EFEKTIVITA TRHU A PRONÁJMU PŮDY V RUSKÉM ZEMĚDĚLSTVÍ

THE EFFICIENCY OF LAND RENTAL MARKETS IN RUSSIAN AGRICULTURE

Irina Lyakisheva, Vasily Erokhin, Andrey Murga

Anotace:
Článek se zabývá fungováním trhu s půdou a nájmem půdy v Rusku. Spíše než modelu rodinného hospodářství se však věnuje hodnocení fungování trhu s půdou a otázkám nájmu půdy. Článek charakterizuje ruský trh s půdou. Poskytuje přehled o užití a vlastnictví půdy v Rusku a analyzuje data týkající se nájmů půdy. Na závěr je ukázáno, že efektivnost trhu s půdou a nájmů půdy je u jednotlivých domácností a jejich hospodářství rozdílná a stejně tak se liší i mezi regiony. K vysvětlení těchto odlišností je využita regresní analýza.

Klíčová slova:
Trh s půdou, nájem půdy, efektivita, Rusko,

Abstract:
This paper takes a closer look at the functioning of the Russian land rental market. However, rather than developing a formal (household) model, we try to develop a simple framework to assess the functioning of land (rental) markets that is easy to disseminate. The text tries to characterize the Russian land rental market: on the one hand a general overview of land use and ownership in Russia is given; on the other hand we discuss the data used in our analysis as well as the incidence of leases. It shows how the effectiveness of the land rental market varies among households and regions and we try to explain these differences using regression analyses.

Key words:
Land rental market, efficiency, Russia

INTRODUCTION

In Russia, as well as in most Central and East European countries (CEECs), the practice of buying and selling land has not yet developed as a result of both economic and legislative reasons. This has resulted in a very unequal distribution of farm sizes, following the initial land reform processes that started in 1991-1992. Authorities only slowly implement policies to facilitate further movement of land plots between individuals, with the objective of creating farm sizes that are appropriate for efficient farming. Without a functioning land market, land owners who are the least risk-averse and the most motivated to farm individually will not be able to increase their initial holding and thus land will remain locked into an inherently inefficient distribution pattern. In order to avoid under-utilization of valuable land resources a clear legal process must be defined for inactive landowners to rent or sell land to those who want to farm. Since land sales are still restricted throughout CEECs, private farmers can take advantage of leasing opportunities in order to adjust their holdings.

METHODOLOGY

The aim of this paper is to assess and explain the functioning of land rental markets. For this, we use a simplified version of the four-step methodology proposed by Barrett et al.'s to estimate labor supply in Cote d'lvoire agriculture. The procedure is as follows:

For each farm in the sample the Marginal Value Product of Land (MVPL) is estimated using a Cobb-Douglas production function. Farm-specific MVPL are then calculated by taking the derivative of the estimated function with respect to land.

Using a sub-sample of farmers who are active in the land rental market (i.e. those leasing in and/or out agricultural land), the computed MVPL figures are compared to the land rental prices paid or received by these farmers. We calculate the "allocative inefficiency" (AI) of a household as the deviation of the text book equilibrium MVPL = Wrentai, being AI = ln(MVPL/w_{ren}tai). Consequently, we can estimate the AI as a function of household characteristics that are either immutable or predetermined choices, and measures of factor constraints.

These estimated parameters are then used to derive the AI of those households who are nor leasing in nor renting out agricultural land.

Finally, these AI-scores are aggregated to a level that corresponds to the notion of a land market. For Russia, we take the county level. This county-specific indicator then allows us to determine the factors that cause regional differences in the functioning of the land rental market.

DISCUSSION

In this section we will describe the features of the Russian land rental market. Hence, we first discuss land ownership and land use in Russia in order to get a general overview of the country-specific situation. Second, we depict the data used for determining and clarifying the regional differences concerning the effectiveness of the Russian land rental market.

