

# Individual Farmers and Land Renting in Hungary

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# **INDIVIDUAL FARMERS AND LAND RENTING IN HUNGARY**

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## **ABSTRACT**

This paper uses data from a survey of more than 1,400 farming households in Hungary to identify a set of profiles of farming households, which are active in the rental market and to estimate econometrically the impact of household characteristics, such as social, physical, and human capital, as well as regional and environmental characteristics on land rental activities. We show that the decision of farming households to lease in land is related to their land endowment, their access to capital assets, human capital variables such as age and education and their social capital. Environmental factors are also important.

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## ABSTRACT

This paper uses data from a survey of more than 1,400 farming households in Hungary to identify a set of profiles of farming households, which are active in the rental market and to estimate econometrically the impact of household characteristics, such as social, physical, and human capital, as well as regional and environmental characteristics on land rental activities. We show that the decision of farming households to lease in land is related to their land endowment, their access to capital assets, human capital variables such as age and education and their social capital. Environmental factors are also important.

## 1 INTRODUCTION

Land reform and the creation of optimal land institutions has attracted renewed attention because of its importance in transition processes such as in China, Vietnam, South Africa, the former Soviet Union, and Central and Eastern Europe (Csaki and Nash, 1997; Mathijs and Swinnen, 1998; Swinnen, 1999) and because of new political pressure for land reforms in countries with highly unequal land distributions such as Zimbabwe and Brazil. New insights in the functioning of land markets and institutions have also induced renewed attention to land access as a poverty reducing tool (de Janvry et al., 2001). In particular, the role of *land rental markets* has recently been re-emphasized as important for providing access to land for the poor and as an efficiency-enhancing institution in environments characterized by large uncertainties, such as countries in transition (Deininger and Binswanger, 2001; Swinnen 2001). Yet, empirically, the importance of rental markets differs strongly between countries (Sadoulet et al., 2001).

Existing models of rental markets often focus on sharecropping or on large landlord-small tenant models (Bavermann and Stiglitz, 1982; Bradhan, 1989). While these assumptions are relevant for parts of the developing world, they do not capture the essential characteristics of rental contracts elsewhere, and are therefore insufficient as a basis for explaining the variation in rental activities. For example, land markets in transition countries are characterized by dispersed landownership by many rural and urban households who compete for the access to land with large-scale corporations. Furthermore, existing models pay relatively little attention to property rights security. Yet, new research suggests that insecurity of property rights is a key constraint on land rental in Latin America (Macours et al., 2001).

Our paper analyses the development of land rental markets in Hungary by explicitly incorporating transition characteristics of land ownership, land use, and rural market imperfections. We use data from a survey of more than 1,400 farming households. First, we describe some general characteristics of land use and ownership in Hungary. Second, we present a conceptual framework to analyse the decision of farming households to participate in the land rental market. Third, we describe profiles of farming households who act as a tenant or landlord in the Hungarian land market. The fourth section describes how regions with a high percentage of farming households who participate in the land rental market differ from regions where this percentage is low. Finally, we estimate econometrically the impact of household characteristics, such as social, physical, and human capital, as well as regional and environmental characteristics on land rental activities.

## **2 THE HUNGARIAN LAND MARKET**

Under the communist regime, three types of organizations dominated Hungarian agriculture: collective farms, state farms and household plots. Their share in land use was estimated respectively at 57%, 31% and 12%. Farm land ownership was distributed as follows: the collective farms owned 42%, the members of the collective farms 24%, the state owned 27% and other private owners held 7% of productive land (European Commission, 1998).

Even under the communist regime, about 35% of the land cultivated by collective farms was still privately owned by farm members (Mathijs and Mészáros, 1997). Yet, they had very little effective rights. The 1990s land restitution process allowed these collective farm members to withdraw freely the land that they formally owned. However, since the land has been improved by land consolidation and investments by the collective farms, members could only withdraw a share of their land.

Former landowners who had lost legal rights on their land were compensated for their losses. People eligible for compensation were farmers whose land was seized just after Second World War and farmers who were forced to sell their land to the collective farm for a low price in the 1970s and 1980s. Former owners (or their descendants) who claimed compensation received vouchers based on the estimated value of their lost property. About 2.5 million hectares of collective land and 0.2 million hectares of state owned land were privatised through voucher-based auctions. The remaining land from the collective farms was allocated to their members, but registration of these is proceeding very slowly (European Commission, 1998).

The land cultivated by the state farms was not subject to privatisation and became the responsibility of the State Property Agency. They allocated the land as follows: 40 % was used for compensation of private persons, 37 % is used by companies which remain state property, 27 % was leased (mainly to former state farms) and 6 % was allocated to employees of state farms (Mathijs and Mészáros, 1997).

