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Semi-Subsistence Farming, Farm Income and Social Capital in Bulgaria – Is there a Link?¹

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Abstract

Social capital matters in determining a person's or a family's material well-being. It is argued that social capital functions similar to the traditional production factors. However, there are not many empirical analyses looking into this hypothesis at the farm-household level in general and in post-communist countries in particular. Whether or not social capital affects farm income is tested in this paper in two ways using micro-data from 185 Bulgarian semi-subsistence farm households (SFHs). First, it is tested whether social capital has an impact on agricultural income. Whether social capital promotes more efficient farming is evaluated in a second step. The findings confirm the hypothesis that social capital not only increases agricultural income, but also the efficiency of agricultural production among SFHs in Bulgaria. However, different specifications of social capital may impact income and efficiency in a diverse way. While good relations to corporate farms are significant in getting higher agricultural incomes, good relations to large-scale private farmers significantly impact

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efficient managerial capability of SFHs. It is suggested that good links to the second group are vital for those SFHs, which aim at becoming viable farmers in the future.

Keywords: empirical survey, household farming, agricultural income, social capital, Bulgaria

JEL: Z13, Q12, R15, D13, P32

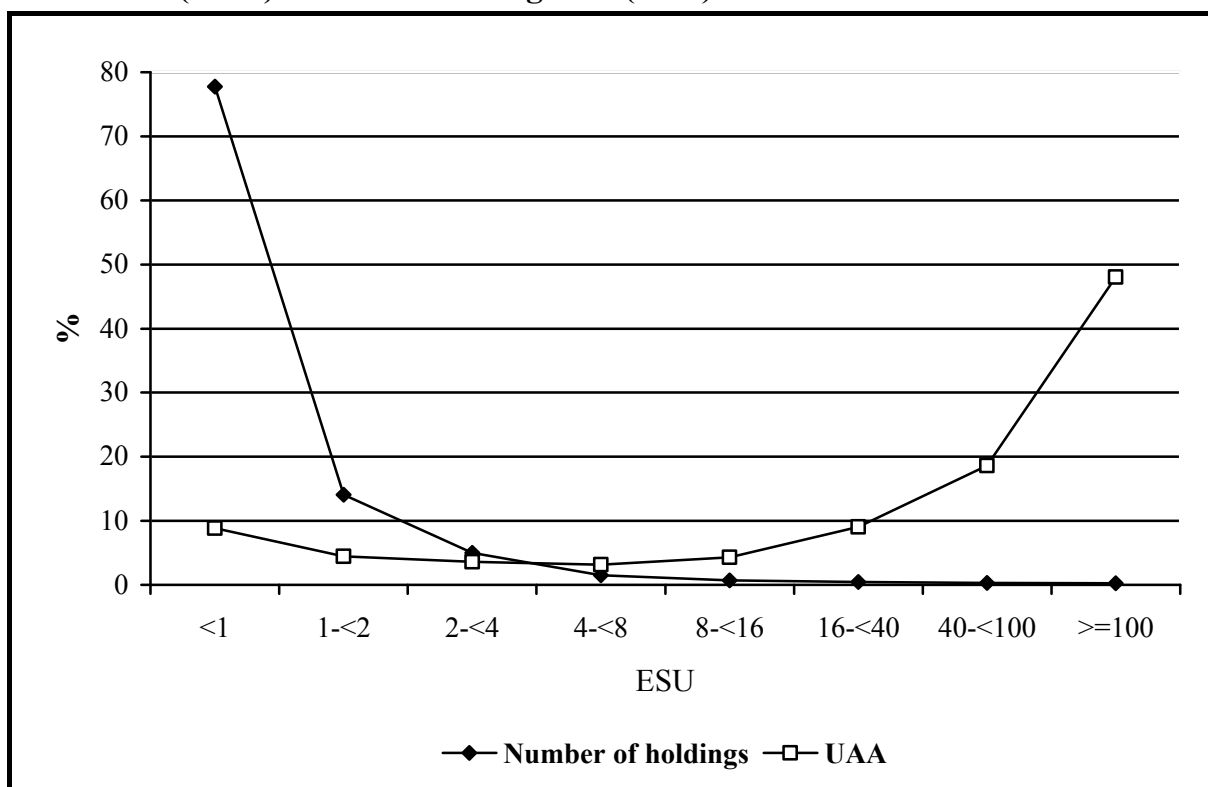
1 Introduction

After the collapse of the socialist regimes in Central and Eastern Europe (CEE), the agricultural sector did not develop as quickly as originally anticipated. The reasons have been comprehensively discussed by BUCHENRIEDER et al. (2009), ROZELLE and SWINNEN (2004) or BEZEMER (2002). While household plot farming had been a characteristic feature of socialist agriculture, it had been nevertheless a surprise that semi-subsistence farming became the dominant type of farm holding. In line with this observation, semi-subsistence farming in CEE has shown not to be a short or medium-term transition phenomenon but its importance has even grown over time. It seems that semi-subsistence farm households (SFHs) of less than five hectares have become a persistent and economically non-negligible phenomenon in CEE. They make up the majority (82% out of a total of 9.2 million) of farms in CEE. According to POULIQUEN (2001) they contribute at least 50% to the total agricultural production. Nevertheless, the majority of them cannot provide sufficient income for an adequate level of livelihood for the farm household (EC, 2004).

SFHs can be distinguished from subsistence farms on the one side and commercial ones on the other by looking at the share of sales of total agricultural production. However, the respective limitations are not universally accepted (ABELE and FROHBERG, 2003). For the purpose of this paper, SFHs are defined as those agricultural holdings of 1 to 4 ESU (European Size Unit), i.e. 1,200 € to 4,800 € standard gross margin, which market a part of their agricultural production. According to the latest figures (EUROSTAT, 2008), subsistence and semi-subsistence farms are still the dominant mode of agricultural production in Bulgaria (see figure 1). About 530,000 farms are cultivating around 2.7 million ha of the total utilised agricultural area (UAA). The majority, namely three quarters of them are producing less than one ESU. Another 19% are producing between 1 and 4 ESU. Only 3% of all farms can be classified as commercial. On the other side, farms producing less than 4 ESU are just cultivating about 17% of the UAA.