Land ownership and land use

Under the communist regime, three types of organizations dominated Russian agriculture: collective farms, state farms and household plots. Their share in land use was estimated at 80%, 14% and 6% respectively. Nevertheless, these figures differ considerably from the ownership distribution of productive land: the collective farms owned 42%, the members of the collectives 24%, the state owned 27% and other private owners hold 7% of productive land. In 1989, the central planning apparatus was dismantled and profound reforms accompanied the transition to a market economy. Within the agricultural sector, four concepts were at the center of attention: restitution, compensation, transformation and privatization.

Farm restructuring and land reforms generated important changes in land use as well as land ownership. Despite these changes in land ownership, Russia's land sales market is still embryonic which is caused by two factors. First, there is the problem of the delay in land entitlement, in particular for co-operative shares. Second, existing legislation constraints land ownership and thus land transactions by setting an upper limit of 300 ha for individual ownership, by prohibiting legal persons and non-resident foreign citizens to own agricultural land and by forbidding the sale of land received through compensation or as a share from collective farms for three years after receipt. These constraints clarify the importance of the land rental market in transferring land from less to more productive users.

As opposed to the sales market, we observe a very active rental market with many different participants. In this study we want to investigate how the functioning of the land rental market enables farmers to adjust the operational size of their production units. As a consequence, we focus on the impact of the functioning of the rental market on individual farmers, and thus not on the constraints and possibilities experienced by other individuals or legal persons.

The data used in this paper originate from two sources. On the one hand, we use county-level information from the statistical yearbook of Russia (Russian Central Statistical Office). On the other hand, we use data derived from a representative survey of Russian family farms carried out in 2005. The data sets contain detailed information on production structure, labor, land and other input use, capital, non-agricultural activities, investments, credits and external

conditions of 1,618 family farms. A review of the data revealed some errors and farms for which errors could not be resolved were dropped. Further, farms for which information about physical production was missing were eliminated. We assumed further that two inputs are essential in agricultural production: labor and land. If information about these inputs was absent, the farm was also removed, such that we ended up with a sample of 1,158 family farms.

The data used for the estimation of the Cobb-Douglas production function include gross output and data on land, labor, capital and other inputs. Concerning land use, figures were available for the total cultivated area in 2005. The input capital consists of four components, i.e., the estimated value of buildings, machinery, livestock and plantations. The available labor figures were converted into annual working units (AWU). One AWU corresponds to 2,150 hours worked, i.e., the number of hours that a full-time worker can perform in one year. The surveys include also figures on other inputs, such as purchases of seeds, feed grains, roughage, concentrated feed, fertilizers, electric energy, gas, fuels and services. Output is physical production valued at fixed prices and corrected for own produced feed used for the breeding of animals. Using fixed national prices was necessary to avoid that output would be effected by price differences. The prices used in the output calculations were based on price information available in the surveys. Further, we also incorporate a measure for land quality in the specification of the production function since this will affect the magnitude of output change when increasing the cultivated land area with one unit. Finally, we enclose regional dummies since geographical conditions are likely to be important when looking at the derivative of output with respect to the amount of cultivated land.

By way of illustration, we also report the descriptive statistics of explanatory variables of the production function for two sub-samples: the group of farmers active in the land rental market (22%) on the one hand, and a group of farmers neither leasing in nor renting out agricultural land (78%) on the other hand. It becomes clear that there are important differences between the two sub-samples: those active in the land rental market are on average larger than those neither leasing in nor renting out. Testing for equal means between both categories reveals that, at a 0.1 level of significance, the means of the variables *output, cultivated land, land quality, machinery, seeds, roughage, fertilizer, electric energy, fuels* and *services* are significantly larger for the sub-sample of farmers active in the land rental market. These results suggest that farmers who adjust their land size through the land rental market will reach a larger economic size. Since there exists a positive relation between economic size (measured by total output) and the efficiency of Russian family farms, these results suggest that farmers who adjust their farm size through land leasing may be more efficient.

