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Commercialization and Subsistence in Transaction Agriculture: Empirical Evidence from Albania, Bulgaria, Hungary and Romania

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COMMERCIALIZATION AND SUBSISTENCE IN TRANSITION AGRICULTURE: EMPIRICAL EVIDENCE FROM ALBANIA, BULGARIA, HUNGARY AND ROMANIA

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Abstract

Present-day Central and Eastern European agriculture is characterized by a high incidence of small-scale farmers who are not producing for the market. This paper uses household level data from comparative farm surveys in Albania, Bulgaria, Hungary and Romania to analyze which farm household characteristics and endowments influence commercialization and subsistence farming.

Key Words — subsistence farming, farm structures, farm size, microanalysis, land ownership, land tenure, agricultural policy, transition

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Commercialization and Subsistence in Transition Agriculture: Empirical Evidence from Albania, Bulgaria, Hungary and Romania

1. Introduction

Present-day Central and Eastern European agriculture is characterized by a bimodal farm structure with a very large amount of small-scale farms and a small amount of large farms organized as a company or cooperative. More than ten years after transition has begun, markets have not fully developed yet and market-based middle-sized farms are rare (Sarris et al., 1999). Many small-scale farmers produce only for own consumption and cannot find their way to the market place. The transition towards a market economy seem to have passed many of these smallholders. The existence of many small farms poses problems for those countries that are preparing for accession to the European Union. The latter is not prepared to extend its generous direct income payment scheme to Eastern European countries without qualifications.

Why there are so many farms in Central and Eastern Europe, and more specifically, why are so many among them not producing for the market? It has been argued that subsistence has been triggered by macroeconomic instability resulting in high unemployment and high inflation, and that it persists mainly because of the adverse income and employment situation in rural areas. In this paper, we use survey data from four Central and Eastern European countries (Albania, Bulgaria, Romania and Hungary), collected in the period 1998-2000 in the framework of two EU Phare ACE research projects, to investigate the impact of farm household characteristics and endowments on subsistence.

2. Subsistence agriculture in transition economies: definition and determinants

The term subsistence can refer to different levels of analysis or aggregation, such as subsistence production, subsistence levels of living, subsistence agriculture, subsistence

economy and subsistence farmer. Particularly concerning the latter there is no consensus definition. However, most scholars would agree that subsistence farming can be associated with poverty, low levels of technology, inefficient production and low levels of commercialization. Subsistence farming thus limits development. Moreover, subsistence farmers are not very responsive to market and policy signals (Wharton, 1969; Lerman, 2001a; von Braun and Lohlein, 2001; Brüntrup and Heidhues, 2002). A problem with defining subsistence is that it can be approached from the point of view of consumption as well as production, but also that any subsistence indicator moves along a gradient from 0 to 100%. Hence, distinguishing between subsistence and market-orientation is always arbitrary (Brüntrup and Heidhues, 2002).

The factors influencing subsistence and commercialization are complex, as most of them interact.[1] Rather than presenting a full theoretical model, we discuss some of the major factors as identified in the relatively scarce literature on subsistence agriculture in transition economies.

2.1 Initial conditions and factor endowments

An economy's initial conditions play a prominent role in economic behavior and performance in transition, as they influence the choice of reform policies and thus the reallocation of factor endowments. Macours and Swinnen (2002) show how differences in initial conditions between transition countries in Europea and Asia have triggered different reform paths. Mathijs and Swinnen (1998) have observed that the shift towards individual farms has been more pronounced in countries characterized with a large share of their labor force in agriculture and a low land-to-man ratio.

A key production factor in agricultural production is land, so the ways various government dealt with land privatization and reprivatization provide an important initial

[1] Refer e.g. to de Janvry et al. (1991) and Key et al. (2000) for recent theoretical work that focuses on the impact of market imperfections and transaction costs on commercialization, and Tritten and Sarris (1999, 2001) for

condition for further behavior. Most Central European countries have restituted (or "reprivatized") land previously cultivated by collective farms to the pre-communist owners. Notable exceptions are Hungary, where part of the collective land was auctioned to former owners and another part was given to the member-workers of collective farms; Romania, where part of the collective land was allocated to member-workers; and Albania, where land was distributed equally on a per capita basis (Swinnen, 1999; Lerman, 2001b). The resulting pattern of land ownership is one of extreme fragmentation and old to very old landlords. However, fragmented ownership does not automatically imply fragmented cultivation. Mathijs and Swinnen (1998) noted that fragmented ownership may lead to high transaction costs of withdrawing land from the collective farm. As a result, restitution may actually conserve the pre-reform farm structure. For example, in Slovakia, the bulk of the land is still cultivated by large-scale cooperatives and companies, despite the restitution of land to former owners.

More land means more surplus and sales, *ceteris paribus*. For example, Lerman and Mirzakhanian (2001) found that in Armenia sellers have considerably larger land holdings than non-sellers. World Bank surveys in transition countries consistently reveal a willingness to increase farm size (Lerman, 2001a). However, initial conditions, such as the way land has been (re)privatized, may have a double impact on subsistence. On the one hand, restitution seems to have locked the agricultural sector into a dual farm structure brought about by reform. There is no sizeable amount of middle-sized farms, as land markets continue to fail to correct inefficient farm structures (Sarris et al., 1999). On the other hand, the reforms have given some people the opportunity to enlarge the household plots they were cultivating under communism, or to get access to land altogether, thus improving their livelihood.

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recent applications to transition agriculture.

2.2. Household characteristics, risk and imperfect markets for labor and insurance

Subsistence agriculture is often seen as an important strategy for rural households to deal with the hardships of transition (Seeth et al., 1998; Caskie, 2000; Kostov and Lingard, 2002). Transition usually implies macroeconomic instability with high unemployment and inflation. Particularly in those countries where social security systems are inadequate and markets for insurance are missing, subsistence production provides households with an important buffer to survive. For example, Cungu and Swinnen (1998) argue that Albania's reform has been so radical and spontaneous (in the sense that all collective structures have been broken up), because farmers wanted to increase their food security, as a reaction to dramatic adverse conditions under collective farming.