Obviously, SFHs represent a large share of farms in the CEE in general and in Bulgaria in particular. Yet, not much is known about their motivation, objectives and behaviour (KOSTOV and LINGARD, 2004). SFHs seem to play an important role as a social buffer in rural areas; some of them seem to wish to exit the agricultural sector, while others have the potential of becoming viable. Hence, SFHs in Bulgaria do not form a homogeneous group. It is understood that access to production factors, i.e. land, labour, capital, and human capital is a prerequisite for economic development of farm households. However, it has been observed that similar endowments of production factors do not necessarily lead to similar economic results (see e.g. SLANGEN et al., 2004). Therefore, it is plausible to conclude that there is an additional, so far under-rated factor of production, which affects agricultural income among SFHs and, hence, their potential of becoming viable farmers. This factor is labelled social capital. We will test this hypothesis in making use of farm survey data from 185 SFHs in Bulgaria referring to year 2006.

Figure 1. Distribution of agricultural holdings and utilised agricultural area (UAA) in farm size categories (ESU)



Note: 1 European Size Unit (ESU) is equivalent to 1,200 € standard gross margin.

Source: EUROSTAT (2008)

The paper is structured as follows. First, we will discuss the concept of social capital, its dimensions and definition. The major part will be made up by the analysis of the empirical data among SFHs in Bulgaria whether social capital has a significant impact on agricultural income and farm efficiency. A concise conclusion follows.

2 Concept of Social Capital

The concept of social capital, although being adopted rather recently in social and economic sciences, has become very popular. In broad terms, it can be defined as networks, norms and trust, which facilitate information sharing, collective decision-making and collective action. No doubt, 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 towards the institutionalisation of group relations, which might be usable as a source of other benefits (PORTES, 1998). Scholars debate, however, whether networks should be attributed to the individual (e.g. BOURDIEU, 1983) or considered as a group property (e.g. COLEMAN, 1988). Another problem of the concept refers to the understanding that social capital, due to difficulties of quantification, cannot be measured directly by one or two indicators, but requires multiple proxies. Hence, despite the immense amount of topical research, there is no common consensus about its meaning. Therefore, there has been a lot of criticism about its explanatory power in analysis, particularly among economists (e.g. MANSKI, 2000). However, during the last years and following other social sciences, economists increasingly recognise that people act within social and cultural contexts (GOETZ and RUPASINGHA, 2006). There has been an expanding scholarly literature on how social capital increases an individual's ability and willingness to cooperate, improves monitoring and enforcement of contracts, and reduces free-riding and information asymmetry lowering transaction costs (BUCHENRIEDER and DUFHUES, 2006; FIDRMUC and GËRKHANI, 2008).