These land reforms and the restructuring of the farms generated important changes in land ownership and use. By 1995, the state still owned 20% of the farmland, co-operative members owned 33% and other private owners 48%. The land use distribution among the main farm types was as follows: 28% of the land is used by about 4,300 private farming corporations, 24% by about 2,100 co-operatives and 48% by about 1,200,000 private individual farms (European Commission, 1998).

The land reform process resulted in many new landowners who do not use (all) their land. Land selling is not widespread in Hungary. In contrast, the land rental market is very active. A considerable part of the land rental activities are by large-scale farms such as corporations and cooperatives. Part of this is mainly cooperatives leasing land from their members.

In this paper we focus on the activities of individual farms in the rental market. We analyse which characteristics determine whether certain farming households lease in or lease out land.

## **3 CONCEPTUAL FRAMEWORK**

Our analysis of the determinants of participation in the lease market is based on theoretical models where households maximize their utility derived from income and leisure (Carter and Salgado, 2001; Sadoulet et al. 2001; Skoufias, 1995; Yao, 2000). Some key assumptions underlying these models are imperfections in the labour, land and credit market, heterogeneity in the distribution of initial wealth and specific human capital, and rationing of

off-farm labour opportunities. The assumption of labour market imperfections is related with moral hazards in hired labour: supervision of workers is required so that the effective labour supplied by hired workers depends on the amount of family labour working on the farm as well as the area of land cultivated. Land market imperfections are assumed because of the presence of transaction costs, such as search costs and costs related to negotiating the terms of the tenure contract. Hence, the models incorporate that effective rent paid is larger than the effective rent received. If the credit market is imperfect, a farmer may not borrow against future profits so that the loan he can get depends on the amount of land in his possession. Consequently, the available working capital is constrained by the farmers' initial wealth status, the land area that the farming household owns, the income from wage labour and the payments received from renting out their land. The assumptions of households' heterogeneity and rationed off-farm employment opportunities are incorporated in the models by allowing that the wage paid to hired labourers differs from the wage the household members can gain off farm.

These theoretical models yield several hypotheses. A first set of factors affecting participation in the lease market are variables which determine the management capabilities of the farming household. Human capital variables as well as the labour endowment will affect the household's ability to manage more land and, *ceteris paribus*, are therefore likely to have a positive impact on leasing.

Second, in the presence of capital constraints, the size of the operated land area will be affected by household asset endowments and initial wealth. More wealthy households are less liquidity constrained so that they have more working capital at their disposal and hence they can increase their operated farm size via rental. In other words, increasing the operated size by leasing in land will only be useful if the household has enough machinery and land to access credit or enough initial wealth so that the necessary working capital can be provided. On the other hand, if there are economies of scale in production, e.g. due to imperfect markets, there exists an optimal operational farm size so that the probability of leasing in (out) land may decrease (increase) with the farmer's land endowment.

Next, environmental factors have an effect on the rental behaviour of farming households through their influence on the magnitude of transaction costs in the rental market. In addition, environmental factors may strengthen the consequences of imperfections in other factor markets and in that sense they are expected to have also an indirect impact on the farmers' decision to participate in the lease market.

#### **4 PROFILES OF TENANTS AND LANDLORDS IN HUNGARY**

The data used in this paper originate from two sources. On the one hand, we use county-level information from the statistical yearbook of Hungary (Hungarian Central Statistical Office). On the other hand, we use data derived from a representative survey of Hungarian family farms carried out in 1998 collecting data for 1997<sup>1</sup>. The data sets contain detailed information on production structure, labour, 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 so that we ended up with a sample of 1,469 family farms.

Only a small share of the individual farmers (IFs), namely 8 %, adjusts their operated farm size by leasing in land. The percentage of IFs leasing out land is twice as high (16%).

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<sup>1</sup> These data were collected in the framework of EU Phare ACE project P96-6090-R coordinated by Erik Mathijs of the KULeuven and Alexander Sarris of the University of Athens. The Hungarian survey was coordinated by Tibor Ferenczi, Budapest University of Economic Sciences.

Very few IFs are both leasing in and out land so that only a quarter of the Hungarian IFs are involved in the land rental market. There are regional variations in the incidence of leases (see further). We first identify some “profiles” of tenants and landlords.

#### 4.1 Profiles of “Tenants”

In order to shape a picture of IFs who lease in land, we created four different classes of tenants, which we compared with a reference group that embraces those farmers who are not leasing in land, i.e. the *non-tenants*. The other classes are formed based upon the amount of land leased in. The first class comprises farmers leasing in 0.5 hectare or less, the second class consists of farmers leasing in 0.5- 1 hectare, the third group contains farmers leasing in 1- 10 hectares and the fourth class contains farmers leasing in more than 10 hectares.