In many transition countries, farmers' labor opportunity costs have decreased, as transition involved closing unprofitable enterprises, thus restricting the labor outflow out of agriculture (Macours and Swinnen, 2002). In addition, most landowners are fairly old, as a result of land restitution. The opportunity costs of a rural pensioner are close to zero, due to low pensions and difficulties to find work (Kostov and Lingard, 2002). Subsistence farming is hence a strategy to supplement low pensions. The incentive to increase the level of technology and to produce a surplus is low for these landowners, as the ability to work and the propensity to take risk both decrease with age. The level of pensions is thus a crucial factor influencing the decision to keep a plot of land for subsistence production, or to sell or lease it to others.

2.3. Transaction costs in factor and output markets

A final set of factors is related to potential barriers in factor and output markets that prevent farmers to increase their production by using more inputs and better technology and that limit the ability to market their surplus. Particularly access to land, machinery and services for marketing and input provision are crucial to increase farmers' market orientation.

While access to land can be enhanced by improving the functioning of the land sales and lease market, access to machinery and services for marketing and input provision can only be improved by some kind of cooperation among farmers, as was done in most market economies. Deininger (1995) argues that the new role of the old collective farms should be to become service cooperatives.

Access to credit is also mentioned often as a major factor affecting the commercialization of agriculture. In most surveys, farmers state their lack of financial resources as the single most important constraint to improve their situation or expand their activities. An important distinction must be made here before short term credit and long term credit. Access to long term credit is often limited in transition agriculture as banks do (or can) not accept land as collateral. However, demand for long term credit may actually be low. Farmers tend to finance long run investments predominantly with equity (Swinnen and Gow, 1999; Lerman, 2001a). Access to short term credit to finance working capital is often a problem in transition agriculture, but does not necessarily have to be solved through government intervention. Short term credit can for example be supplied by buyers, or can be part of contract arrangement (Gow and Swinnen, 1998).

3. Survey results from Albania, Bulgaria, Hungary and Romania

3.1. Survey design

A consortium of the Policy Research Group at the Catholic University of Leuven (Belgium), the Department of Economics of the University of Athens (Greece) and local partners have carried out country-wide surveys in the period 1998-2000 in six countries: Albania, Bulgaria, the Czech Republic, Hungary, Romania and Slovakia.[2] The purpose of

[2] The surveys were financed in the framework of the European Union's Phare ACE programme, projects P96-6090-R and P97-8158-R, coordinated by Erik Mathijs (Belgium) and Alexander Sarris (Greece). Local country coordinators include Ismail Beka (Albania), Diana Kopeva (Bulgaria), Emil Divila (Czech Republic), Tibor Ferenczi (Hungary), Dinu Gavrilescu (Romania) and Peter Bielik (Slovakia).

this research was to analyze the agricultural transition and farm restructuring process in Central and Eastern European countries from a micro-economic perspective. Therefore, countries such as Poland and Slovenia were excluded, as their agriculture was dominated by private farms before the reforms.

The *survey instruments* were designed to enable comparative analysis between the six countries. They were assembled in a modular way to capture: (1) the background of the household members (age, employment, etc.) or farm; (2) the performance of the agricultural enterprise (land ownership and use, agricultural production, assets, inputs, financial situation); (3) the household's or farm's non-agricultural activities and income; (3) the household's or farm's intentions and perceived constraints to increase agricultural production and/or non-agricultural income; and (4) the environment of the household or farm (social, infrastructure, rurality, etc.).

The *survey sampling procedure* involved two samples, one of households (family farms) and one of enterprises (cooperatives, companies). The household sample involved a two stage selection. First, villages were selected with probability proportional to size. Second, a fixed number of households was selected in each village. Farm enterprises were selected randomly from a national list. Due to cost limitations, the surveys were carried out in typical regions in the Czech Republic and in Slovakia, while the survey are national and thus representative in all other countries. These procedures resulted in the following samples:

- 1,411 households and 196 enterprises in Bulgaria, collected in 1998,
- 1,618 households and 404 enterprises in Hungary, collected in 1998,
- 1,676 households in Romania, collected in 1999,
- 400 registered and 200 unregistered family farms and 105 farm enterprises in the Czech Republic, in the regions Brno and Jihlava (both in the south east), collected in 2000,

- 412 registered family farms and 150 farm enterprises in Slovakia, in the regions Nitra and Zilina, collected in 2000,
- 1,232 households in Albania, collected in 2000.

In the remainder of the paper, we will limit the discussion and analysis to Albania, Bulgaria, Hungary and Romania. We can thus draw from four country-representative samples. The four countries represent a mix of middle income countries preparing for EU accession (Hungary, Bulgaria and Romania) and a relatively low income country not preparing for accession (Albania). Alternatively, we can compare a Central European country (Hungary) with three Southeastern European or Balkan countries having similar initial conditions (Bulgaria, Romania and Albania). Albania's Gross National Income per capita (1,100 USD) is somewhat lower than the average of lower middle income countries, while Bulgaria (1,510 USD) and Romania (1,670 USD) are above this average. Hungary (4,740 USD) is close to the average of upper middle income countries (see table 1). Noteworthy is further that incomes are relatively unequally distributed in Albania compared to the other three countries (table 2).

Following Macours and Swinnen (2002) the four countries can also be characterized by their "pattern of transition", as defined by their evolutions of agricultural output and labor productivity during transition (also cfr. table 3 and 4):

- Hungary belongs to a group of countries (with the Czech Republic and Slovakia) characterized by strong decline in agricultural output, but an even stronger decline in agricultural employment resulting in an increase in agricultural labor productivity. The shift from collective to individual tenure has been relatively limited, such that large-scale farming still plays an important role (50-80% of total agricultural land). Agriculture represents a relatively small share of the total economy (maximum 10%).