Therefore, from the empirical perspective the main value of the concept of social capital seems to be in following a 'narrow focus' (DURLAUF and FAFCHAMPS, 2005: 1692). 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 make social capital operational, GROOTAERT and VAN BASTELAER (2002) 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 count, while at the macro level the most institutionalised relationships and structures are analysed.
- With respect to *forms*, structural and cognitive types can be distinguished. 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. Cognitive social capital refers to shared norms, values, trust, attitudes and beliefs. It is more subjective and intangible. The former type facilitates a stream of benefits having already established patterns of interaction. The latter type predisposes people toward cooperative behaviour (UPHOFF, 1999).
- With respect to *relationship*, bonding and bridging types can be distinguished. Bonding refers to intra-group relationships that strengthen links between people and facilitate intra-group interaction and collective action. Bridging refers to inter-group relationships that strengthen linkages between people, groups and organisations both at horizontal and vertical levels. PUTNAM (2000) argues that both types bring benefits, but in different ways. Bonding social capital is good for promoting special reciprocity and mobilising solidarity, although it might create also negative effects. Bridging networks are better for linkage to external assets and for information diffusion.

Intuitively, all dimensions are essential for the improvement of a person's well-being. In our analysis, we will adopt a narrow focus and concentrate on the micro level, i.e. SFHs. Similarly, we give attention to the structural side as well as on both bonding and bridging ties. In this way, we aim at covering most facets of social capital as discussed in theory while limiting the number of relevant indicators.

3 Methodology

This contribution centres around the analysis of whether and in which way social capital impacts on the socio-economic development of the small-scale farming sector in transition economies. The central hypothesis is that, besides the provision of the major production factors like land, human capital (including labour), physical as well as financial capital, social capital can be identified as a significant factor influencing agricultural income and farm efficiency. We test this hypothesis by analysing unique farm household data. The survey took place in 2007 in the North-West and North-

Centre regions of Bulgaria and refers to 2006. A sample of 185 SFHs was randomly selected. The structured questionnaire covered a wide range of social capital issues at the household level in line with the theoretical discussion.

Seventeen independent variables have been identified and included in the questionnaire, which are hypothesised to have an influence on agricultural income and efficient farm production of SFHs. Seven of them represent facets of structural social capital. First, SFHs were asked to rate their relations to fellow small-scale farmers, private large-scale farmers and corporate farms on a five-point scale (1: hostile to 5: mutual help). Relations to fellow small-scale farmers refer to bonding social capital while those to large-scale private farmers and corporate farms are of bridging type. Then, respondents were asked whether they acquired a formal loan in 2006, which corresponds to the bridging type of social capital. An informal loan reflects bonding social capital (dummy variables). Finally, SFHs were asked about their membership in formal organisations. We distinguished between agricultural on the one side and the more general oriented non-agricultural ones on the other. Both types of variables present the structural bridging type of social capital. Agricultural organisations comprise a membership in input supply cooperatives, marketing cooperatives, producer cooperatives, milk cooperatives, saving and credit cooperatives, producer organisations and agricultural associations (dummy variables). All these variables were condensed in an index (0: no membership at all, 1: membership in all observed organisations) by dividing the number of observed memberships by the number of agricultural organisations. Among the non-agricultural organisations, youth and women organisations as well as political parties were considered in the questionnaire. Since no membership in youth and woman associations was observed, only the membership in political parties (dummy variable) was entered in the analysis.

The other ten variables (out of the 17, which are assumed to influence SFHs' agricultural income and farm efficiency) represent labour, land, capital, production structure and human capital. Multiple regression analysis is applied to test whether the seven social capital variables have a significant impact on the annual agricultural income. The dependent variables are (i) gross agricultural value added, i.e. turn-over minus variable costs as a proxy of agricultural income and (ii) gross agricultural value added per unit of variable costs as a proxy for farm efficiency. The variables in the model are described in table 1.