Based on the tests for equality of means, we can conclude that the average *share of non-farm income* as well as the average *expenditures per household member* are significantly larger for farmers not active in the land rental market. Conversely, means of the *age* of the household head, the *labor endowment* of the household, the *distance* to the railway station, the *number of plots* cultivated and the *number of crops* grown are all significantly larger for the sub-sample of family farms involved in the land rental market. Further, the share of households from which someone is *member of a cooperative* or *partner in a company,* as well as the share of family farms who *received land in compensation* is also significantly larger for those active in leasing in and/or out land.

In this paragraph we try to shape regional differences in the incidence of leases, in the constraints concerning renting in land experienced by rural households and in reasons why households rent out (part of) their agricultural land. First, it becomes clear that there is a huge variation in the share of households active in the rental market (from 1% to 38%). This variation is mainly caused by enormous differences in the percentage of households leasing out their agricultural land. Further, renting out seems to occur much more frequently than renting in land. Most reasons for renting out land are linked with the lack of labor and machinery. Nevertheless,

the percentage of households who experience that labor and/or machinery shortages drive them to rent out land differs greatly among counties. Finally, also deficiency in labor impedes households to rent in (more) agricultural land. These figures indicate that there are strong links between the functioning of the land rental market and the labor market, which we will investigate in the next section.

ESTIMATION RESULTS

Calculation and assessment of allocative inefficiency at household level In the first step of our analysis we estimate a Cobb-Douglas production function in order to derive the marginal value product of land. Since some inputs may have zero values, we include a dummy variable for each input, which equals one if the farmer does not have/use the particular input and 0 otherwise. At the same time the original input variables are replaced by a new variable, which equals the original value if the original variable has a positive value, and which equals 1 when the original variable is zero. We use this procedure only for *buildings, machinery, livestock, permanent crops, seeds, feed grain, roughage, concentrated feed, fertilizer, electric energy, gas, fuel* and *services.* According to Battese, this technique yields efficient estimators using the full data set without introducing bias. Furthermore we also include county-dummies in order to capture regional differences that may affect the production function.

The production function estimates allow us to calculate the AI of farmers who do adjust their land size by renting practices since we know the land rental price they received or paid. If the AI has value zero, then the farmer equalized his marginal value product of land to the land rental price so the textbook equilibrium has been reached. Conversely, deviation of the Al-scores from zero means that land is under- or oversupplied. In order to capture these deviations we take the absolute value of the AI from which we give the distribution in figure 1. In principle, this distribution is censored at 0 and has a relatively large but thin positive tail (kurtosis 2.9, skewness 0.5). Therefore to estimate the AI as a function of household characteristics and factor constraints a left-censored tobit regression has to be used. But since none of the variables were censored at zero in the tobit-model, the regression reduced to the classical ordinary least squares with the following results (table 8):[4] 1. Personal characteristics of the household head do not influence the AI significantly.

The same holds for income characteristics and the asset index of the household.

These results suggest that there are no differences in access to the land rental market between poor and wealthy farmers, well-educated and poorly educated farmers, etc., ceteris paribus.

Land endowment has a negative impact on AI. Hence, households with more land are more capable to adjust their land size to the prevailing market prices. According to Skoufias, households who own more land are more likely to rent out land. In this way they can adjust their landholdings to an optimal operational size by renting out, while they still cultivate enough land themselves to make a living.

A larger herd (i.e. equivalent numbers of livestock heads) leads to a higher AI. In other words, livestock farmers have more difficulty to adjust their farm's land endowment than crop farmers.

More remote household farms are less efficient in adjusting their land size to the prevailing market prices. One possible explanation for this can be that farmers in remote areas have less labor opportunities so that they stick to farming, even if they can not reach on optimal size, since that is their main (or only) way of making a living.

The more plots, the better a farmer succeeds in equalizing his MVPL to the market price. This suggests that some degree of land fragmentation is necessary for the land rental market to work.