- Albania belongs to a group of countries (with China and Vietnam) characterized by growth in both agricultural output and agricultural labor productivity. In Albania, collective farms have completely disappeared. Agriculture is still the country's largest sector (about 60%).
- Bulgaria follows a hybrid path (with Latvia and Lithuania) that closely resembles the transition pattern of Russia, Ukraine and Belarus, and that is characterized by a strong decline in output and labor productivity. However, Bulgaria differs from for example Russia, as it witnessed a significant shift towards individual farming (about 50% of total agricultural land). The share of agriculture in the economy is relatively large (25%).
- Romania also follows a hybrid path (with Armenia and Georgia) that resembles somewhat the Albania-China-Vietnam transition path. However, output and labor productivity increased only 2-3 years after the beginning of transition. Agriculture is a large sector (37%) dominated by family farms (67% of total agricultural land).

3.2. Survey results

We focus here on results that relate to the financial situation, marketing problems and other constraints reported by the households in the different countries. Table 5 reports the own assessment of the household's financial situation. The results are as expected from the per capita income data reported in table 1. Only about 7% of Hungarian farming households report that they cannot even cover their basic needs, while this is 45% in Albania. Bulgarian households are somewhat better off than Romanian households, which is opposite from their ranking according to per capita income. Despite their adverse situation, the majority of Albanian households report that their financial situation is unchanged or has improved compared to 1989 (almost 90%) and 1995 (80%). This is the reverse in Bulgaria and

particularly in Romania, where most households (about half in Bulgaria and three thirds in Romania) report that their financial situation is worse than before (table 6).

Table 7 reports the main problems farmers face to market their output. In Bulgaria and Romania, lack of information on buyers and the fact that buyers will not come to the farm are clearly the main constraints. In Hungary, the fact that the farmer has to transport his produce to the market, but also other reasons are more important. Particularly in Romania many farmers experience decreasing number of buyers over time (table 8). Table 9 gives an overview of the importance of various constraints to expand agricultural activity. As in most surveys, lack of financial resources is stated as the most important constraint, followed by low prices received for products. Interestingly, the latter is not a problem in Albania, where access to land is more important. In Hungary, high input prices is considered by three quarters of all farmers as an important problem. Payment delays are more important in Hungary than in the other countries, probably because more products are sold on contract.

4. An empirical model of subsistence farming in transition

4.1. Methodology

To investigate the relative importance of household-specific characteristics, we use data from the farm household surveys in Bulgaria, Hungary, Romania and Albania, as described before. The share of households selling at least some of their production differs greatly among the four countries: 36% in Romania, 38% in Bulgaria, 57% in Hungary and 84% in Albania. Figure 1 provides the distribution of the amount of sales in Albania. The picture is similar in the other countries and also when sales per hectare are considered. Lerman (2001a) suggests as a general rule that “two-thirds of household plots sell one-half of their production”. However, this author also finds percentages of more than 80% in Moldova and Armenia. The figures for Bulgaria and Romania seem very low.

To assess the effects of various household-specific factors on subsistence, we run a Tobit regression with total sales and total sales per hectare as dependent variable:

(1) $S_i = S(X_i,Z_i)$ for all farms.

where S represents total sales in domestic currency; X is a set of household specific variables (age and education of the household head, household size, income situation, car ownership, membership in a cooperative or agricultural enterprise, and distance to the nearest regional centre), and Z is a set of farm specific variables reflecting the farm's resources (land, machinery and livestock). Table 10 provides the definitions of the variables used in the regression analyses.

We also test whether commercialization is actually a two-stage decision problem, following Cragg (1971), Heckman (1979) and Goetz (1992).[3] In a first stage, households decide whether or not they sell any surplus of their agricultural production. The equation of the first stage is estimated with a probit analysis. In a second stage, those households who decided to sell, decide how much produce they will market. This equation is estimated by ordinary least squares. The following models are estimated:

(2) $D_i = D(X_i,Z_i)$ for all farms with $D_i=0$ if $S_i=0$ and $D_i=1$ if $S_i>0$

(3) $S_i = S(X_i,Z_i)$ for $D_i=1$.

Table 11 summarizes the mean values for the explanatory variables for sellers and non-sellers:

- Age: Household heads are particularly old in Bulgaria and Romania. Figure 2 reveals an almost perfect negative relationship between commercialization and average age. Sellers are younger then non-sellers, except in Albania.
- Education: The level of education is relatively high in all countries (8 to 9 years of

[3] We follow the approach of Goetz (1992) who modeled an agricultural household's discrete decision of whether to participate in coarse grain markets separate from the continuous decision of how much to sell or buy, conditional on participation. However, contrary to Goetz (1992), we consider all products and we do not consider the buying decision.

schooling). While sellers are better educated than non-sellers, the differences are small.

- Household size: Albanian families (5 members) are larger than families in the associated countries (3 members). Sellers have somewhat larger families than non-sellers.
- Income: Income is consistently higher for sellers than non-sellers.
- Car ownership: Sellers are more likely to own a car than non-sellers. In Bulgaria and Hungary, more farmers own a car than in Romania and particularly in Albania.
- Membership: Sellers are more likely to be a member of a cooperative than non-sellers in Hungary and Romania.
- Land: Sellers have consistently larger land holdings than non-sellers. Subsistence farmers cultivate between on average half a hectare in Albania to 2.5 ha in Hungary. Holdings are much smaller in Albania than in the associated countries and are the largest in Hungary.
- Machinery: Sellers are more likely to own at least one piece of equipment than non-sellers. Machinery ownership is relatively high in Bulgaria (40-66%) and Hungary (35-51%) compared to Romania and Albania, where virtually no households own machinery.
- Livestock: The amount of livestock owned is consistently higher for sellers than non-sellers. Livestock ownership is much higher in Hungary than in the Balkan countries.
- Distance: Sellers are located slightly further away from the market than non-sellers, except in Albania. Distances are large in Bulgaria (70-80 km) and small in Albania (about 10 km).