Table 1. Descriptive statistics for the variables in the model

Variable	Unit	Min	Max	Median
<i>Independent variables</i>				
Number of economically active household members	Persons	0.0	5.0	2.0
Total arable land	Hectare	0.00	7.66	0.60
Capital index for buildings ¹⁾	Index	0.17	0.83	0.50
Capital index for machines ¹⁾	Index	0.00	0.75	0.00
Number of cattle, incl. milking cows	Heads	0	6.00	1.00
Number of pigs and sows	Heads	0	5.00	0.50
Production structure ²⁾	%	0	100	24.12
Age of farm operator	Years	24	87	58
Highest level of formal schooling in the household ³⁾	Scale	2	7	4
Experience of farm operator in managing a farm	Years	3	50	15
Relations to fellow small-scale farmers ⁴⁾	Scale	1	5	4
Relations to large-scale private farmers ⁴⁾	Scale	2	5	4
Relations to corporate farms ⁴⁾	Scale	2	5	4
Getting informal loan (no=0, yes=1)	Binary			24.3 ⁵⁾
Getting formal loan (no=0, yes=1)	Binary			19.3 ⁵⁾
Membership in agr. organisations ¹⁾	Index	0.00	0.43	0.00
Membership in political party (no=0, yes=1)	Binary			22.8 ⁵⁾
<i>Dependent variables</i>				
Gross agricultural value added	EUR	-633.65	7,102.61	1,781.37
Gross agr. value added/variable costs	EUR/EUR	-0.41	35.47	3.76

Notes: N=149: 36 households were excluded from the analysis due to outliers in the data. ¹⁾ Index ranging from 0 to 1. ²⁾ Share of crop production in total agricultural production. ³⁾ 0: cannot read or write, 1: no studies, but can read or write, 2: completed elementary school, 3: vocational school, 4: grammar school, 5: other occupation-specific higher education, 6: B.Sc., 7: M.Sc., 8: post-graduate studies, 9: Ph.D. ⁴⁾ 1: hostile, 2: bad, 3: no relations at all, 4: good, 5: mutual help. ⁵⁾ Percentage of households answering "yes".

Source: own calculation with data from S-FARM survey in Bulgaria. Data refer to the year 2006

We wanted to test our hypothesis in two ways: First, we analysed whether or not social capital has a significant impact on the volume of agricultural income (Model 1, equation 1). In a second step, we investigated whether or not SFHs with social capital are managing their farm more efficiently, i.e. for each Euro of variable costs they earn a higher income (Model 2, equation 2).

$$(1) \quad GAVA(j) = const_1 + \sum_{i=1}^{17} [b_1(i) * variable(j,i)] + err_1(j)$$

GAVA(j) : gross agricultural value added for the j^{th} household ($j=1..149$)

const₁ : regression's constant for Model 1

$b_1(i)$: coefficient for the i^{th} variable ($i=1..17$) in Model 1

variable(j,i) : value for the i^{th} variable ($i=1..17$) for the j^{th} household ($j=1..149$)

err₁(j) : error term for the j^{th} household ($j=1..149$) in Model 1

$$(2) \quad GAVA_vc(j) = const_2 + \sum_{i=1}^{17} [b_2(i) * variable(j,i)] + err_2(j)$$

GAVA_vc(j) : gross agricultural value added per unit of variable costs for the j^{th} household ($j=1..149$)

const₂ : regression's constant in Model 2

$b_2(i)$: coefficient for the i^{th} variable ($i=1..17$) in Model 2

variable(j,i) : value for the i^{th} variable ($i=1..17$) for the j^{th} household ($j=1..149$)

err₂(j) : error term for the j^{th} household ($j=1..149$) in Model 2

In both models the regression coefficients were calculated by ordinary least squares method. The variance inflation factors (VIF) were smaller than 2.0 and the pairwise correlations were smaller than 0.8 for all variables, indicating that there is no multicollinearity between the variables in the models (HÜBLER, 1989). Among the 185 interviewed households, 36 outliers² were identified and thus excluded from the analysis. The calculation started with the full model, which was backwards reduced thereby excluding non-significant variables step by step. This is because when a model includes irrelevant variables then the estimators for the coefficients are unbiased but inefficient (MADDALA, 1992). According to AGRESTI (2002) backwards reducing the model is the procedure that most statisticians prefer. A variable was treated as non-significant if its level of significance was higher than 0.1.

