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The Impact of Social Capital on Agricultural Income Among Corporate Farms in the Czech Republic

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Abstract

In the Czech Republic, agricultural production is still dominated by corporate farms. However, not all of them had been equally successful, economically. 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 analysed in this paper. Based on the findings of a survey among a sample of 166 corporate 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.

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

JEL classification: C31, P32, Q12, Z13

1 Introduction

Right after the change of the political regime, the transformation process in most countries of Central and Eastern Europe (CEEC) focused on the restructuring of the organisation of agricultural production in promoting the privatisation of former agricultural production co-operatives and state farms. Production entities compatible with the market-economic system emerged although in many cases the legal label was changed, only (Lerman, 2000: 10). Many of these organisations had been transformed into corporate farms or legal entities, i.e. transformed agricultural producer co-operatives, joint-stock companies and limited liability companies. However, as intended in most CEEC, the number of registered and, particularly unregistered, private farms increased rapidly. Nevertheless, not that many had been established as originally anticipated and their share in agricultural production is in general much lower than in Western Europe. Both, managers of the corporate farms and the private farmers had to learn to organise agricultural production in a market-economic environment.

In addition, the transformation of the agricultural sector involved the supporting organisations of the newly established agricultural producers. Both, managers of the corporate farms and individual farmers were in urgent need of appropriate institutions and self-help organisations (see for general discussion on the role of institutions and organisations: North, 1990: 3-6) to their support in order to participate actively in economic development, and not to be sidelined as passive producers. The institutional set-up of the command economy had become obsolete when Ministries of Agriculture, state-owned companies and mass organisations under the guidance of the Party used to link agricultural production and producers with the national economy and society. A new set of organisational infrastructure in support of agricultural producers which are membership-oriented and independent from any outside interference had to be established. These organisations could be set-up either from scratch or 'traditional-ones' had to be transformed accordingly. It is assumed that, besides other factors of influence, the competitiveness and the level of economic welfare of agricultural producers is restrained if they cannot rely on organisations to their support.

As could be observed during the last decade, some transition economies have been more successful than others in moving towards an agricultural sector that typifies that one found in the West (Rozelle and Swinnen, 2004; Slangen et al., 2004: 246). Similarly, when looking at the farm level, quite a number of agricultural producers had been very successful while others failed. Many factors seem to be of influence. One factor which is being analysed since about more than a decade concerns the issue of collaboration and linkages with people being confronted with a similar situation. This aspect is discussed under the heading of social capital. Whether this concept constitutes an additional factor increasing economic welfare will be the focus of this analysis. It is guided by the hypothesis that, besides the provision of other production factors, social capital can be identified as a significant factor in determining agricultural income.

2 Concept of Social Capital

The concept of social capital had been adopted fairly recently in social and economic sciences. Conventionally, in economics, growth and development are based on the efficient adoption of the major production factors, i.e., in general, land, labour and capital or, more specifically, natural capital, physical or produced capital (i.e. tools and technology), some economists separate financial capital (i.e. savings, credit, and investment) out of physical capital, and since its recognition in economics during the 1960s human capital (i.e. education, health, and training). “Together they constitute the wealth of nations ... Some natural capital will be depleted and transformed into physical capital” (Grootaert, 1998: 1). The latter will depreciate, and it is expected that technology will yield a more efficient replacement. The 19th and 20th centuries have seen a massive accumulation of human capital which helped to foster a rapid increase in economic welfare. However, during the last years it has become more and more realised that similar endowments with production factors do not necessarily lead to similar patterns of economic growth and development.

In this connection the concept of social capital has gained much prominence. 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 institutionalisation of group relations, usable as a source of other benefits (Portes, 1998: 3). Although there had been a long tradition of research on organisational development, particularly concerning co-operatives (see e.g. Dülfer 1994), a growing theoretical and empirical literature has helped to fuel a resurgence of interest in the social dimension of development. A range of new research has shown that communities endowed with a rich stock of social networks and civic associations are in a stronger position to resolve disputes, share useful information, set up informal insurance mechanisms, implement successful development projects, and confront poverty and vulnerability (Isham et al., 2002: 6). However, due to its recent emergence, broad ambit and multi-disciplinary nature, the conceptual literature is still evolving (Productivity Commission, 2003: 5). 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 sceptical whether this concept should be applied at all in studying economic issues (e.g. Manski, 2000: 121-123). Others argue that these differences and disagreements are a good measure of the intellectual excitement of the current social capital literature and urge to go on with the debate (e.g. Durlauf, 2002: F418).