4.2. Regression results

The results from the various regression analyses are summarized in tables 12-14. Table 12 presents the results with the logarithm of sales as dependent variable. We tested the sensitivity of the results to heteroskedasticity by running the Tobit regression also with sales divided by the amount of land (output could not be calculated in a consistent way for all four countries) (table 13). Finally, we excluded income from the latter regression to avoid problems of endogeneity. Further, the results of the Heckman procedure are not reported, as none of the Heckman regressions was significant. In other words, the selection regression dominates the allocation to such an extent that the latter provides no additional information. This suggests that to market food, households have to take a considerable hurdle. Hence, we will limit our discussion to the Tobit results. The following results were obtained:

- Age has a negative impact on commercialization in all countries, but only significantly so in the associated countries, not in Albania.
- Education has no impact on commercialization in Albania, Romania and Hungary. In Bulgaria better educated rural household members are less market oriented, which suggests that they spent more time off-farm.
- Household size is not significant for the Balkan countries. Only in Hungary, the impact of this variable on the farms' sales is significant and negative, which suggests that smaller households are able to generate a larger marketable surplus.
- Income is positively related to sales, and significantly so in the Balkan countries. However, one has to be cautious with the interpretation of this variable as its effect can run both ways: households may be richer because they are market oriented, but access to off-farm income sources may also be an important precondition to escape from subsistence.
- Car ownership, which can be interpreted as a proxy for asset ownership that is less

susceptible to endogeneity than income, has a significant positive effect in Albania, but a significant negative effect in Romania. However, the latter becomes insignificant when income is omitted as an explanatory variable.

- Membership in a cooperative or agricultural enterprise has a positive and significant effect on commercialization in Hungary and Romania, and a negative, but insignificant, impact in Bulgaria. (There are no cooperatives in Albania.) This suggests that cooperative structures enhance the access to services.
- Land is significant and positive for all countries, suggesting that farms need to be enlarged to become more market oriented, and that land markets are not functioning.
- Machinery ownership has a significant and positive impact on commercialization in Albania and Bulgaria, but a significantly negative effect in Hungary. The latter is surprising as the summary statistics have shown that a larger share of sellers own machinery (51%) than non-sellers (35%).
- Livestock has a significant positive effect in the Balkan countries, but is insignificant in Hungary, where the livestock index is on average three times higher than in the other countries.
- Distance has a positive effect on sales in all countries, but only significantly so in Bulgaria and Romania. This suggests that people living nearby a major town, while having better access to output markets, have also better access to labor markets, and hence commercialize less of their produce.

The results do not change when the variable "sales" is replaced by "sales per hectare". Excluding income as explanatory variable has minor impacts on the regression results.

4.3. Discussion

The regression results confirm the relationship between age and subsistence suggested in figure 2, and thus the importance of demographics as pointed out for instance by Kostov

and Lingard (2002). Particularly in Bulgaria and Romania, there is a high incidence of pensioners and subsistence farming, signaling poor social security networks that withhold these farmers to rent out or sell their land to more efficient farmers. Lack of land is, however, a major constraint in all four countries, suggesting too small farm sizes and badly functioning land markets, a situation identified by Lerman (2001a) as the most important constraint to break out of subsistence in most transition countries. However, as the problem of badly functioning land markets is often attributed to badly defined property rights, our results suggest that the problem is rather one of lack of supply of land, as land is also a constraint in countries where property rights are strong.

Access to machinery and market services is an important precondition to improve productivity, generate a surplus and take it to the market. Lack of machinery is clearly a constraint in Albania, where very few households own a piece of machinery and Bulgaria, where half of the farmers own machinery, but not enough to become fully market oriented farmers. However, machinery ownership is certainly not a necessary condition as shown by the case of Romania, where very few households own machinery, but machinery does not seem to be a constraint. Machinery ownership even has a negative impact on commercialization in Hungary, a phenomenon we cannot explain. In Hungary and Romania, however, membership in a cooperative significantly enhances market orientation. We cannot conclude whether this is because of better access to inputs and machinery or because of better marketing opportunities, but the fact that the effect is strong and highly significant suggests that cooperatives play an important role in solving market imperfections, as suggested e.g. by Deininger (1995).

Although the share of cooperatives in total agricultural land has largely declined during transition (see table 3), the existence of highly fragmented land structures, lack of machinery and high transaction costs in the output markets warrants their importance as

service cooperatives. It must be noted that other institutions, such as contracts, can also be very successful in improving access to inputs and marketing (see e.g. Gow and Swinnen, 1998). Noteworthy (although the effect is not significant) is the negative impact of membership in Bulgaria, where private farmers rely more on their own resources and managerial capabilities than on the experience of cooperatives. Additionally, Bulgarian cooperatives are still burdened with financial debts and more importantly, the assets and the services they provide are less efficient and of worse quality compared to the private ones.[4]

Finally, access to finance is often mentioned as an important condition to increase commercialization. Unfortunately, we were not able to include variables that would reflect the importance of access to credit in our analysis. Higher off-farm income implies that more own funds are available for farm investment. Some authors thus interpret income as a measure for liquidity constraints (e.g., Rizov et al., 2001).