4 Interpretation of Results

The results of testing the hypotheses, i.e. SFHs with high social capital not only earn higher agricultural incomes than SFHs with less social capital, but also manage their farms more efficiently, are summarised in tables 2 and 3. Table 2 summarises the results of the multiple regression analysis for the model in equation 1 showing the variable coefficients and their significance level. The right-hand side shows the significant explanatory variables. In the reduced model, four variables show a significant impact on agricultural income. They are the variables 'total arable land', 'number of pigs', 'highest level of formal schooling in the household' and the social capital variable

² Outliers are observations having standardised variables' values outside the range of -3.0 to 3.0.

‘relations to corporate farms’. All coefficients have a positive sign, indicating that the effect of the significant variables on gross agricultural value added is positive. This result is concordant with neoclassical economic theory. In addition, our hypothesis is confirmed as social capital in the form of ‘structural bridging’, i.e. good relations to corporate farms, has a significant positive impact on agricultural income.

Table 2. The impact of social capital on agricultural income (Model 1)

Variable (i)	Full model		Reduced model	
	$b_1(i)^*$	Level of significance**	$b_1(i)^*$	Level of significance**
Number of economically active household members	0.084	0.231		
Total arable land	0.458	0.000	0.488	0.000
Capital index for buildings	0.002	0.982		
Capital index for machines	0.034	0.619		
Number of cattle	0.087	0.239		
Number of pigs	0.340	0.000	0.328	0.000
Production structure	0.064	0.366		
Age of farm operator	0.069	0.385		
Highest level of formal schooling in the household	0.090	0.181	0.106	0.091
Experience of farm operator in managing a farm	-0.084	0.267		
Relations to small-scale fellow farmers	-0.037	0.642		
Relations to large-scale private farmers	0.122	0.138		
Relations to corporate farms	0.113	0.152	0.193	0.003
Getting informal loan	-0.089	0.170		
Getting formal loan	0.025	0.703		
Membership in agricultural organisations	0.095	0.152		
Membership in political party	-0.012	0.861		
Constant		0.065		0.034
Corrected R²	0.433		0.440	

Notes: N=149, * Standardised coefficients, **A significance level lower than 0.1 indicates a significant effect of the variable on gross agricultural value added.

Source: own calculation with data from S-FARM survey in Bulgaria

Whether social capital has also a positive impact on more efficient farming among SFHs is tested in the second model (table 3, equation 2). In the reduced model, five variables show a significant impact on farm efficiency. These are the variables ‘total arable land’, ‘number of cattle’, ‘number of pigs’, ‘relations to large-scale private farmers’ and ‘getting informal loans’. The variables ‘total arable land’, ‘number of pigs’

and ‘relations to large-scale private farmers’ have a positive sign indicating that their effect on farm efficiency is positive. This result confirms our hypothesis. We suggest that SFHs with good links to corporate farms can sell their surplus production through them at higher output prices than through alternative channels. Similarly, they have access to inputs at lower prices than through alternative suppliers. However, the variable ‘getting an informal loan’ has a negative sign meaning that access to informal loans is actually reducing farm efficiency. In this sense, our hypothesis is not fully supported by the results, but confirms findings of others (e.g. SABATINI, 2008) who state that social capital of its bonding type, i.e. strong links with close associates, might even hamper economic development. Additionally, the variable ‘number of cattle’ has a negative effect on farm efficiency. We assume that SFHs had to buy animal feed at rising prices in 2006 while milk prices declined.