Class 1 covers 22% of the tenants and consists of farmers whose household income sources stem mainly from pensions and wage employment (respectively 41% and 40 %), while the share of income coming from own farming activities is small (only 14%). In class 2, we find 22% of all tenants and their main income source stems from wage employment (43%). Own farming activities as well as pensions provide each approximately one quarter of the household income. Class 3 with 34% of the tenants as well as class 4 with 23% contain farming households whose main income source originates from own farming activities, respectively 44% and 66%.

Besides the source of household income, the tenants also differ in human capital variables. The oldest farmers can be found in class 1, while the youngest can be found among the IFs of class 2. Further, the number of years of schooling received by the household head increases with the amount of land leased in.

The capital and land endowment varies considerably among the tenant groups. The index of machinery ownership<sup>2</sup> and the percentage of households owning machinery increases with the amount of land leased in, while the amount of buildings owned remains more or less stable among all categories as indicated by the building index<sup>3</sup>. The IFs of class 3 and 4 cultivate much larger parcels (respectively 12 ha and 79 ha) than those of class 1 and 2. The pattern of land endowment among the tenure categories is as follows: the *non-tenants* own on average 5 hectare, the tenants leasing in less than 1 hectare (class 1 and 2) own less land (respectively 1 and 4 hectares) than the *non-tenants*, while the tenants leasing in more than 1 hectare (class 3 and 4) own more land than the *non-tenants* (respectively 9 and 27 hectares). So, large parcels of land are leased in only if the farmer himself owns a considerable amount of land. Interestingly, tenants of class 3 and 4 bought respectively 4 hectares and 15 hectares of land which corresponds to more than 30 % of the land they own. *Non-tenants* bought on average 2 hectares of land, while the farming households belonging to class 1 and 2 bought on average less than 0.5 hectare which is less than 16% of the land they own. Hence, purchasing land and renting land seem to be complementary activities. On the other hand, the share of land owned before 1990 is negatively related with the amount of land leased in. Further, it is worth mentioning that none of the IFs leasing in less than 0.5 hectare (class 1) received land under the compensation program. This means that their land has never been confiscated or that they used their compensation vouchers for other purposes than acquiring land. Given the age structure of the tenants of class 1 (they are on average 57 years

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<sup>2</sup> The machinery index is measured as a weighted index of household ownership of machinery and equipment items with the following weights: truck =1, tractor =1, cultivator =1, combine for cereals =1, feed combine =1, sowing machine =1, spraying equipment =1, milk processor =1, grape press =1.

<sup>3</sup> The building index is an unweighted index of the availability of six building items (cattle stables, pig houses, poultry houses, sheep shelters, storage facilities, and fixed greenhouses).

old), it is not unlikely that some of them did receive compensation vouchers but that they used them to claim for example a life-annuity rather than to buy land.

Furthermore, the share of households of which at least one person is member of a cooperative or partner of a farming corporation is considerably larger among the group of tenants than among the *non-tenants*. This may suggest that external relations of IFs with farming corporations and cooperatives increase the social network, which makes it easier to lease in land (for example from persons also related to that agricultural enterprise).

Finally, table 1 provides some information on the income status of IFs. Figures on expenditures per capita and the share of food expenditures in total household expenditures suggest that the poorest farmers can be found among the tenants leasing in less than 0.5 hectare, while the IFs who lease in more than 10 hectare form the wealthiest group.

Based on the description of the tenants we can assign some labels to the different tenant classes. Older farmers whose main income source stems from pensions can be found in class 1 so that the name *pensioned farmers* seems to be appropriate. In class 2, we find the youngest IFs whose main income source stems from wage employment and hence we name them the *part-time tenants*. In class 3 and 4 we find IFs whose main income source stem from own farming activities. Therefore we assign to both classes the name full-time tenants, but make a distinction based on the average operated farm size and their endowment: IFs of class 3 are called *small full-time tenants*, while class 4 gets the label *large full-time tenants*.

So, we can conclude that more educated and younger farmers can be found among the *part-time* and *full-time tenants*, while *non-tenants* and *pensioned tenants*, who lease in a very small amount of land, are older and less educated. Concerning the source of own land, *full time tenants* bought most of the land they own while *non-tenants*, *pensioned* and *part-time tenants* hold mainly land that was already in their possession before the transition period. Farmers leasing in more than one hectare of land seem to be more dynamic: they bought a considerable share of the land. They own and further adjust their farm size through leasing so that they cultivate a rather large amount of land. They own more machinery, have more access to machinery services and a larger part of them has some family link to a farming corporation or a cooperative. Consequently, it is not surprising that they form the wealthiest group of farmers. On the other hand the *pensioned tenants* and the *part-time tenants* own also more machinery than the *non-tenants* and a large part of them has access to machinery through services, but the amount of land they own is smaller. The poorest households can be found among the farmers who lease in less than one hectare. Although farming is not their main way of making a living, it is probably important for them to gain some extra money by farming and consequently to be able to lease in some land (even if this amount is very small).