5. Conclusions and policy recommendations

As the transition from planned to market economy is characterized by macro-economic instability, high unemployment and limited access to land and capital, the cultivation of small household plots remains a reliable source for food provision. In regions where off-farm opportunities are limited, agriculture is still the main source of income. Both output and factor markets are still underdeveloped, and in addition, many rural households in transition countries have no access to them. In this paper, we have used farm survey data from four transition countries to investigate to what extent patterns of subsistence can be explained by household specific characteristics and endowments. In other words, we wanted to identify those factors that inhibit farming households in transition agriculture to participate in the market and escape from subsistence. Identifying these constraints can give direction to

[4] Mathijs and Vranken (2001) found a similar phenomenon when investigating the relationship between farm efficiency and membership in a cooperative: a positive effect in Hungary but a negative effect in Bulgaria.

where rural development policies should put their priorities. The results of our econometric analysis show that there is still a considerable hurdle to be taken to produce a marketable surplus, and that household-specific characteristics and endowments contribute to explaining why farmers stay in subsistence farming. Based on our results, we would like to formulate two particular policy recommendations.

First, age plays a prominent role when analyzing subsistence agriculture in transition economies, particularly in countries were land was restituted to former owners. Landowners are relatively old and have a low incentive to transfer their land to more efficient users. This seems to lock the land market, which is confirmed by the observation that land significantly affects commercialization in all countries, including in Hungary where property rights are strong. Social security systems hence play a key role in solving subsistence. Nevertheless, policies improving the functioning of the land lease market, at the development of the land sales market and at the consolidation of fragmented farm structures are still necessary in all four countries, as there is a strong relationship between land and commercialization.

Second, our results suggest that forms of cooperation can solve market imperfections and reduce the hurdle to the market. The conversion of existing cooperatives into service cooperatives and the creation of new forms of cooperation should be stimulated to increase the access to machinery and market services, particularly in Albania and Bulgaria, where these institutions are missing.

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Figure 1. Distribution of sales in Albania

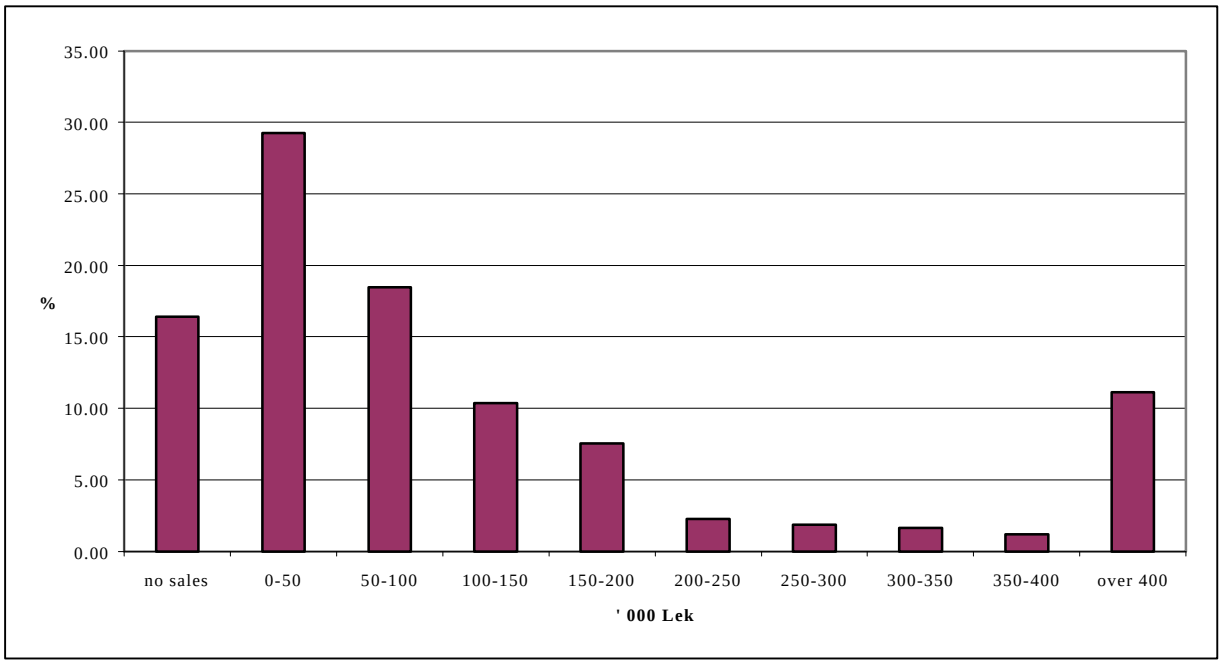

Figure 2. Relationship between the share of sellers and the average age of the household head