Table 3. The impact of social capital on efficient farm management (Model 2)

Variable (i)	Full model		Reduced model	
	$b_2(i)^*$	Level of significance**	$b_2(i)^*$	Level of significance**
Number of economically active household members	0.122	0.155		
Total arable land	0.240	0.008	0.180	0.028
Capital index for buildings	0.043	0.599		
Capital index for machines	-0.130	0.123		
Number of cattle	-0.280	0.002	-0.194	0.015
Number of pigs	0.301	0.001	0.295	0.000
Production structure	-0.152	0.081		
Age of farm operator	0.090	0.353		
Highest level of formal schooling in the household	0.076	0.351		
Experience of farm operator in managing a farm	-0.043	0.640		
Relations to small-scale fellow farmers	0.056	0.561		
Relations to large-scale private farmers	0.127	0.203	0.180	0.019
Relations to corporate farms	0.035	0.713		
Getting informal loan	-0.138	0.082	-0.147	0.055
Getting formal loan	-0.007	0.931		
Membership in agricultural organisations	0.025	0.756		
Membership in political party	-0.109	0.178		
Constant		0.179		0.584
Corrected R²	0.157		0.164	

Notes: N=149 * Standardised coefficients, **A significance level lower than 0.1 indicates a significant effect of the variable on gross agricultural value added per unit of variable costs.

Source: Own calculation with data from S-FARM survey in Bulgaria.

In general, it is plausible to conclude that our hypothesis is confirmed, i.e. social capital in form of its structural bridging type has a significant positive impact on farm efficiency. Good relations to the business-oriented large-scale private farmers support SFHs to manage their farms more efficiently. If SFHs have good links to these farmers, they learn how to improve their own production activities. However, the social capital variable 'getting informal loan' has a negative significant impact, which is actually reducing farm efficiency. This shows that social capital in its bonding form might cause negative economic effects not only for the society but also for individuals. Having an informal loan may point to the fact that family and friends support each other in times of need.

With respect to the classical production factors, it is worthwhile to mention that many variables that measure labour and human capital and even some proxy variables for capital, had no impact at all, neither with respect to farm income nor to farm efficiency. Like with the social capital variables, some proxy variables for capital were also opposing each other. For example, while the variable 'number of pigs' has a positive impact on both agricultural income and farm efficiency, the variable 'number of cattle' did not show any impact on agricultural income, but showed a significant negative effect on farm efficiency. A possible interpretation is that pigs can be fattened with leftovers on the farm and, hence do not demand any variable costs, while cattle has to be fed with purchased feed as farms are small and do not dispose of meadows to supply enough feeding stuff. In addition, the capital indices for buildings and machines did not affect farm income or farm efficiency. Results from descriptive statistics show that most households do not possess any machines or equipment, thus an impact of mechanisation cannot be shown. Buildings are available for all households and it can be assumed that they are sufficient with respect to the present requirements of semi-subsistence production. In none of the models, labour was significant. This is not surprising because labour on semi-subsistence farms is not a scarce factor. Thus, hidden unemployment seems to be widespread. The only limiting production factor seems to be the area of arable land.

5 Conclusions

The agricultural sector in Bulgaria is dominated by SFHs. However, SFHs do not form a homogeneous group. Some are more productive and business-oriented than others; some aim at higher farm incomes while others produce for subsistence needs only. According to neoclassical economics the varying access to the classical production factors land, labour, capital and human capital explains this variation. But it has been observed that similar endowments of production factors do not lead to similar economic results. Therefore, it is hypothesised that – in addition to the classical

production factors – social capital is contributing significantly not only to higher agricultural incomes, but also to more efficient farm production among SFHs in Bulgaria. We tested this thesis with empirical data of a survey among 185 SFHs referring to figures from 2006.

The econometric analysis revealed that four variables, ‘total arable land’, ‘number of pigs’, ‘highest level of formal schooling in the household’ and good ‘relations to corporate farms’ are significantly affecting agricultural income. Our hypothesis is confirmed that social capital of its structural bridging type is significant in earning higher agricultural incomes. With respect to production efficiency, five significant variables could be identified: ‘total arable land’, ‘number of pigs’, ‘number of cattle’ as well as the social capital variables ‘getting informal loan’ and good ‘relations to large-scale private farmers’. Again, our hypothesis has been confirmed. However, our findings show also that social capital variables are not heading into one direction, but various facets might even oppose each other. Social capital of its bonding type is actually decreasing farm efficiency while its bridging type is important in improving agricultural income and farm efficiency among SFHs in Bulgaria. Concerning agricultural income this refers to good relations with corporate farms, concerning farm efficiency this refers to good relations with large-scale private farmers. We suggest that particularly those SFHs that want to expand farm production and become competitive in the future might take advantage by deepening their relations with more dynamic, business-oriented large-scale farmers of private and corporate types.

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