2.1 *General Remarks*

The term ‘social capital’ had already been applied since a couple of decades. The concept, however, had become more popular during the 1980s. In general, it is referred to Bourdieu (1983) who considers social capital as an attribute of an individual in a social context. One can acquire social capital through purposeful actions and can convert it into other types of capital, like e.g. physical capital. But, he stresses that a high degree of transformation work is needed and long-term investments are necessary (Bourdieu, 1983: 195). Others, like Coleman (1988) and Putnam (1993) have focused on the collective point of view, although their concepts and objectives differ to a large extent. In general, sociologists and political scientists relate in their studies to norms, networks and organisations through which people gain access to power and resources. In economics, the concept gained prominence with the execution of the ‘Social Capital Initiative’ by the World Bank during the second half of the 1990s. When analysing economic performance the ambitious claim had been put forward that social capital might constitute an independent, and hitherto under-appreciated, factor of production (Woolcock, 2002: 20-21).

Economists, in general, concentrate on the contribution of social capital to economic growth. At the microeconomic level this is seen primarily through the way it improves the functioning of markets. At the macroeconomic level institutions, legal frameworks, and the government’s role in the organisation of production are seen as affecting macroeconomic performance (Grootaert, 1998: 2). Social capital is seen to affect economic development mainly by facilitating transactions among

individuals, households and groups in society. This facilitating function can take the following forms: (1) Participation by individuals in social networks increases the availability of information and lowers its cost. This is true in formal and informal organisations, especially when the information can increase the returns from agriculture. For example, prices, location of new markets, sources of credit, treatment of plant or livestock diseases can be easily exchanged among members. (2) Participation in local networks and attitudes of mutual trust make it easier for any group to reach collective decisions and implement collective action. Since the bargaining power of individual farm entities is, in general, too small of having any impact on price negotiations with buying companies, joint marketing through their own groups and organisations can help maximise their income. (3) Networks and attitudes reduce opportunistic behaviour by group members. Social pressures and fear of exclusion can make individuals behave in certain group-beneficial ways.

More specifically, the social capital question concerns the benefits and costs of co-operation. Olson's study (1965) about the logic of collective action can be seen as the basic work of research about organisational development. As a central issue incentives, costs and expected profits are discussed that motivate people to act together. The basic hypothesis concerning social capital's impact assumes that the welfare within the group generally will be enhanced, in the sense that the collective gains net of costs to group members will be positive (Knack, 2002: 43).

The major reason for the large spread of different understandings of social capital can be seen in the fact that different authors focus on different dimensions which in real life are interdependent and overlapping. Basically, four key dimensions can be distinguished: They are its scope (i.e. micro, meso and macro levels), its forms (i.e. structural and cognitive), its channels (i.e. information sharing, collective action and decision-making) and its type of relationship through which it affects development (i.e. intra- or inter-group relationships) (Grootaert/van Bastelaer, 2002: 2-4; Bebbington/Carroll, 2000: 6). Since individual authors emphasise different aspects of the various dimensions, it is no surprise that the adopted definitions of social capital vary to a large extent. Some authors have tried to cover as many dimensions as possible, so the definitions become highly complex. The major drawback of such an approach is the fact that it is almost impossible to make them operational for any empirical tests. Therefore, voices became louder and called for a more tightly focused micro definition of social capital and advocated a 'lean and mean' conceptualisation focusing on the sources – that is, primarily social networks – rather than its consequences (which can be either positive or negative, depending on the circumstances), such as trust, tolerance and co-operation. 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 in which communities are inherently embedded (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 organisations used by individuals and households to produce goods and services for their own consumption, exchange or sale". In general, informal social networks comprise face-to-face relationships between a limited number of individuals who know each other and are bound together by kinship, friendship, or propinquity. Informal networks are 'institutions' in the sociological sense of having patterned and recurring interaction. However, they lack legal recognition, employed staff, written rules and own funds. In general, they are not formally structured as there is no principal but agents only exchanging information, goods and services. On the other side, formal organisations are legally registered and, hence, have a legal personality. They are rule-bound and have to follow formal procedures in their management. In general, they have a secured annual budget which might be made up by its members, the market and/or the state. A formal organisation can have as its members both, individuals and/or other organisations. In this respect, an organisation is a corporate actor who, as a principal, co-ordinates its agents' activities and benefits from the activities of the agents (Rose 1999: 149; Abele et al., 2001: 4).