The impact of the number of cultivated crops on AI is non-linear: negative up to 4 different crops and positive thereafter. This result suggests that when a farmer is too diversified he will run into problems getting enough land for each crop, i.e., that he is loosing scale economies.

Being partner in a farming company lowers the allocative inefficiency, while being member of a cooperative has no significant effect on AI. This is an indication that the vicinity of a cooperative suppresses the functioning of the land rental market which can be caused for example by forcing members to rent out their land to the cooperative for a very low price. Conversely, the proximity of a company is beneficiary for the effectiveness of the land rental market. Probably, this has to do with the fact that companies are mostly smaller than cooperatives so the former will be less capable to dominate and distort the market.

In the last step of our analysis we aggregate the actual and fitted AI scores to county level so that we reach an indicator for each county. There is reasonable belief that constraints in rural labor markets have spillover effects on land market participation decisions. More specifically, we consider the relationship between the county-level AI and the following variables which were readily available from the Russian statistics: the number of industrial employees per 1000 inhabitants, the unemployment rate, the change in unemployment between 1992 and 1996, and the agricultural wage:

The number of industrial employees per 1000 inhabitants is positively related to AI: the more industrialized a county, the less efficient its land market. In such counties agriculture is not an important economic activity and is even performed for subsistence reasons. Farmers adjust their labor endowment rather than their land endowment as sufficient off-farm opportunities are available. As a result, the land market is rather thin in industrialized counties.

The unemployment rate is negatively related to AI: counties with a higher unemployment rate have more efficient land rental markets. Unemployed individuals are forced into self-employment activities in the absence of viable alternatives. These activities constitute primarily agricultural production. More actors imply better functioning land rental markets.

However, the change in unemployment is positively related to AI, which suggests that the impact of unemployment on the AI is conditional on the initial level of unemployment in 1992.

The agricultural wage is negatively related to AI: a high agricultural wage reflects good agricultural conditions and thus a more active land market.

In summary, there is a negative spillover effect from the labor market into the land market, when the initial unemployment level is low. In such counties, individuals working off-farm still keep their land, thus hampering the emergence of an active land market. This is surprising as the existence of economies of scale would suggest transactions to take place to enlarge the holdings of those who stay. Several reasons can be suggested for this phenomenon. First, individuals who engage into off-farm work may still have an incentive to cultivate their land extensively. Speculation that land prices will increase upon EU accession is one such incentive. Second, it may be difficult to find somebody to rent the land, as everybody moves to the labor market, resulting in a matching problem. Third, there may be other factors explaining why farmers do not increase their holdings despite the existence of scale economies. For example, the existence of delayed payments for delivered product as an important problem in Russian agriculture explaining why farmers do not invest. In a more dynamic environment characterized by decreasing unemployment, these incentives seem to play a lesser role.

CONCLUSIONS

In this paper, we adopted a four-step methodology to assess the functioning of the land rental market in Russian agriculture, both at the level of the household and of the "market" represented by the county. We computed an index of allocative inefficiency as the wedge between opportunity cost of land and land rental price paid. At the household level, no systematic differences in human capital and wealth was observed between farmers with high and low allocative inefficiency. We did find that larger farms (in terms of land) display higher levels of allocative efficiency. At the county level, we have found significant correlations with labor market characteristics, suggesting that a well functioning labor market involves a thin land market and vice-versa. The implication of this is that in Russia, while improving the livelihoods of households, improving off-farm opportunities does not automatically lead to a better functioning land rental market. Hence, specific measures to overcome matching problems, such as better land information systems, may be necessary. Further research must explore whether additional problems, such as uncertain business environment, cause land markets to be imperfect.

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Authors:
Irina Lyakisheva
(Associate professor, Chair of Dept. of World Economy)
Vasily Erokhin
(Assistant)
Andrey Murga
(Assistant professor)
Faculty of Economics
Stavropol State Agrarian University, Russia
e-mail: Irina_Lyakisheva@mail.ru
tel: +7 8652 35 64 40/12-22