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MARKET IMPERFECTIONS AND SUBSISTENCE FARMING: THE CASE OF KOSOVO

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Abstract

With data from the Agricultural Household Survey of 2004, carried out by the Statistical Office of Kosovo, and a methodology derived from a household model framework, the paper investigates whether there are market deficiencies on input or output side, which impede farm commercialisation in Kosovo. The results suggest that market imperfections deepen the subsistence character of farming in the region. The imperfections appear to be mainly in the land market.

Keyword: subsistence farming; market imperfections; Kosovo

1. INTRODUCTION

Rural areas in Kosovo, although covering 60 per cent of the population, do not contribute much to the economic growth. One of the reasons for this situation is that agriculture is stagnating because most of the farms produce for self-consumption. Imports are thus required to meet the urban demand, particularly of wheat, milk and dairy products (Lingard, 2003). The dramatic prevalence of subsistence farming makes the region an interesting case study from a development point of view. Transforming agricultural households into more commercialised farm operators would help generate additional income in rural areas.

This paper investigates whether there are market deficiencies on input or output side, which would require government intervention in order to facilitate farm commercialisation. Agricultural households might not have access to output market due to an underdeveloped downstream sector and a lack of contractual relations with processors and traders. On the other side, local producers might not be preferred in comparison to imports as their production level is low with unsatisfactory and variable quality due to constraints on the input markets. This might be the case in Kosovo due to a lack of off-farm opportunities (and thus oversupply and underemployment of labour on-farm), a limited access to credit (resulting in underinvestment and low quality inputs used on-farm) and a high land fragmentation but missing institutions for land consolidation. The only exception is a pilot project Agriculture Land Utilisation project (ALUP) funded by the European Agency for Reconstruction (EAR) which mainly provides technical assistance but does not have the financial capacity to proceed with a wide coverage of land consolidation in practice.

To answer these questions, data from the Agricultural Household Survey (AHS) of 2004 are used and a methodology derived from a household model framework is applied.

2. THEORETICAL MODEL

Several papers have investigated the issue of subsistence farming in transition countries. In general, studies agree that subsistence farming has expanded during the transition period due to macroeconomic instability and uncertainty, but underline that transaction costs between market prices and households' shadow prices are also crucial determinants (e.g. Kostov and Lingard, 2004; Mathijs and Noev, 2002). The model underlying the empirical analysis in this paper is based on this transaction cost concept and household theory in imperfect markets.

The household model with perfect markets can be written as (Sadoulet and de Janvry, 1995):

$$\text{Max}_{c_a, c_m, l} U(c_a, c_m, l, z) \quad (1)$$

subject to production, income, and time constraints

$$q_a = f(L, X) \quad (2)$$

$$p_x X + p_m c_m = p_a (q_a - c_a) + w(L_F - L) \quad (3)$$

$$l + L_F = T \quad (4)$$

with U the utility, z the household's characteristics; c_a the home consumption of agricultural good; c_m the consumption of other goods bought on the market; q_a the agricultural output; f the production function; L the total labour and X the other inputs used for the agricultural production; l the leisure; L_F the family labour; T the total time endowment; p_a, p_m, w, p_x , the prices of c_a, c_m, L and X respectively.

In the case of perfect market, the model is recursive, implying that consumption activities do not influence production activities. Decisions are separable; the optimal home consumption of agricultural good being:

$$c_a^* = c_a(p_a, p_m, w, p_x, L^*, X^*) \quad (5)$$

where L^*, X^* are the optimal input levels.

The home consumption thus depends exclusively on the market prices; the household's preferences play no role. In this case, self-consumption is a rational response when household's asset and time endowment give the household a comparative advantage over the goods and factors exchanged on the market.

In the case of deficient or missing markets, however, it might be more beneficial for the household not to participate in the market and to be fully, or close to fully, self-sufficient, if their shadow prices are less than the market prices they would face. In this case, decisions are not separable and the consumption of agricultural goods will depend on the household's characteristics and not on the market prices.

We consider market imperfections related to positive transaction costs that are likely to occur in Kosovo.