Closely linked to the discussion about the definition of social capital is the question of how to quantify and measure it. Like human capital, social capital is difficult, if not impossible, to measure directly; for empirical purposes the use of proxy indicators is necessary. Years of education and years of work experience have a long tradition as proxies for human capital and have often proven their value in empirical studies, depending on the research question. Depending on the definition adopted, the number and focus of indicators varies which make any comparison of social capital studies quite difficult. Indicators differ both geographically and sectorally (Grootaert/van Bastelaer, 2002: 6-7). Some authors have developed up to 124 indicators which were grouped into 44 variables (see e.g. Bebbington/Carroll, 2000: 20-21). Needless to say that this approach required a lot of time and resources. In line with the call for a more tightly focused micro, or more pragmatic, definition of social capital the number of relevant indicators is supposed to be reduced. In our analysis we could make use of a limited range of indicators, only. Therefore, we will follow this more pragmatic approach and will concentrate on membership in formal organisations, i.e. both passive and active one. While passive membership just means membership as such, i.e. paying membership fees and participating in meetings, involves active membership the election to and service of the respective members in the self-governing bodies of an organisation.

2.2 *Role of Social Capital in Transitional Agriculture*

In general, it can be stated that the transition of the agricultural sector from a centrally planned to a market economy has not been that successful as originally anticipated and a number of reasons have been given (see e.g. Rozelle and Swinnen, 2004, Bezemer, 2002: 1301-1307). The major ones can be summarised as follows: Underdeveloped rural financial systems and the complicated mode of farm restructuring led to limited access to loans due to the lack of profitability, collateral problems, risks and uncertainty. Similarly, the farm sector was characterised by a weak human capital structure, fragmented land ownership, rapid changes in agricultural policies and an incomplete legal framework. As an additional reason, it has been argued that the poor and disappointing results of the transformation process have been due to a low level of social capital (e.g. Paldam and Svendsen, 2000). Putnam (1993) stresses the correlation between time of dictatorship and its detrimental effect on trust and co-operation.

Even after a decade of transition, it had been suggested that social capital of post-communist countries is therefore weak, and these low levels may also explain why their national incomes are low relative to the levels of physical and human capital. Large parts of the populations tend to rely passively on the state, a feature to be found in the agricultural sector of many CEEC in particular. It is argued that, in all transition countries, farmers, including farm managers, have to regain initiative and relearn how to co-operate (Chloupkova/Bjornskov, 2002: 245). The importance of connections and networks for managers of transformed co-operatives and privatised state-farms for doing businesses in comparison to individual farmers is underlined by Bezemer in his study about the access to financial services, including subsidies in the Czech Republic. For all types of farmers it is vital to build up longer-term relationships with market partners, including bank staff, in order to reduce transaction costs. Corporate farm managers have been by far more successful in doing so than private farm operators. The main reason seems to be that most of these relationships have been transferred from the socialist period and *de novo* private farmers have no option of joining. As these networks pre-date the economic reforms, the relatively new businesses such as individual farms have more limited access to resources allocated within the networks, such as e.g. credit (Bezemer, 2002: 1312-1314). In this respect, it could be observed that social capital built up during the socialist period could be transformed step by step into new relations which helped to overcome the uncertainties of the newly established market economy. However, as will be discussed below, managers of the transformed farm production entities had not been equally successful in building up this type of capital.

But it has to be admitted that contrary to the situation in developing countries not that many studies about the role of social capital on rural development in general and agricultural development in specific have been executed in transition economies, so far. A very comprehensive overview about research on social capital in Central and Eastern Europe has been presented by Mihaylova (2004). While, like in other disciplines, the number of studies about the impact of social capital on economic

development is increasing, there are only a few when it comes to rural, or even, agricultural development. First studies have been organised by Rose (1999) and O'Brien (2000) focusing on Russia, but the existence of social capital among rural inhabitants as such and not the agricultural development process was the focus of their work. However, during the last years various researchers started to look in more detail into the concept of social capital and its relevance for agricultural development. Besides Bezemer (2002) and Chloupkova/ Bjornskov (2002), Hudeckova/ Lostak (2003) analysed data from the Czech Republic, Swain (2000) from Hungary, Wolz et al. (2004) from Poland and Hagedorn et al. (2002) from different CEEC. However, in not all of these studies social capital had been the central focus and the adopted approaches differ greatly.