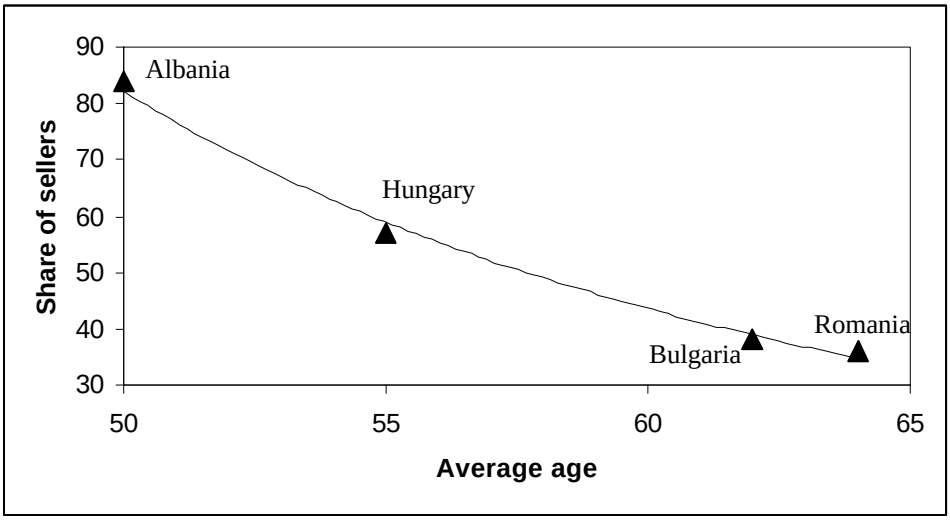

Table 1. Gross Domestic Product and Gross National Income per capita, 2000

	GNI per capita	
	AM[a]	PPP[b]
	US$	International dollars
Albania	1,100	3,550
Bulgaria	1,510	5,530
Hungary	4,740	12,060
Romania	1,670	6,380
Low income	420	1,990
Middle income	1,970	5,650
Lower middle income	1,140	4,580
Upper middle income	4,620	9,170
High income	27,510	27,450
Europe & Central Asia	2,010	6,620
Latin America & Caribbean	3,680	7,030
European Monetary Union	22,000	23,670
World	**5,150**	**7,350**

[a] Atlas Methodology.
[b] Purchasing Power Parity.

Source: World Bank, 2001 World Development Indicators Database.

Table 2. Inequality in income or consumption for selected transition countries

	Survey year	Share of income or consumption				Inequality measures		
		Poorest *10%*	Poorest *20%*	Richest *20%*	Richest *10%*	Richest 10% to poorest 10%[a]	Richest 20% to poorest 20%[b]	Gini index[b]
Hungary	1998	4.1	10.0	34.4	20.5	5	3.5	24.4
Bulgaria	1997	4.5	10.1	36.8	22.8	5	3.6	26.4
Romania	1994	3.7	8.9	37.3	22.7	6.1	4.2	28.2
Albania	1995	2.2	5.4	49.7	33.8	15.4	9.2	43.7
Poland	1998	3.2	7.8	39.7	24.7	7.8	5.1	31.6
Slovak R.	1992	5.1	11.9	31.4	18.2	3.6	2.6	19.5
Czech R.	1996	4.3	10.3	35.9	22.4	5.2	3.5	25.4
Russian Federation	1998	1.7	4.4	53.7	38.7	23.3	12.2	48.7
Ukraine	1999	3.7	8.8	37.8	23.2	6.4	4.3	29.0

Note: Surveys in Hungary, Albania, Poland, Russian Federation and Ukraine based on consumption; surveys in Bulgaria, Romania, Slovak republic and Czech Republic based on income.

[a] Data show the ratio of the income or consumption share of the richest group to that of the poorest. Because of rounding, results may differ from ratios calculated using the income or consumption shares in columns 3-6.

[b] The Gini Index measures inequality over the entire distribution of income or consumption. A value of 0 represents perfect equality, and a value of 100 perfect inequality.

Source: UNDP, Human Development Report, 2001.

Table 3. Evolution of organisational structures in Central and East European agriculture

	Collective/Co-operative farms		State farms		New co-operative farms	Individual farms	
	Pre-1990	1998	Pre-1990	1998	current	Pre-1990	1998
Share of arable land in %							
Albania	74	-	22	20	-	4	80
Bulgaria	58	42	29	6	-	13	52
Czech Republic	61	43	38	2	32	0	23
Hungary	80	28	14	4	14	6	54
Romania	59	12	29	21	-	12	67
Slovak Republic	69	60	26	15	20	5	5
Average size (ha)							
Albania	1053	-	1588	-	-	0.1	1.4
Bulgaria	4000	637	1615	735	-	0.4	1.4
Czech Republic	2578	1447	9443	521	690	5.0	2.7
Hungary	4179	833	7138	7779	204	0.3	3.0
Romania	2374	451	5001	3657	-	0.5	2.7
Slovak Republic	2667	1509	5186	3056	1191	0.3	7.7

Source: European Commission, 1998

Table 4. Selected indicators for agriculture

	Share of agriculture in total employment (%)			Unemployment (%)			Average share of household income spent on food (%)			Average annual change in consumer price index (%)	
	1991	1995	1998	1991	1995	1998	1991	1995	1998	1990-99	1998-99
Hungary	17.9	8.9	8.2[c]	4.7	10.4	8.0	21.5	17.7	n.a.	21.5	10.0
Bulgaria[b]	19.1	23.3	24.7	11.1	11.1	12.2	47.0	46.0	48.0	129.3	2.6
Romania[a]	27.5	33.6	37.3[c]	3.0	9.5	10.3	55.0	57.5	59.0	108.9	45.8
Albania	49.0	64.6	64.0	9.1	12.9	16.9	63.0	72.1	73.0	32.1[c]	0.4

[a] Includes employment in the processing sector.
[b] Average share of household income spent on food includes food produced in households.
[c] Data for 1996.

Source: OECD 2000; UNDP, Human Development Report 2000/2001.

Table 5. Household financial situation, %

	Bulgaria	Romania	Hungary	Albania
Households with income not even enough to buy food	26.5	40.9	6.7	45.3
Households with income enough only for food	31.3	45.3	30.1	39.1
Households with income enough for food and necessities, but not for other expenses	37.1	11.3	46.5	14.9
Households with income enough to meet all their needs	5.1	2.5	16.7	0.7

Note: Results are based on the own assessment of the interviewed.

Source: Own calculations based on Phare ACE Surveys 1998-2000.

Table 6. Evolution of households' financial situation, %

	Bulgaria compared to:		Romania compared to:			Albania compared to:	
	1992	*1996*	*1990*	*1996*	*1997*	*1989*	*1995*
Much more improved	3.5	1.9	1.1	0.5	0.3	11.1	1.2
Improved	12.3	13.8	6.1	5.3	4.4	58.9	38.2
Unchanged/Similar	22.1	36.6	11.1	17.4	26.8	19.4	41.0
Worse	25.6	25.5	41.2	52.5	52.6	9.3	17.9
Much worse	36.5	22.2	40.4	24.4	15.8	1.3	1.8

Note: Results are based on the own assessment of the interviewed.