## 4.2 Profile of “landlords”

When taking a closer look at the IFs who lease out land – we call them landlords-, it turned out to be appropriate to create two categories of landlords. The first class (90%) embraces IFs that lease out less than 10 hectare, while the second class (10%) includes those IFs who rent out more than 10 hectares of agricultural land (see table 2). Again those IFs who are not leasing out land act as a reference group and are called the *owner-operators*.

The main income source of landlords and *owner-operators* stems from pensions (at least 40%). Own farming activities provide less than 21% of the household income and are the least important income source.

A first distinguishing factor among the landlord classes can be found among the human capital variables. On the one hand, the age structure differs: landlords are older than the *owner-operators* (59 versus 54 years old). Education does not differ among landlord classes in terms of years, but the type of education varies. The share of household heads that

received agricultural education is smaller among landlords than among *owner-operators* (4% versus 10%).

In terms of cultivated land area, the smallest IFs can be found in class 1: they cultivate on average 2 hectares of land. The *owner-operators* cultivate 6 hectares and the IFs who lease out more than 10 hectares have the largest operational size (10 hectares). The amount of land owned hardly differs between the *owner-operators* and the IFs of class 1, while the IFs of class 2 own considerably more land. This reflects that the amount of land leased out depends mainly on land endowment of the farming household. When the amount of owned land is large, the farming household may have an excess of land compared to their endowment of other production factors and hence more land is leased out.

Not only the amount of owned land differs among landlord classes, also the way they got possession of their land varies. Almost half of the land in possession of the *owner-operators* was already owned before the transition period. Landlords of class 1 received 40% (on average 2 hectares) of their land under the restitution programme. Most of the recipients of restituted land were able to hold their land title because they stayed active on the collective farm. However borders were often not clear defined so that it was difficult to withdraw land and hence leasing out the land to the successor organisation was a very common option for the recipients of restituted land. Landlords leasing out more than 10 hectares received on average 5 hectares under the restitution programme and 11 hectares under the compensation programme. Problems in land entitlement combined with the fact that the IFs of class 2 own a large land area may induce these IFs to lease out land to the large- scale successor organisations of collective and state farms: almost 80% of the IFs landlords of class 2 leases out on average 15 hectares to a farming corporations or cooperative. Considering the manner that landlords got hold of their land, it is not surprising that 50% of the landlords are member of a cooperative or partner of a company.

Farming households leasing out less than 10 hectares (class 1) are the least endowed in capital assets. This can be concluded based on the machinery index. In contrast, landlords of class 2 are rather well endowed: they own on average more machinery than the *owner-operators* and the IFs of class 1.

Finally, figures on total expenditures per household member and the share of food expenditures in total expenditures show that the wealthiest IFs can be found among the landlords of class 2, while the figures are not conclusive when comparing the wealth status of the IFs of class 1 and the *owner-operators*.

## 5 REGIONAL VARIATIONS

The survey data show that regions with a high percentage of IFs participating in the land lease market can be found mainly in north-east Hungary, while regions with a small percentage of farming households who are active in the land rental market are spread around the country. In table 3 we compare the characteristics of regions where a small share of the IFs (less than 5%) are leasing in land with those where the percentage of IFs who are leasing in land is larger than 10%. Both types of regions are then compared with the total sample. Next, the same comparison is made based on the share of farming households who are leasing out land. Regions with the lowest (less than 10%) and the highest (more than 24%) percentage of IFs who are leasing out land are grouped and their characteristics are compared.

First, the average amount of land cultivated and owned by IFs is considerably smaller in the counties where less farming households are leasing in land. In these regions, we find not only less tenants, also the average amount of land leased in is very small. Further, table 3 illustrates that the average land quality, as reported by the IFs, is significantly lower in these regions where less IFs are leasing in land, despite the fact that official statistics indicate that



this difference in land quality between counties with a high and low incidence of tenants is smaller. Yet, in counties where less than 5% of the IFs are leasing in land, the quality of the land cultivated by the IFs is only 83% of the county average. This is an indication that in these counties, the most fertile and productive land is still cultivated by farming corporations and cooperatives, while IFs are at a disadvantage. This means that in some counties the transformation process was in favour of the large-scale successor organizations and individual farmers still don't have access to the most productive land within their county.