In general, it has to be concluded that the weights ascribed to social capital in explaining the variations in economic performance, for the transition economies at least, stands in stark contrast to the dearth of empirical evidence that would support such conclusions. There is still a great lack of information regarding the economic effects of social capital with respect to the situation of agricultural producers in transition economies. The empirical analysis about this issue has just started. In our analysis we want to contribute in filling this gap by analysing survey data from managers of corporate farms in the Czech Republic.

3 Data Analysis

In this contribution, we want to analyse the impact of social capital in promoting agricultural development in transition economies. We assume that membership in organisations will lead to higher economic returns. Hence, 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 explaining economic development at national, regional and local levels. More specifically, we follow the hypothesis that the economic welfare of agricultural producers is, at least to some extent, determined by their membership in formal organisations and informal networks.

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 jointly developed by IAMO (Halle) and VUZE (Prague) and had been executed by a commercial survey company during late summer of 2004. However, the focus of this survey had not been on social capital, but on assessing transaction costs among milk producers. But some questions concerning social capital could be included. In our analysis we focus on corporate, large scale farms, i.e. joint stock companies, transformed agricultural co-operatives or limited liability companies. Private or individual farms have been covered by a separate survey which is not being discussed in this paper. Actually there had been two questionnaires covering corporate farms, first a more general one for directors of the farm enterprises focusing on organisational issues (N = 166) and a second one for the chief economists focusing on economic issues (N = 157). Unfortunately, not all chief economists of the survey farms could be approached for interview. Hence, their number is somewhat smaller. Based on key informant interviews and statistical data, it had been assured that the sample is representative for corporate farms of the Czech Republic.

Due to the different focus of this survey as well as financial and organisational limits not that many questions covering the concept of social capital could be incorporated in the questionnaire. It had to be restricted on the role of formal organisations, while questions about the nature and relevance of informal networks had to be left out. Similarly, the cognitive side of social capital, like trust, values, norms and attitudes could not be incorporated in the questionnaire. Therefore, the focus is on the structural form of social capital. Hence, in total, 22 variables could be used for analysing their influence on the annual gross agricultural income of which 13 variables are representing social capital and another nine the other production factors (see for more details Chapter 3.1). The data analysis starts with descriptive statistics to get an overview over the sample. Because the size of the annual gross agricultural income depends a lot on correlated variables, further evaluation was done using factor analysis in order to extract independent factors from the set of correlated variables. These factors were used in the final evaluation step to calculate a multiple regression model and to test

whether the factors have a significant impact on the agricultural farm returns. All the calculations were done with the software package SPSS.

3.1 Descriptive Statistics

The 22 independent variables could be put together under six categories (i.e. labour, land, capital, production structure, human capital and social capital). These categories were used in the quantitative analysis below. As the dependent variable the annual total agricultural turn-over in 2003 had been applied for gross agricultural income. The variables of the six categories can be described as follows:

Labour: The labour input is measured as the sum of the total annual working time for all employees and workers of a farm (Table 1 for summarising statistics). The total median labour input comes up to about 121,700 hours per farm.

Land: This indicator covers the total size of arable land operated by the farm (Table 1). Almost all land had to be rented. The median farm size comes up to 1,085 hectares.

Capital: This variable is the sum of four separate indicators, i.e. the value of buildings, machines and equipment, animals, and perennial crops (Table 1). It is based on the book accounting value. The value of own arable land is not included. The average book value per farm amounts to about 47.5 million CZK¹.