1) The output market is imperfect. In this case the following constraint is added to the household model:

$$p_a \leq \bar{p}_a \quad (6)$$

with \bar{p}_a the maximum price that the household can receive selling their output (the difference

$p_a - \bar{p}_a$ approximates the transaction costs).

The optimal home consumption is then:

$$c_a^* = c_a(p_m, w, p_x, L^*, X^*, z) \quad (7)$$

2) The input markets are imperfect. In this case the following constraints are added to the household model:

$$w \geq \bar{w} \quad (8)$$

$$p_x \geq \bar{p}_x \quad (9)$$

with \bar{w}, \bar{p}_x the minimum prices that the household must pay for inputs on the markets. The difference with w and p_x approximates the transaction costs on the input side.

The optimal home consumption is then:

$$c_a^* = c_a(p_a, p_m, L^*, X^*, z). \quad (10)$$

3. DATA AND METHODOLOGY

Data from the 2004 AHS are used. The survey was carried out by the Statistical Office of Kosovo (SOK) with the technical Assistance by the EAR project 'Agricultural Statistics and Policy Analysis Unit for Kosovo' (ASPAUK). The survey sample was stratified by municipality and village size and thus has a good geographical coverage and village representation (SOK, 2004). Data were collected with face to face interviews based on a questionnaire and then cleaned checked for consistency by the ASPAUK team.

Table 1. Descriptive statistics of the sample used; averages

	Number of observations	Mean
Household size	4,187	8.9
Average age in the household	4,187	29.8
UAA (ha)	4,187	2.4
Arable land area (ha)	4,187	1.2
Grassland area (ha)	4,187	0.9
Fallow land area (ha)	4,187	0.2
Total number of plots	4,187	6.6
Average size of arable plot (ha)	3,813	0.45
Average size of grassland plots (ha)	3,337	0.65
Share of irrigated land (%)	4,128	20.4
Share of rented UAA (%)	4,173	4.6
Average rental (euros/ha)	234	122.8
Total number of different crops	4,187	8.3
Grain yield (t/ha)	2,951	3.9
Fruit and vegetable yield (t/ha)	3,003	15.4
Forage yield (t/ha)	3,326	3.4
Mineral fertilisation per ha (kg/ha)	4,101	319
Manure per ha (kg/ha)	4,126	2,618
Value of equipment owned (euros)	4,187	2,943
Number of tractors owned	4,187	0.6
Number of livestock units	4,187	2.7
Labour (AWU)	4,187	1.96
Share of hired labour (%)	3,916	1.8
Average wage (euro/day)	815	12.6
Total farm business operating expenses (euros)	4,187	779
Total farm revenue (euros)	4,187	817
Total interest / Total equipment value	2,469	0.001

The micro data useable records cover 4,187 agricultural households. The Survey provides data on the agricultural situation in Kosovo, namely the demographic characteristics of agricultural households; land use and farm structure; sub-sectoral production data for crop, livestock and forestry; variable inputs; machinery, labour force and farm expenditure. Table 1 provides some descriptive statistics of the sample used. Households are large, with an average of 9 members, but farm a small Utilised Agricultural Area (UAA) of 2.4 ha on average. The land area is very fragmented (6.6 plots on average).¹ The land is mainly arable; 20 percent is irrigated. A large number of different crops is cultivated per farm (8.3 on average). Grain yields (3.9 t/ha on

¹ According to the survey, a household is defined as people living under the same roof and pooling their income. Kosovo still maintains the traditional style of living when extended families live together. In order to be classified as agricultural, the household should possess and cultivate more than 0.10 ha of arable land, or less than 0.10 ha of arable land but have at least: 1 cattle and a calf, or; 1 cattle and 2 sheep or goats, or; 4 sheep or goats, or; 50 poultry, or; 20 beehives, or; more than 20 m² of fish pond (SOK, 2004).