Source: Own calculations based on Phare ACE Surveys 1998-2000.

Table 7. Main constraints* for farmers to find buyers for their output, %

	crop production			livestock production		
	Bulgaria	Romania	Hungary	Bulgaria	Romania	Hungary
Buyers will not come to the farm	73.9	22.8	36.8	56.4	27.7	25.7
Volume of output is too low	42.1	11.4	27.1	32.7	18.8	22.2
We do not know many buyers	66.7	36.7	20.9	61.2	30.7	11.5
We do not know the market price	38.6	10.1	15.6	28.3	6.9	14.2
Other reasons	31.6	19.0	37.7	7.3	15.8	31.1
Total	-	100.00	-	-	100.00	-

*Answers are given only for the households that have difficulties in finding buyers for their output. In Romania, respondents were asked to consider only the most important reason. In Bulgaria and Hungary, respondents were asked to consider whether a particular reason was important or not. Here, the figures reflect the share of households that considers this constraint to be important.

Source: Own calculations based on Phare ACE Surveys 1998-2000.

Table 8. Assessment of the number of buyers, %

	Bulgaria compared to:		Romania compared to:		Hungary compared to:	
	1992	*1996*	*1996*	*1997*	*1993*	*1996*
crop production						
More buyers	45.6	41.8	11.5	8.5	37.9	20.3
Less buyers	30.6	31.0	44.1	42.0	23.6	28.3
The same	23.8	27.2	44.5	49.5	38.5	51.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
livestock production						
More buyers	57.4	56.3	17.1	11.6	35.7	19.6
Less buyers	20.5	25.2	35.9	35.9	20.6	24.5
The same	22.1	18.5	47.0	52.5	43.7	55.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Own calculations based on Phare ACE Surveys 1998-2000.

Table 9. Constraints for increasing the agricultural activity, %

	Bulgaria		Romania		Albania		Hungary		
	very important	important	most important	second most important	most important	second most important	important	medium	not important
Cannot obtain more land	37.0	15.1	10.3	2.6	17.2	6.7	13.0	23.8	63.2
Cannot obtain loans/credit	16.0	16.8	6.7	5.4	13.0	14.9	27.3	14.5	58.2
Cannot find labor	8.0	10.1	5.0	5.2	8.1	9.5	15.1	23.8	61.1
Cannot sell the products	16.8	19.3	14.1	12.0	5.5	10.7	35.4	29.8	34.8
Not enough financial resources	58.0	17.7	41.6	20.6	35.7	11.3	n.a.	n.a.	n.a.
Low prices of the products	46.2	20.6	11.4	27.8	8.1	21.3	68.3	13.9	17.9
Delayed payments from buyers	10.5	20.2	0.6	2.8	0.1	0.4	24.2	29.2	46.6
High input prices	35.7	11.8	4.3	15.0	3.6	12.4	78.5	7.4	14.1
Cannot find suppliers of inputs	4.2	11.3	0.4	1.3	0.0	0.7	n.a.	n.a.	n.a.
Cannot obtain own land from enterprise (or association)	7.6	7.1	0.0	0.1	n.a.	n.a.	n.a.	n.a.	n.a.
Policy problems (difficulties with dealing with the state)	13.0	8.4	0.5	0.5	n.a.	n.a.	30.7	23.8	45.5
Problems with agr. company or co-operative	6.3	14.3	0.3	0.2	n.a.	n.a.	17.1	25.7	57.2
Agriculture is less profitable than other activities of the household	19.8	16.8	2.4	4.1	0.8	2.1	82.9	17.1	0.0
Other constraints	10.1	7.1	2.3	2.3	7.9	10.0	9.7[a]	1.9[a]	6.1[a]
No constraints	7.6	6.3	0.1	0.1	0.0	0.0	7.9[a]	-	-
Total	-	-	100.0	100.0	100.0	100.0	-	-	-

[a] From the total number of observations in the sample.

Note: In Romania and Albania, respondents were asked to rank the three most important constraints. Respondents in Hungary gave their assessment of each constraint. Respondents in Bulgaria indicated all the constraints they consider as the most important, then those constraints they find important, etc.

Source: Own calculations based on Phare ACE Surveys 1998-2000.

Table 10. Definition of variables

Variable	Definition
Sales	Amount of sales, in local currency, realised by the household
Age	Age of the household head
Education	Years of schooling of household head
Household size	Number of household members (including children)
Income	Categorical variable: 1 = household income is not even enough for food, 2 = enough only for food, 3 = enough for food and necessities, but not for other expenses, 4 = enough to meet all the household's needs
Car	Dummy variable equal to 1 if the household owns at least one car, and 0 otherwise
Member	Dummy variable that equals 1 if a household member belongs to a co-operative, association or other agricultural enterprise, and 0 otherwise
Livestock	Weighted index for owned livestock
Land	Land cultivated by the farm household in hectares
Machinery	Dummy variable that equals 1 if the household owns some agricultural machinery, and 0 otherwise
Distance	Distance of the household's farm to the nearest regional centre

Table 11. Summary statistics (mean) of variables, by non-sellers and sellers

Variable	Albania		Bulgaria		Hungary		Romania	
	non-sellers	sellers	non-sellers	sellers	non-sellers	sellers	non-sellers	sellers
Age	49.20	50.22	63.53	59.82	56.56	53.86	64.44	62.43
Education	9.16	9.28	8.96	9.27	7.41	8.68	8.49	9.00
Household size	4.90	5.14	2.85	3.37	3.11	3.22	2.94	3.16
Income	1.45	1.78	2.13	2.53	1.74	2.03	1.66	1.90
Car	0.03	0.08	0.33	0.46	0.49	0.66	0.15	0.21
Member	n.a.	n.a.	0.15	0.16	0.18	0.28	0.18	0.24
Livestock	2.55	4.55	4.03	6.26	3.56	18.08	3.70	6.61
Land	0.51	1.12	1.40	3.58	2.55	10.49	2.39	3.60
Machinery	0.00	0.04	0.40	0.66	0.35	0.51	0.08	0.14
Distance	11.06	10.44	72.63	83.26	41.76	45.76	43.25	50.84
Sales	0.00	1,676,004	0.00	2,480,771	0.00	455,253	0.00	5,401,857
Observations	152	775	534	329	446	590	946	523
Total number of observations	927		863		1036		1469	