Table 1: Descriptive statistics for variables describing labour, land, capital, human capital, and gross agricultural income

Variable	Unit	N	Median
Sum of the total annual working time for all employees and workers	Hour	154	121,672.5
Amount of total arable land	Hectare	157	1,085.0
Value of capital	Thousand CZK	150	47,484.5
Education of the director (1=apprentice; 2=secondary school and apprentice; 3= university)	Scale	165	3.0
Work experience of the director	Year	160	30.0
Education of the management (1=apprentice; 2=secondary school and apprentice; 3= university)	Scale	159	2.0
Work experience per manager	Year	158	24.0
Average age of all employed persons	Year	160	45.0
Gross agricultural income, 2003	Thousand CZK	158	42,539.5

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

Human Capital: Five variables reflect human capital of the respective corporate farms (Table 1). The educational level of both, directors and management staff had been asked. Since the educational level of managerial staff in the Czech Republic is quite high, a simple scale had been adopted: 1 = primary school and apprenticeship in agriculture; 2 = high school degree followed by an agricultural apprenticeship; 3 = university degree. More than two thirds of the directors had a university degree and more than two thirds of the managers had a high school degree and passed an agricultural apprenticeship. In addition, the work experience of both, directors and management staff had been asked. Both groups are well experienced as they worked for, on average, 30 and 24 years, respectively. With respect to the management the average number of years working in the job refers to all managers. Finally, it had been asked about the average age of the total workforce of the farm. With an average age of 45 years, the staff is not too old.

¹ CZK: Czech Koruna, 1 US\$ = 28.23 CZK, 1 €= 31.89 CZK in 2003 (OANDA, 2005).

Production Structure: The production structure was measured in five categories according to the significance of crop and animal production to the gross agricultural income. As shown in Table 2 most farms prefer a mixed farming system, i.e. a combination of crop and animal production. Only 1.8 % of the 165 farms are totally specialised in crop production whereas no farm of the sample solely focuses on animal production.

Table 2: Production structure (relative frequencies in %, N = 165)

Category	Relative frequency (%)
Animal production only (100 % of gross agricultural income)	0.0
Mostly animal production (more than 75 % and less than 100 % of gross agricultural income)	15.8
Mixed farming system	77.0
Mostly crop production (more than 75 % and less than 100 % of gross agricultural income)	5.5
Crop production only (100 % of gross agricultural income)	1.8

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

Social Capital: The focus of this paper is on social capital. As discussed above, we had to restrict the analysis on its structural form. Therefore different indicators describing passive membership and active participation in formal organisations, marketing channels, co-operation with other farms and public relations were used. In total, there had been 13 different variables referring to social capital. Among the formal organisations the Chamber of Agriculture plays a distinguished role and was separately listed in the questionnaire. The directors were asked whether the farm is a member of the Chamber of Agriculture, whether any employee or worker of the farm is serving as a member in any self-governing body of the Chamber and how often representatives of the farm participate in activities organised by the Chamber. 141 farms (or 85 %) are members and 59 of them (or 42 % of those who are member) have an employee serving in at least one of the self-governing bodies of the Chamber. Participation in the activities offered by the Chamber is very high. Employees of nearly half of all farms take part in 2-5 activities (i.e. lectures, seminars) annually and those of about 44 % are even more active (Table 3).

Table 3: Annual Participation in activities offered by the Chamber of Agriculture and lobbying organisations in 2003 (relative frequencies in %)

Organisation	N	Number of Participation				
		never	1	2-5	6-10	> 10
Chamber of Agriculture	141	1.4	5.7	48.9	29.1	14.9
Lobbying organisations	139	7.2	6.5	38.1	28.1	20.1

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

The membership in lobbying organisations was recorded by asking the directors whether they were member in up to five organisations which are mainly representing corporate farms in the political process. These were the Association of Agriculture, the Czech-Moravian Association of Agrarian Entrepreneurs, the Association of Private Agriculture of the Czech Republic, the Association of Young Farmers and other associations with agrarian orientation. About 74 % (i.e. 120 out of 162 having answered to this question) have joined the Association of Agriculture (AA) while the other organisations of support are of marginal relevance only. This reflects the general situation in the Czech Republic as AA is the dominant one. Surprisingly, 35 out of 163 farms (or about 22 %) have not joined any of these lobbying organisations at all. Employees from 63 farms (or about 50 % of those farms which are member) are serving in one of the self-governing bodies of these lobbying organisations. Similarly, there is a high participation rate in the various activities offered by these organisations. Employees of about 38 % of the farms take part in 2-5 activities and those of about half of the farms are even more active (Table 3).