Farming corporations and cooperatives still cultivate on average 79% of the agricultural land within the counties where the incidence of tenants is low. In these regions, the percentage of IFs who are member of a cooperative or partner of a farming corporation is also very low. This may indicate that members or partners of large-scale farms face high exit cost and are discouraged to start up an individual farm so that the land is still cultivated by the large-scale successor organisation. If only a small percentage of the households who run an individual are linked with a farming corporation or a cooperative, then the social capital of the IFs is limited so that it is more difficult to find a landlord from who they can lease in land.

In counties where the incidence of tenants is small, the land price adjusted for land quality is also lower. If leasing in land is a second best option to buying, then IFs may prefer to buy land instead of leasing when land sales prices are low.

Finally, it is worth mentioning that in counties where more than 10% of the IFs are leasing in land, we observe a lower unemployment rate. More employment opportunities make that less productive landowners seek wage employment instead of running an individual farm. Hence, more land will be available for leasing.

If we group regions based on the share of IFs who are leasing out land, we observe only a few differences between regions with a high and low percentage of IFs who are leasing out land. The average amount of land leased out is larger and the average land quality is rather high when more IFs act a landlord. Further, the share of IFs who are linked with a farming corporation or a cooperative is also larger and most of the IFs lease out their land to a large-scale successor organisation. In regions with good farming conditions such as high land quality, members or partners of large-scale farms are more inclined to start up an individual farm so that more members or partner can be found among the IFs. In these regions, beneficiaries of the compensation program will also be motivated to use their vouchers to buy agricultural land because the high productive value generates more (present and future) benefits. However, if the land endowment does not correspond to the present endowment of other production factor, these new landowners will lease out part of the land they.

## 6 ECONOMETRIC ANALYSIS

In this section we compliment the profile analysis by a formal econometric model. The dependent variable in regression A is the amount of land leased in, in regression B the amount of land leased out. Since the amount of land leased is censored at zero, we use a tobit regression.

The econometric model includes variables measuring human capital and physical capital, as well as a set of additional factors discussed above. The estimated model is a two-stage regression approach since the variables for machinery ownership are likely to be endogenous. For a detailed discussion of the model and the variables, we refer to Vranken and Swinnen (2002). Here we only present the key estimation results (see table 4) and the key conclusions. These are as follows.

First, the econometric analysis confirms that the management capability of the household is important. Younger and higher educated farmers lease in more land. Further, larger households (in terms of adult household members) lease in more land. This may be

because on the one hand, more labour is available and, on the other hand, moral hazard problems are reduced when more family members can provide labour on the farm. Nevertheless, time constraints and off-farm employment opportunities limit the amount of land leased in. When the share of the household's income received by wage employment increases, less land is leased in. This may be due to higher labour opportunity costs or to risk diversification at the household level.

The amount of land leased in is positively correlated with the likelihood that the household has also purchased land - which is consistent with our previous conclusion that buying and leasing of are complementary strategies. This may also reflect market imperfections as farms may see leasing as a second best option to buying.

Yet the amount of land leased in is smaller for households which own more land, *ceteris paribus*. Presumably this reflects the simple affect that households who own more land need to lease less.

Next, the households' capital asset endowment is important. Imperfections in the credit market matter. Ownership of machinery and access to machinery have a significantly positive effect on the amount of land leased in.

The land sales price (adjusted for land quality) has a significant positive effect on leasing. High land sales prices make it difficult to adjust operational farm sizes through buying agricultural land. Hence, leasing becomes an important alternative to adjust farmers' land holdings.

To what extent corporate farms dominate the use of agricultural land in a county has also an impact on the leasing behaviour of IFs. If the share of agricultural land cultivated by corporate farms is larger than 90%, then significantly less land is leased in by IFs. In those regions corporate farms and cooperatives dominate the land market to such an extent that very little land is available for IFs to lease in. Moreover, in areas with less leasing activities among IFs, the quality of the land cultivated by IFs is on average 20% smaller than the county average and only very few IFs are related with a corporate farms in these regions. These results suggest that when corporate farms dominate the land market, they tend to discourage private farming and to constrain land rental activities.

Finally, to capture some fixed effects, we introduced regional dummies, which indicate that the amount of land leased in is significantly smaller in southern and eastern Hungary compared to central Hungary.

The regression results with the amount of land leased out as dependent variable show that significantly more land is leased out by older IFs. On the one hand, older individuals might not be physically capable to farm the land them selves and on the other hand, they might be less motivated to cultivate the land they own since they receive income from pensions.

