empirical farm survey data investigating whether social capital has an influence on their material welfare. A short concluding section follows.

2   Concept of Social Capital

The concept of social capital has been adopted rather recently in economic and social sciences. 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 people act within social and cultural contexts. These contexts affect how resources are allocated to competing ends. There has been an expanding scholarly literature if and how social capital matters for economic growth (GOETZ and RUPASINGHA, 2006: 1304; ISHAM et al., 2002: 6). However, despite this immense amount of topical research, there is no common consensus about its meaning. In their review article DURLAUF and FAFCHAMPS (2005: 1643) complain 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 in empirical research, like the present study has been to develop a 'lean and mean conceptualisation' when applying the concept (WOOLCOCK, 2002: 22) or to follow a 'narrow focus' (DURLAUF and FAFCHAMPS, 2005: 1692). 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 (WARREN et al., 2001: 2). 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 referring to SPORLEDER and WU (2007: 3) who define 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". To improve the operationalisation of social capital, GROOTAERT and VAN BASTELAER (2002: 2-4) propose to focus on its dimensions. Basically, three major dimensions can be distinguished: They are (1) its scope (or unit of observation), (2) its forms (or manifestations) and (3) 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. At the micro level individuals and households are the focus of analysis, at the meso level relations among groups rather than individuals, while at the macro level the most institutionalised relationships and structures, such as e.g. the rule of law, are analysed.

- With respect to *forms* two types can be distinguished: structural and cognitive. Structural social capital facilitates information sharing and collective action through established roles and social networks supplemented by rules, procedures and precedents. It is relatively objective and observable and can be devised through group deliberation. Cognitive social capital refers to shared norms, values, trust, attitudes and beliefs within a 'we-group'. It is more subjective and intangible. The former group facilitates a stream of benefits, in particular in lowering transaction costs, having already established patterns of interaction that make productive outcomes from cooperation more predictable and beneficial. The latter group predisposes people toward cooperative behaviour, in part because once they are widely shared they make cooperation more likely (UPHOFF, 1999: 218).

- With respect to *relationship*, again two major types can be distinguished. One type refers to intra-group relationships, i.e. relationships of 'bonding' that strengthen links between people and facilitate intra-group interaction and collective action. The other type refers to inter-group relationships, i.e. relationships of 'bridging' that strengthen linkages between groups and organisations from different backgrounds, both at horizontal and vertical levels. PUTNAM (2000: 22-23) argues that both types of links bring benefits, but in different ways. Bonding social capital is good for promoting special reciprocity and mobilising solidarity (or to 'get by'), although it might create also negative effects. Bridging networks are better for linkage to external assets and for information diffusion (or to 'get ahead').

All dimensions are essential for the improvement of a person'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.

3 Methodology

In this contribution, we want to analyse the impact of social capital in promoting socio-economic 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, human capital (including labour) and physical as well as financial 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 was added. 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 23 indicators. The other seven variables stand for 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.

3.1 Descriptive Statistics

The eleven independent variables were allocated to six categories (i.e. labour, land, capital, production structure, human capital and social capital). These variables were used in the quantitative analysis below. As dependent variable for agricultural income the gross agricultural value added in 2005 was used. It was calculated as total value of agricultural production minus variable production costs. On average, it stood at about 8,093 UAH (1 EUR = 7.24 UAH, OANDA, 2008) in 2005. The variables in the model are described in Table 2.

Table 2: Descriptive statistics for the variables in the model

Variable	Unit	N	Min	Max	Median
Independent variables:					
Labour input: total annual working time	Hours	255	730	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	0.33	1.00	0.67
Dependent variable:					
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.

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.

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. LERMAN et al. (2007: 6) report a more even balance of crop and livestock production among household plot farmers in Ukraine. The relative small share in our sample 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 38 different aspects of social capital. Out of these, 23 indicators could be applied for further analysis. Interestingly, almost no household farmer is member of a formal self-help organisation, e.g. service cooperatives or lobbying organisations. Therefore, the respective indicators had to be dropped from further analysis. One option generally applied when analysing a large set of variables is the creation of a single numerical index (e.g. see for social capital analyses: NARAYAN and PRITCHETT, 1999: 876-877; KRISHNA and UPHOFF, 2002: 106). The problem with this approach is that it requires strong and somewhat arbitrary assumptions about the weights for each indicator in the aggregation. In addition, this method assumes that a single numerical index is sufficient to represent social capital. However, various studies have shown that social capital is not a homogeneous entity (WINTERS et al., 2002: 148).