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 the three major marketing channels mentioned by the farm managers, i.e. joint marketing through marketing co-operatives based on voluntary membership as well as sales to agri-trade enterprises and domestic processors, respectively. Marketing co-operatives have been set up since 1990. However, quite a number of them failed, so their image is not that good among farm managers. Agri-trade enterprises are the privatised successor companies of the former state-owned marketing enterprises which are specialised in input supply and sale of farm products. Domestic processor companies are those who buy up the agricultural raw material and process it directly to food or fibre, etc., e.g. milk or sugar beets. Farm directors and managers had been asked about their marketing channels and the respective share on total annual agricultural sales in 2003.

While marketing through joint marketing organisations requires the build-up of social capital with other farms, the other two marketing channels do not need this type of capital. With respect to joint marketing, it had been enquired about the number of products. No director named more than three products. One third of the farms sold at least one product, another third sold two or three products while another third did not name a product. In total the directors of 105 farm said that they sold products through joint marketing. This figure differs somewhat from the answer the chief economist gave on the question whether the farm uses joint marketing organisations to sell its products. Just 87 of them mentioned this type. Table 4 summarises some key statistics about the marketing channels. Joint marketing is very important for their members realising 50 % of their turn-over but just a bit more than half of all farms made use of this channel. Almost 80 % of all farms sold (at least a part of) their products to agri-trade enterprises which made up about 20 % of their total annual turn-over. About two thirds of all farms sold some of their products directly to a domestic processor. This sales channel accounted for nearly 40 % of their respective annual agricultural turn-over. Of minor importance is the sale of products through private traders and direct marketing. We conclude therefore that Czech farm managers make use of various marketing channels simultaneously but rely more on traditional buying organisations like agri-trade enterprises and domestic processors.

Table 4: Relevance of Major Sales Channels (N = 157)

Sales channel	Number of farms using the sales channel	Percentage of total annual agricultural turn-over (Median)	
		among those farms using this sales channel, respectively	for all farms
Joint marketing org.	87	50.0	18.0
Agri-trade enterprise	122	20.0	13.0
Domestic processor	106	39.8	22.0

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

Another important part of social capital is the ability to co-operate with other farm enterprises. The directors were asked whether they co-operate, formally or informally, in providing e.g. farm services, joint purchase of technology, joint leasing of technology, joint purchase of inputs, establishment and operation of co-operative saving banks, refining and warehousing and in other fields. About 90 % of all farms co-operate with respect to farm services and about a third each with respect to joint leasing of technology and refining and warehousing, respectively. The other areas are of marginal relevance. Most of the co-operations are informal. We use the total number of co-operations per farm as an indicator for the ability to co-operate and the density of the co-operation networks. Only 11 farms have no co-operations at all. The average number comes up to two co-operations per farm.

Finally, we use two variables to investigate about the linkages to the public authorities which might have an influence on the annual agricultural farm turn-over. Firstly, the directors were asked how often the representatives of the farm took part in public activities. About 70 % of all farms did so at least once per year. Secondly, directors were asked whether they invited representatives of the

municipality to farm events. About 40 % of the directors used this possibility to build up or strengthen this type of networks.

Gross Agricultural Income: As the dependent variable we used the total agricultural turn-over as indicator for gross agricultural income (Table 1). On average, gross agricultural income comes up to about 42.5 million CZK in 2003. Unfortunately, we had not sufficient information in order to come up with reliable cost figures. We understand that our dependent variable cannot be applied, in a strict sense, as a proxy for performance. Therefore, at this stage, it cannot be our intention to prove any influence of social capital on farm efficiency, but just to show that it has a significant influence on agricultural income.

3.2 Factor Analysis

The focus of this paper is to test the influence of social capital on gross agricultural income. 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 arable land. The factor analysis is a multivariate procedure that extracts independent factors from a set of correlated variables. The extracted independent 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 0.65 proving the matrix as mediocre but suitable for factor analysis (Backhaus et al., 2000: 269). By principal component analysis with varimax rotation and Kaiser normalisation nine factors could be extracted from the set of 22 variables explaining 66.6 % of the total variance in the included variables. Only factors with an eigenvalue greater than 1 are used in the further analysis because a factor should at least explain as much variability as one variable causes (Kaiser criterion). Hence, those factors with a lower eigenvalue are not further considered.

Table 5 summarises the results of the calculations by showing all the relevant factor loadings greater than 0.6 or less than -0.6 and those greater than 0.45 or less than -0.45 in italics for the 22 variables on nine factors.