Table 12. Tobit regression results with ln(sales) as dependent variable

Variable	Albania	Bulgaria	Romania	Hungary
Age	-0.02 (0.19)	**-0.13** **(0.00)**	**-0.11** **(0.02)**	**-0.05** **(0.04)**
Education	-0.05 (0.49)	**-0.19** **(0.03)**	0.16 (0.40)	0.07 (0.21)
Household size	-0.02 (0.83)	0.12 (0.46)	-0.19 (0.54)	**-0.54** **(0.01)**
Income	**0.65** **(0.01)**	**1.48** **(0.00)**	**2.97** **(0.00)**	0.42 (0.20)
Car	**1.40** **(0.02)**	-0.46 (0.46)	**-2.77** **(0.05)**	0.64 (0.23)
Member	-	-0.41 (0.58)	**3.27** **(0.00)**	**1.65** **(0.00)**
ln (Land)	**1.87** **(0.00)**	**1.51** **(0.00)**	**3.91** **(0.00)**	**2.77** **(0.00)**
Machinery	**1.50** **(0.09)**	**1.73** **(0.00)**	-0.69 (0.66)	**-0.83** **(0.09)**
Livestock	**0.21** **(0.00)**	**0.11** **(0.02)**	**1.05** **(0.00)**	0.00 (0.23)
Distance	0.02 (0.28)	**0.01** **(0.07)**	**0.02** **(0.03)**	0.01 (0.47)
Constant	**4.78** **(0.00)**	-0.52 (0.82)	**-11.94** **(0.01)**	**5.17** **(0.01)**
Log likelihood	-2492.45	-1356.97	-2643.27	-2259.12

Note: Coefficients are given with p-values between brackets. Coefficients significant at 10% level are indicated in bold.

Source: own calculations

Table 13. Tobit regression results with ln(sales/land) as dependent variable

Variable	Albania	Bulgaria	Romania	Hungary
Age	-0.01 (0.23)	**-0.21** **(0.00)**	**-0.10** **(0.02)**	**-0.05** **(0.02)**
Education	-0.05 (0.45)	**-0.32** **(0.03)**	0.15 (0.39)	0.07 (0.26)
Household size	-0.02 (0.74)	0.17 (0.54)	-0.17 (0.56)	**-0.58** **(0.01)**
Income	**0.58** **(0.01)**	**2.36** **(0.00)**	**2.76** **(0.00)**	0.39 (0.25)
Car	**1.27** **(0.02)**	-0.87 (0.41)	**-2.61** **(0.05)**	0.66 (0.22)
Member	-	-0.53 (0.67)	**3.13** **(0.00)**	**1.71** **(0.00)**
Ln (Land)	**0.86** **(0.00)**	**1.90** **(0.00)**	**3.31** **(0.00)**	**2.09** **(0.00)**
Machinery	**1.29** **(0.10)**	**2.97** **(0.00)**	-0.71 (0.63)	**-0.87** **(0.08)**
Livestock	**0.18** **(0.00)**	**0.17** **(0.04)**	**0.98** **(0.00)**	0.00 (0.24)
Distance	0.01 (0.24)	**0.01** **(0.07)**	**0.02** **(0.04)**	0.01 (0.49)
Constant	**5.13** **(0.00)**	0.32 (0.93)	**-10.98** **(0.01)**	**5.28** **(0.01)**
Log likelihood	-2400.74	-1539.54	-2615.41	-2276.39

Note: Coefficients are given with p-values between brackets. Coefficients significant at 10% level are indicated in bold.

Source: own calculations

Table 14. Tobit regression results with ln(sales/land) as dependent variable and income excluded as explanatory variable

Variable	Albania	Bulgaria	Romania	Hungary
Age	-0.01 (0.32)	**-0.21** **(0.00)**	**-0.11** **(0.01)**	**-0.06** **(0.02)**
Education	-0.04 (0.59)	**-0.25** **(0.09)**	0.19 (0.28)	0.07 (0.22)
Household size	-0.05 (0.48)	0.21 (0.46)	-0.22 (0.46)	**-0.57** **(0.01)**
Income	-	-	-	-
Car	**1.40** **(0.01)**	-0.15 (0.88)	-1.54 (0.24)	0.81 (0.13)
Member	-	-0.65 (0.60)	**3.25** **(0.00)**	**1.73** **(0.00)**
Ln (Land)	**0.97** **(0.00)**	**2.01** **(0.00)**	**3.50** **(0.00)**	**2.14** **(0.00)**
Machinery	**1.41** **(0.07)**	**3.38** **(0.00)**	-0.29 (0.84)	**-0.83** **(0.09)**
Livestock	**0.20** **(0.00)**	**0.24** **(0.00)**	**1.01** **(0.00)**	0.00 (0.21)
Distance	0.01 (0.26)	0.01 (0.18)	**0.02** **(0.04)**	0.01 (0.54)
Constant	**5.75** **(0.00)**	4.28 (0.26)	**-6.49** **(0.10)**	**5.89** **(0.00)**
Log likelihood	-2404.78	-1548.56	-2624.70	-2277.05

Note: Coefficients are given with p-values between brackets. Coefficients significant at 10% level are indicated in bold.

Source: own calculations