Therefore, following the theoretical discussion above about the heterogeneity and various dimensions of social capital we deduced four index variables out of the 23 indicators. In our analysis, each indicator has equal weight in that respective variable. 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* summarises 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* refers to trusting in 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* relates to 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 membership in a political party.

3.2   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 (equation 1). The regression coefficients are calculated by ordinary least squares method and tested for significance.

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

GAVA: gross agricultural value added
Const: regression's constant
b(i):   coefficient for the ith variable, i=1..11
variable(i):   value for the ith variable, i=1..11

Table 3 summarises the results of the multiple regression analysis showing the variable coefficients and their significance level[1]. Table 3 summarises the results of the multiple regression analysis showing the variable coefficients and their significance level. At the left-hand side, the influence of all eleven variables is reproduced, while at the right-hand side, the significant explanatory variables are shown only. Six 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, (5) production structure and (11) bridging structural social capital had been significant. On the other side, the variables labour, the two human capital variables and the other three social capital variables had not been significant. At this stage, our hypothesis has been confirmed by the analysis as one facet of social capital was significant.

In the following, the model has 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 the observed variability in gross agricultural value added.

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[1] 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 3: Results of multiple regression analysis

Variable (i)	Model with all variables		Model with significant variables only*	
	b(i)**	Level of significance***	b(i)**	Level of significance***
Labour	-0.021	0.548		
Land	0.210	0.000	0.204	0.000
Number of cattle	0.593	0.000	0.590	0.000
Number of pigs	0.462	0.000	0.451	0.000
Production structure	0.082	0.025	0.079	0.029
Age of household head	0.021	0.542		
Educational level of household head	-0.048	0.161		
Bonding cognitive social capital	-0.019	0.606		
Bridging cognitive social capital	0.005	0.900		
Bonding structural social capital	0.014	0.693		
Bridging structural social capital	0.075	0.053	0.070	0.030
Constant		0.120		0.012
Corrected R²		**0.739**		**0.742**

Source: Own calculation with data from IAMO Ukraine farm survey

Note: * When a model includes irrelevant variables then the estimators for the coefficients are unbiased but inefficient (MADDALA, 1992: 181). Therefore, the original model was stepwise backwards reduced till it only included significant variables. ** 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 (at the 1%-level) 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 absolute 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 congruent 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 hypothesis 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 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 (2008: 489) 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 the 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.

4   Conclusions

The agricultural sector in Ukraine used to be dominated by state and collective farms until the break-up of the Soviet Union. Meanwhile, it is the household plot farms that contribute the majority to gross agricultural output with more than 60% (2004). One of the most important reasons for the dominance of the household plot farms seems to be the need to secure the livelihood with subsistence farming. Moreover, surplus production is an important source for cash revenues to improve the living standard. Clearly, the household plot farms are not a homogenous group but are, at the one end of scale, strongly subsistence oriented and at the other end of scale, rather market oriented. Similarly, some households are economically more successful than others. The varying access to the classical production factors (land, labour, capital and human capital) does not seem to account solely for this variation. Therefore, it is hypothesised in this paper that social capital is contributing also to the difference. However, there are hardly any studies about the impact of social capital on agricultural sector development and adjustment in Ukraine.

The econometric results in this contribution are based on a survey of 255 household plot farmers in 2006. The median gross agricultural value added in the sample was about 8,093 UAH, or 1,120 EUR per household. This indicator for agricultural productivity is taken as dependent variable. It is regressed against the classical production factors as well as a bundle of four social capital index variables. These indices represent various dimensions of social capital. These dimensions combine the forms of social capital, namely structural and cognitive social capital as well as types of relationships, namely bonding and bridging social capital. All dimensions are essential for the improvement of well-being.

The econometric analysis in form of multiple regression analysis revealed five significant variables: land, number of cattle and the number of pigs (both indicators for capital), production structure and bridging structural social capital. Labour was not significant. The reason may be that household plot farmers have to cope with a significant degree of hidden unemployment. Scarcity of labour is thus not relevant in the production process. With respect to our hypothesis, the findings show that social capital in its bridging structural form, in addition to the classical production factors, has a significant impact. Hence, our hypothesis has been approved. In the Ukrainian background these are mostly informal links.

However, the other three index variables reflecting social capital were not significant. 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. Actually, strong ties with close kin might even hamper economic development if they do not allow getting out of close social relationships. The results indicate that social capital is not homogenous and only certain dimensions of it are valuable in promoting economic development. In this respect, our findings confirm the multidimensional and context-dependent nature of social capital (SABATINI, 2008: 468). 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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