In a next step we labelled the nine factors according to the variables that have factor loadings greater than 0.6 or less than -0.6 . Factor 1 summarises the three variables that describe the classical production factors land, labour, and capital. Two factors indicate different characteristics of human capital, i.e. education of the directors and the management staff (factor 6) and their work experience (factor 7). The average age of all employees has not only no relevant loadings on any factor but did not form an independent factor itself caused by small correlations with all other 21 variables. The production structure is quantified by the factor 9. These four factors actually represent more the traditional production factors. Another five factors stand for partial aspects of social capital. We named them membership and active participation in lobbying organisations (factor 2), membership and active participation in the Chamber of Agriculture (factor 4), marketing through joint marketing organisations (factor 3) and public relations and co-operation (factor 5). Factor 8 is labelled marketing through agri-trade enterprises and stands for a marketing channel that needs contacts to these companies but no co-operation with fellow farm enterprises. Hence, we understand this factor as representing a form of marketing which actually requires no social capital.

At this stage, it can be concluded that the factor analysis separated the classical production factors clearly from factors indicating social capital. The membership and active participation in a lobbying organisation as well as in the Chamber of Agriculture, the use of different marketing channels but also public relations and co-operations are independent from farm size or the volume of its capital. Or, in other words, it also shows that farm size *per se* is not related to membership in formal organisations, and hence to a higher level of social capital. Therefore, we feel encouraged to proceed with a more in-depth analysis.

In a final step, the factor scores for the nine independent factors were computed to replace the 22 correlated variables in the multiple regression model and to test whether the five social capital factors have a significant effect on gross agricultural income.

Table 5: Factor loadings greater than 0.45 or less than –0.45 for 22 variables on nine factors (principal component analysis, varimax rotation with Kaiser normalisation)

Variable	Factor								
	1	2	3	4	5	6	7	8	9
Value of capital	0.81								
Sum of total annual working time	0.80								
Amount of arable land	0.77								
Share of crop production in agricultural production									0.87
Education of the director						0.63			
Work experience of the director							0.69		
Education of the management						0.77			
Work experience of the management							0.72		
Average age of all employees									
Membership in the Chamber of Agriculture				0.79					
Service in any of the Chamber's bodies				0.69					
Participation in Chamber's activities				0.80					
Membership in lobbying organisations		0.79							
Service in any of the bodies of lobbying organisations		0.67							
Participation in activities of lobbying organisations		0.85							
Number of co-operations					0.68				
Number of products traded through joint marketing organisations			0.75						
Percentage of total agricultural sales by joint marketing organisations			0.86						
Percentage of total agricultural sales by agri-trade enterprises								0.86	
Percentage of total agricultural sales by domestic processors			-0.65					-0.47	
Participation in public activities					0.58				
Inviting of representatives of the municipality to farm events					0.74				
Eigenvalue	2.19	2.09	1.98	1.92	1.55	1.30	1.25	1.23	1.15

Remarks: Relevant factor loadings greater than 0.6 or less than –0.6 are in standard letters. Those greater than 0.45 or less than -0.45 are in italics.

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

3.3 Multiple Regression Analysis

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

$$Z_GAI = \sum_{i=1}^9 b(i) * factor(i)$$

Z_GAI : standardised gross agricultural income

b(i) : coefficient for the ith factor, i=1..9

factor(i) : scores for the ith factor, i=1..9

Due to missing values and three outliers the total number of observations came up to 102 farms on whose data the calculations of the regression analysis were based. Table 6 summarises the results of the regression analysis, i.e. on the one side the influence of all nine factors and on the other, of those three significant ones, only. The impact of five of the nine factors was not significant in the first model. Just the factors (1) land, labour and capital, (2) membership and active participation in lobbying organisations, (6) farm management's education and (9) production structure had been significant. In the following, the model was reduced in a stepwise modus to a model comprising only significant factors. A factor is only considered to be significant if its level of significance is smaller than 0.05. Both models are highly significant and explain about 60 % of gross agricultural income.