Rural households with a larger land endowment have the intention to lease out more agricultural land. Landowners with an excess of land given their endowment in family labour and capital assets can choose between renting out land or cultivating it them selves using hired labour. Imperfections in the labour market (moral hazard problems) and other factor markets (e.g. in the credit market so that limited access to credit prohibits the purchase of capital assets to cultivate the land them selves) will lead to a landowners' decision to lease out part of the land he possesses.

Farmers who received land under the compensation program are more likely to lease out land. This reflects the fact that most land is coming from the compensation programme - see also table 2.

Access to machinery services and machinery endowment of rural households is negatively correlated with the amount of land leased - which is consistent with the results in regression A.

Finally regional variables indicate that in western Hungary more land is leased out. This may be related with the proximity of Austria. Austrian farmers may be interested in leasing in land from Hungarian rural households living close to the border. As a result the demand for land increases which drives up the rental price and more rural households will consider leasing out land to be more beneficial than cultivating the land themselves.

## 7 CONCLUSION

In this paper we have studied which factors determine whether individual farmers will participate in the Hungarian land rental market. We first describe a set of profiles of tenants and landlords as well as regional variations in the incidence of leasing. Next, we used an econometric model to find the determinants of a household's land leasing behaviour.

First, individual farmers' decision to lease land is related with their land endowment. The probability to lease in (out) land decreases (increases) with the amount of land owned. The amount of land leased is positively correlated with the likelihood that the household has purchased land, while the amount of land leased out is correlated with the likelihood of receiving land under the restitution or compensation program. Further, the leasing behaviour is correlated with the endowment of capital assets or access to certain capital assets which is probably caused by the presence of credit market imperfections. Human capital variables such as age and education affect the household's capabilities to run an individual farm and hence it has an impact on the leasing behaviour. Social capital such as family links with a farming corporation or cooperative affect the leasing behaviour of individual farmers because it affects the probability of and search costs to find a leasing partner. Further, environmental factors are important. Regions characterized by a low percentage of farming households who are leasing in land are typically areas with a high unemployment level, low land sales prices (adjusted for land quality), small land endowments of farming households and with larger impediments to start up an individual farm or extend their farm size.

## References

- Csaki, Csaba and John Nash, "The Agrarian Economies of Central and Eastern Europe and the Commonwealth of Independent States", *World Bank Discussion Paper*, No. 387, The World Bank, Washington D.C.
- Bardhan, Pranab K., 1989, *The economic theory of agrarian institutions*, Oxford University Press, Oxford
- Braverman, Avishay and Joseph E. Stiglitz, 1982, "Sharecropping and the Interlinking of Agrarian Markets", *American Economic Review*, 72(4), pp. 695-715
- Carter, Michael and Ramon Salgado, 2001, "Land Market Liberalization and the Agrarian Question in Latin America" in: de Janvry, A., Gordillo, G., Platteau, J.-P. and E. Sadoulet (eds.), *Access to Land, Rural Poverty, and Public Action*, A study prepared for the World Institute for Development Economics Research of the United Nations University (UNU/WIDER), Oxford University Press, Oxford, pp. 246-278.
- Deininger, Klaus and Hans Binswanger, 2001, "The evolution of the World Bank's Land Policy" in: de Janvry, A., Gordillo, G., Platteau, J.-P. and E. Sadoulet (eds.), *Access to Land, Rural Poverty, and Public Action*, A study prepared for the World Institute for Development Economics Research of the United Nations University (UNU/WIDER), Oxford University Press, Oxford, pp. 406-440.