average) are much lower than in Western Europe but not too far from the yields recorded in some neighbouring countries during the period of transition (e.g. Bulgaria). Households almost do not use external factors of production: only 1.8 percent of the total labour force is hired and 4.6 percent of the UAA is rented from private landowners or from the State. This suggests that agricultural households are not integrated in the factor markets. As presented in Table 2, the share of the output sold in the total value of output is also low, 13.5 percent on average, while 83.7 percent are used for human consumption or for animal feed (around 3 percent are wasted). This indicates a low level of integration in output markets as well. To the extent that output sold is concerned in includes mainly fruit and vegetables, and forage crops, while grains are mostly used as self-consumption. According the SOK (2004) around 8 percent of the land in 2004 was left fallow and around one fourth of households had some area left fallow. Table 3 shows that the survey respondents identified the lack of production factors (variable inputs, manpower and equipment) as the main reason for leaving some land fallow (48 percent of the cases), followed by a low profitability (34 percent of the cases). This indicates that some agricultural households in Kosovo might face some constraints on both input and output markets. Table 3 shows that 14 percent of the fallow plots were not cultivated due to the lack of manpower. At first glance, this is counter intuitive bearing in mind the excess labour in Kosovo agriculture. However, the averages might hide particular cases when labour is a constraint.

Table 2. Use of agricultural output (%); sample averages

Share of total output sold	13.5
Share of total output used for household needs or on-farm, including:	83.7
used for household needs	38.1
used on-farm (animal feed)	45.6
Share of grains sold	6.4
Share of fruit and vegetables sold	12.5
Share of fodder crops sold	11.7
Share of grain output used for household needs or on-farm	91.1
Share of fruit and vegetables output used for household needs or on-farm	82.7
Share of fodder output used for household needs or on-farm	86.5

Table 3. Reasons for leaving some land fallow; shares of fallow plots (%)

Crop rotation	2
Lack of inputs	23
Lack of manpower	14
Lack of equipment	11
Low economic profitability	34
Mines	1
Lack of security	9
Other reasons	6

In order to test which market is primarily deficient, the share of production sold in the total value of output is regressed over a set of explanatory variables. Several variables have been tested. They include households' characteristics z (such as household size, average household's age), proxies for the output and input prices p_o , w , p_x (such as location, wages, rentals, interest), as derived from equations (7) and (10), and other farm characteristics.

4. RESULTS

The dependent variable of the regression is the share of total production sold. In order to proxy the prices of inputs (p_x), rentals per ha, daily wages and interest per value of the equipment were included as explanatory variables. However, such variables were available for few households only (the other ones did not respond to the relevant questions during the survey, or did not have any rented land or hired labour). Therefore, the regression was performed on a reduced sample

(189). Results from the regression are presented in Table 4. Only the significant explanatory variables were kept in the final specification. Among the input prices, land and capital prices (respectively rentals in euros per ha, and total interest divided by the total value of equipment) have a significant influence on the share of production that is sold. Their influence is positive, suggesting that higher input prices provide incentives to sell output in order to cover the costs. The output market was represented in the regression by a dummy equal to 1 if the household lives in a municipality (i.e. county) that is crossed by the major road connecting Serbia to FYR Macedonia, and equal to 0 if not. The positive and significant coefficient indicates that transportation infrastructures are crucial to sell the production. No household characteristics (z) were significant, but a few farm characteristics were. Size in terms of UAA in ha has a positive influence on the share of production sold, while the number of livestock units has a negative impact. This suggests that larger farms can sell their production more easily, while livestock farms would sell less easily than arable farms. This might be due the low number of stock per household. Ninety percent of farmers use direct sales and only about 3 percent of farmers sell through an association or cooperative. Based on Riinvest rural and urban household survey 2004 (Beilock, 2004), farmers lack of information about markets and prices. Finally, farms with a high share of irrigated land and those that use a higher ratio of mineral fertilisers per ha sell more of their production. The reason might be that such farms can achieve larger quantities and better quality output, which is easier to sell.

Table 4. Regression results (with input prices)

	parameter	<i>t</i> -statistic	probability
Constant	1.69	0.47	0.64
Rental per ha	0.03	2.81	0.01
Interest per equipment value	151.10	1.68	0.09
Dummy = 1 if municipality with highway	11.11	2.37	0.02
UAA	1.35	4.90	0.00
Number of livestock units	-0.59	-3.32	0.00
Share of irrigated land	0.28	5.22	0.00
Mineral fertilisation per ha	0.01	2.54	0.02
Number of observations		189	
R-square		0.448	
<i>F</i> -test	21.03		0.00

Dependent variable: share of total production sold.