Table 6: Results of the multiple regression analysis (N = 102)

factor(i)	Model with all factors		Model with significant factors only	
	b(i)	Level of significance *	b(i)	Level of significance *
Land, labour, and capital	0.887	0.000	0.880	0.000
Membership and active participation in lobbying organisations	0.160	0.018	0.142	0.039
Marketing through joint marketing organisations	0.071	0.231		
Membership and active participation in the Chamber of Agriculture	-0.101	0.095		
Public relations and co-operations	0.048	0.454		
Farm management's education	0.195	0.002	0.204	0.001
Farm management's work experience	-0.052	0.424		
Marketing through agri-trade enterprises	-0.060	0.335		
Production structure	0.140	0.023		
Corrected R²	0.61		0.59	

Remarks: * A significance level lower than 0.05 stands for a significant effect of the factor on gross agricultural income.

Source: Own calculation with data from the IAMO/VUZE farm survey 2004

In the final model, three factors remain which have a significant impact on gross agricultural income. They are (1) land, labour, and capital, (2) membership and active participation in lobbying organisations and (6) farm management's education. The coefficients of all three factors are positive, that means that an increasing endowment with land, labour, capital, social capital and human capital increases gross agricultural incomes of corporate farms in the Czech Republic. The absolute values of the coefficients demonstrate that land, labour, and capital have the strongest effect on gross agricultural income followed by the educational level of the farm's management as a facet of human capital. This result is concordant with the theories of neoclassical economics. Social capital in form of membership and active participation in lobbying organisations has a less intensive but nevertheless significant positive impact. The mode of marketing of agricultural products, i.e. whether it is pursued in a more social capital oriented way (i.e. marketing through joint marketing organisations) or in a less social capital oriented one (i.e. marketing through agri-trade enterprises) seems to have no significant repercussions on the level of gross agricultural income. Also good public relations and the ability to co-operate with other farms were without significant influence.

4 Conclusions

In this paper we discussed the impact of social capital on gross agricultural income. We could draw on an empirical survey among directors and chief economists of 166 corporate farms in the Czech Republic. The survey had been executed during late summer 2004. Although the focus had

been on transaction costs a range of questions concerning social capital could be added, particularly with respect to membership in formal organisations and co-operation with other farms.

As expected by neoclassical theory gross agricultural income is significantly determined by the traditional production factors, i.e. land, labour, capital, and human capital. In addition, as stated in our hypothesis, it could be shown that social capital does have a certain influence on the level of gross agricultural income. Its impact is significant, but not that strongly as we had anticipated. Membership in lobbying organisations, serving in their self-governing bodies and participating in any activity organised by them is positively correlated with gross agricultural income. By far, the most important formal organisation for corporate farms in the Czech Republic is the Agricultural Association; an organisation which underwent quite a metamorphosis in various steps from a socialist mass organisation to an organisation based on voluntary membership and devoted to the support of their members. In that respect, they seem to be successful.

On the other side, it is a bit surprising that membership and active participation in the Chamber of Agriculture is not significantly related to gross agricultural income. They had been set up in 1993. At the beginning membership had been obligatory. While it had been conceived to represent the interest of all enterprises of the agricultural sector, it had been not very successful due to conflicting interests of the various members. Hence, particularly individual farmers and agri-industrial enterprises left, but to a small extent corporate farms as well. Nevertheless, by far the majority of corporate farms are still being members (85 % in our survey) so that it is almost impossible to measure any impact from membership for corporate farms.

We had been surprised that marketing through joint marketing organisations which we interpret as a type of social capital did not show a significant influence on the level of gross agricultural income. It is suggested that more in-depth research with respect to marketing channels will be needed to draw the appropriate conclusions.

Finally, it can be concluded that social capital does have a significant positive influence on the level of agricultural income among corporate farms in the Czech Republic. Our hypothesis has been approved by the analysis. Therefore, a first recommendation can be drawn: Corporate farms can improve their gross agricultural income if they join and work actively in formal organisations, particularly lobbying organisations like the Association of Agriculture. But we have to admit that the impact of social capital is not as strong as anticipated. We are just at the start in analysing and quantifying the concept. While we covered the structural side of social capital with respect to formal organisations, we had no data with respect to informal networks or to the cognitive side. Similarly, we cannot say anything about the costs in building up social capital. Nevertheless, we have developed various indicators representing social capital, but we could not come up with a single factor. Hence, there is ample room for improving the methodological approach. More in-depth research will be needed in order to clarify the concept of social capital, its measurability and its impact on agricultural income.

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