- de Janvry, Alain and Jean-Philippe Platteau, Gustavo Gordillo and Elisabeth Sadoulet, 2001, "Access to Land and Policy Reforms" in: de Janvry, A., Gordillo, G., Platteau, J.-P. and E. Sadoulet (eds.), *Access to Land, Rural Poverty, and Public Action*, A study prepared for the World Institute for Development Economics Research of the United Nations University (UNU/WIDER), Oxford University Press, Oxford, pp. 1-26.
- European Commission, 1998, *Agricultural Situation and Prospects in the Central European Countries: Hungary*, Directorate General for Agriculture, Brussels.
- Juhász, Pal, "The end of the Agricultural Miracle and Property Reform in Hungary"
- Macours, Karen, Alain de Janvry and Elisabeth Sadoulet, 2001, "Access to Land through the Land Rental Market: The Case of the Dominican Republic", Paper presented at the American Agricultural Economics Association 2001 Annual Meeting, August 5-8, Chicago, Illinois.
- Mathijs, Erik and Sándor Mészáros, 1997, "Privatisation and Restructuring of Hungarian Agriculture." in: Swinnen, J.F.M., Buckwell, A. and E. Mathijs (eds), *Agricultural Privatisation, Land Reform and Farm Restructuring in Central and Eastern Europe*, Ashgate, Aldershot, pp. 161-188.
- Mathijs, Erik and Johan F.M. Swinnen, 1998, "The economics of agricultural decollectivisation in East Central Europe and the Former Soviet Union", *Economic Development and Cultural Change*, 47 (1), pp. 1-26
- Sadoulet, Elisabeth, Rinku Murgai and Alain de Janvry, 2001, "Access to land via Land Rental Markets" in: de Janvry, A., Gordillo, G., Platteau, J.-P. and E. Sadoulet (eds.), *Access to Land, Rural Poverty, and Public Action*, A study prepared for the World Institute for Development Economics Research of the United Nations University (UNU/WIDER), Oxford University Press, Oxford, pp. 197-227.
- Skoufias, 1995, "Household Resources, Transaction Costs, and Adjustment through Land Tenancy", *Land Economics*, 71(1), pp. 42-56.
- Swinnen, F.M. Johan, 1999, "Political Economy of Land Reform Choices in Central and Eastern Europe", *The Economics of Transition*, 7(3), pp. 637-664.
- Swinnen, F.M. Johan, 2001, "Transition from Collective Farms to Individual Tenures in Central and Eastern Europe" in: de Janvry, A., Gordillo, G., Platteau, J.-P. and E. Sadoulet (eds.), *Access to Land, Rural Poverty, and Public Action*, A study prepared for the World Institute for Development Economics Research of the United Nations University (UNU/WIDER), Oxford University Press, Oxford, pp. 349-378.
- Swinnen, F.M. Johan and Liesbet Vranken, 2002,
- Yao, 2000, "The Development of the Land Lease Market in Rural China", *Land Economics*, 76(2), pp. 252-266.

**Table 1: Profiles of tenants**

	Non-tenants	Class 1 0 <leased in ≤0.5	Class 2 0.5 <leased in ≤ 1.0	Class 3 1.0 <leased in ≤ 10.0	Class 4 10.0 <leased in
Share of total sample	92 %	2 %	2 %	3 %	2 %
Share of tenants	-	22 %	22 %	34 %	23 %
Age of household head (years)	55	57	48	49	50
Education of household head (years)	9	9	10	11	13
Machinery index	0.3	0.4	0.6	1.0	3.0
Share of households owning machinery	24	42	42	61	88
Share of households with access to machinery services	43	54	77	71	78
Building index	2.2	2.2	2.5	2.8	2.4
Cultivated land area	4	1	4	12	79
Land endowment (ha)	4	1	4	9	27
Source of own land (ha)					
Owned before 1990	0.5	0.4	1.3	0.9	0.6
Received under the restitution programme	0.8	0.5	0.6	0.8	4.8
Received under compensation programme	1.4	0.0	1.7	1.5	6.3
Bought	1.7	0.1	0.2	4.3	14.8
Source of own land (%)					
Owned before 1990	43	43	34	28	12
Received under the restitution programme	18	17	25	20	27
Received under compensation programme	15	0	24	10	20
Bought	12	16	7	30	35
Share of households leasing from farming corporations and cooperatives	0	62	31	20	11
Share of households leasing from individuals	0	38	69	88	89
Land leased from farming corporations and cooperatives	0	0.2	0.3	0.4	6
Land leased from individuals	0	0.1	0.6	3	43
Member of coop/partner of comp (%)	19	23	31	27	30
Total expenditures per household member	180	150	177	177	200
Share of food expenditures in total expenditures (%)	52	57	51	49	51
Source of household income (%)					
Wage employment	36	40	43	32	19
Own farming activities	15	14	27	44	66
Pensions	43	41	26	19	9
Type of tenant		Pensioned tenant	Part-time tenant	Small full-time tenants	Large full-time tenants

**Source: Own calculations**

**Table 2: Profiles of landlords**

	Owner-operators	Class 1 0 < leased out ≤ 10.0	Class 2 10.0 < leased out
Share of total sample	84	15	2
Share of landlords	-	90	10
Age of household head (years)	54	59	59
Education of household head (years)	9	9	10
Percentage of household heads received agr educ	9	4	4
Machinery index	0.4	0.2	0.6
Share of households owning machinery	28	17	46
Share of households with access to machinery services	46	39	58
Building index	2.2	2.2	2.7
Cultivated Land Area (ha)	6	2	10
Land endowment (ha)	5	4	28
Source of own land (ha)			
Owned before 1990	0.4	0.6	7.0
Received under the restitution programme	0.7	1.5	4.7
Received under compensation programme	1.4	0.8	11.4
Bought	2.2	0.9	2.9
Source of own land (%)			
Owned before 1990	46	22	12
Received under the restitution programme	14	40	20
Received under compensation programme	13	17	51
Bought	14	5	6
Share of households leasing to farming corporations and cooperatives	0	83	79
Share of households leasing to individuals	0	18	29
Land leased to farming corporations and cooperatives	0	3	15
Land leased to individuals	0	0	4
Member of coop/partner of comp (%)	14	48	46
Total expenditures per household member	180	194	255
Share of food expenditures in total expenditures (%)	52	51	43
Source of household income (%)			
Wage employment	36	33	24
Own farming activities	18	11	21
Pensions	40	50	45