The above analysis indicates that equation (5) applies to this 189 farm households sub-sample, as no household characteristics (z) were significant in the regression. Thus, for farms that have to pay rentals or interest, the household model is separable, i.e. production and consumption decisions are not linked. We refer to these farms as semi-subsistence.

In order to understand what is the situation for the remaining farms of the sample, a separate regression was run for them without factor prices. Results are presented in Table 5. Identically to the first regression, only the significant variables were kept in the final specification. Several variables have the same direction of impact as in the 189 farm sub-sample regression (Table 4), i.e. UAA, the number of livestock units, the share of irrigated land and the use of fertilisers per hectare. Farm location has no importance for this 3,696 farm sub-sample. However, the higher the number of different crops cultivated, the lower the household integration in the output markets. This suggests that the households were diversifying their agricultural production in order to cover the variety of food household needs. The use of hired labour enables the household to market their output, as the share of hired workers has a positive impact on the share of output sold. Finally, one of the household characteristics, household size, has a significant and negative influence, indicating that in this case the model is not separable and that those households appear to face market imperfections that force them to sell less than what they would have done in the case of perfectly functioning markets.

Table 5. Regression results (without input prices)

	parameter	<i>t</i> -statistic	probability
Constant	13.56	12.83	0.00
Household size	-0.26	-3.24	0.00
UAA	1.92	8.59	0.00
Number of livestock units	-1.54	-10.73	0.00
Share of irrigated land	0.11	9.37	0.00
Mineral fertilisation per ha	0.01	2.13	0.03
Share of hired workers	0.15	3.87	0.00
Number of different crops cultivated	-0.27	-3.59	0.00
Number of observations		3,696	
R-square		0.069	
<i>F</i> -test	38.80		0.00

Dependent variable: share of total production sold.

The results presented in Tables 4 and 5 show that the AHS sample analysed is constituted of two sub-samples: a small group of farms that do not face imperfect markets (Table 4) and a large sub-sample whose subsistence character is (at least, partly) a response to market imperfections. The characteristics of these two samples are presented in Table 6.

Table 6. Characteristics of both regression samples; averages

	Sample with factor prices (189 farms)	Sample without factor prices (3,695 farms)
Share of total production sold (%)	27.7	12.8
Share of total production used for household needs or on farm (%)	69.7	84.4
Average age in the household	27.4	29.9
Share of household members without education (%)	16.5	17.1
UAA (ha)	6.1	2.3
Number of livestock units	6.1	2.5
Share of rented land (%)	47.4	2.6
Share of hired labour (%)	2.0	1.8

Share of irrigated land	31.2	19.9
Total farm revenue per ha (euros/ha)	784	314
Grain yield (t/ha)	4.1	3.9
Fruit and vegetable yield (t/ha)	17.3	15.3

The sample not affected by market failures (189 farms) sells more of their production (twice as much) than the sample facing imperfect markets. This suggests that market imperfections aggravate the character of subsistence farming. While the share of hired labour is similar between both samples, there is a substantial difference in terms of the share of rented land (47.4 percent for the sample of 189 farms, versus 2.6 percent for the large sub-sample). Along with the difference in land size (6.1 ha and 2.5 ha respectively), this suggests that imperfections in the land market are more important than imperfections in the labour market. However, as the land price positively affects the share of production that is sold (providing incentives for output sales), it might be concluded that the imperfections are not in terms of price, but in terms of access to land and/or land availability. This is consistent with the assessment in the Green Book that in view of the social situation and traditions in Kosovo the increase in farm size will be a difficult and long-lasting process (UNMIK, 2003). Finally, as expected, subsistence farms perform worse than the semi-subsistence ones in terms of grain and fruit and vegetable yields. Their total farm revenue per hectare is also less than a half the one achieved by the semi-subsistence farms.

5. CONCLUSION

This analysis has shown that market imperfections play a role in the persistence of a population of subsistence farms in Kosovo. In particular, the access to land seems to be a problem. This is not surprising, as Kosovo used to be an industrial region before the fall of the communist regime. Therefore, the land market might not be well developed.

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