**Source: Own calculations**

**Table 3: Regional differences**

	Total sample	Share of IFs leasing IN $\leq$ 5%	10% $\leq$ Share of IFs leasing IN
Land cultivated (ha)	5	2	8
Owned land (ha)	5	4	7
Average amount of land leased in (ha)	13	1	17
Average amount of land leased out (ha)	5	6	5
Share of households leasing in	8	2	13
Share of households leasing out	16	8	16
Land quality reported by households (source: survey data)	20	15	20
Land quality at county level (source: national statistics)	20	18	20
Ratio quality reported by households over county-level quality	99	87	100
Share of agricultural land cultivated by corporate farm	65	79	53
Share of households member of cooperative or partner of farming corporation	19	9	23
Land price adjusted for quality	163	140	175
Unemployment rate	9	9	6
Share of households leasing from farming corporations and cooperatives	15	1	4
Share of households leasing from individuals	6	2	10
Share of households leasing to farming corporations and cooperatives	14	5	13
Share of households leasing to individuals	3	3	3

  

	Total sample	Share of IFs leasing OUT $\leq$ 10%	24% $\leq$ Share of IFs leasing OUT
Land cultivated (ha)	5	5	8
Owned land (ha)	5	5	6
Average amount of land leased in (ha)	13	10	27
Average amount of land leased out (ha)	5	4	5
Share of households leasing in	8	8	10
Share of households leasing out	16	6	26
Land quality reported by households (source: survey data)	20	18	25
Land quality at county level (source: national statistics)	20	18	25
Ratio quality reported by households over county-level quality	99	101	100
Share of agricultural land cultivated by corporate farm	65	61	55
Share of households member of cooperative or partner of farming corporation	19	16	25
Land price adjusted for quality	163	167	165
Unemployment rate	9	9	8
Share of households leasing from farming corporations and cooperatives	15	2	3
Share of households leasing from individuals	6	6	9
Share of households leasing to farming corporations and cooperatives	14	4	24
Share of households leasing to individuals	3	2	1

**Source: Own calculations**

**Table 4: Regression results**

Regression A: Tobit amount of land leased <b>in</b> as dependant variable	Coefficient	P-value
Age household head	***-0.346	0.03
Education household head	**0.926	0.015
Adult household members	***5.458	0.000
Source of household income coming from wage employment	***-0.139	0.000
Owned land area	***-0.770	0.000
Bought land (dummy)	*4.815	0.092
Compensation (dummy)	-4.480	0.148
Owned land before 1990 (dummy)	-3.630	0.139
Access to machinery services (dummy)	***9.643	0.000
Estimated machinery index	***56.824	0.000
Land quality at county level	-0.101	0.734
Land price adjusted for land quality	**0.202	0.002
Regional land use by farming corporations and cooperatives	**-10.248	0.040
Eastern Hungary	***-9.152	0.006
Western Hungary	0.168	0.961
Southern Hungary	** -8.949	0.027
Intercept	***-81.254	0.000
Pseudo R-squared		0.20
Number of Observations		1469
Regression B: Tobit amount of land leased <b>out</b> as dependent variable	Coefficient	P-value
Age household head	***0.143	0.001
Education household head	0.121	0.121
Adult household members	0.258	0.258
Source of household income coming from wage employment	0.004	0.748
Owned land area	**0.063	0.036
Bought land (dummy)	-1.164	0.319
Compensation (dummy)	***4.165	0.000
Owned land before 1990 (dummy)	*1.569	0.060
Access to machinery services (dummy)	*-1.519	0.063
Estimated machinery index	*-3.539	0.099
Land quality at county level	**0.193	0.040
Land price adjusted for land quality	0.020	0.291
Regional land use by farming corporations and cooperatives	-1.417	0.295
Eastern Hungary	0.714	0.503
Western Hungary	***3.151	0.006
Southern Hungary	1.522	0.256
Intercept	***-27.816	0.000
Pseudo R-squared		0.03
Number of observations		1469