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LAND – PRICE DETERMINANTS USING THE SPATIAL ECONOMETRICS MODELING IN THE MOLDAVIAN REAL ESTATE MARKET

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Abstract

The purpose of this paper is to determine the factors which influence the land market in Republic of Moldova. The paper aims to discover the determinants for land pricing using the spatial econometrics modeling, as it is widely used when the spatial component is present. The country's agricultural economy combined with the interest of international organizations and limited data availability directed the focus of this empirical study towards land for agricultural purposes. The factors which determine the land market (for agricultural purposes) in Republic of Moldova are mainly related to economic characteristics of land, such as field productivity, the position on the local landscape (characterized by angle and soil quality), proximity to local or national roads (due to storage and transportation reasons), and economic characteristics of owners. Also, another important role in land market price creation is the pressure of urban space to transform land for agricultural use close to cities and villages in spaces for industrial or residential purposes. This is characterized by the financial pressure from the urban centers which has become significant in land transactions.

Keywords: *spatial econometrics, land market, spatial autoregressive model, transaction prices, Land Bank*

INTRODUCTION

This paper analyses the land market in Republic of Moldova. Since its independence in 1991, the land market has a tendency to be used for agricultural purposes. Also, the country is described an agricultural economy, which is the main reason why the focus of this study is on land prices for agricultural purposes. Another reason is the fact that international organizations such as World Bank and EBRD, seems to show a major interest in this sector due to several reasons: high quality of land compared to global standards, very low land prices and low efficiency levels.

Generally, any market is driven by two fundamental forces: supply and demand. In a market economy, these forces establish the market price, which creates the basis for buy-and-sell transactions. These fundamentals also apply in the land market. Usually the land market can be used in the following activities:

- Industrial
- Construction (residential/commercial)
- Agricultural (farming)

In the market economy, land is considered an economic good which is sold and purchased on the market of production factors. The well-functioning of the land market implies that there exists a land price which indicates the monetary value necessary to transfer ownership of a piece of land from one individual/legal entity to another individual/legal entity, through the sell-purchase document.

Agricultural real estate seems to draw less interest from developed economies as commercial real estate is considered more profitable. However, for country as Republic of Moldova in a transition period, the question of land market is of primordial interest.

Regarding the land market for agricultural purposes, the fundamentals remain the same. The demand is driven by consumers, which in this case are mainly farmers, but also potential investors such as private individuals, public institutions, joint stock companies, private-public cooperation, corporate farmers, investment funds (which are currently not present in Republic of Moldova). The investors are driven by different motives relative to farmer's production goal: urban spaces absorption from a longer-term perspective, leasing the land, speculative motives, and change in land usage (for example, from agricultural to residential). On the other side, the supply is constituted by existing landowners and in some cases state ownership.

The market price of land is the result of interaction between supply and demand for land, of the confrontation (negotiation) among sellers and buyers, each of them looking to get the most from the transaction. The factors determining the level and the evolution of land prices can be limited to:

- Supply and demand of land – the natural limitation of the quantity of land available makes the supply rigid, it being not sensitive to price variation. As a consequence, land prices evolve proportionately to the demand, to the number of people willing to invest in agriculture.
- The possibility to use land alternatively: agriculture, forestry, construction, industrial.
- The interest rate – buying a piece of land is an investment. As a consequence, if the interest rate is higher than the efficiency expected from using that piece of land, the investor would rather deposit his money in a bank, thus influencing the demand for agricultural land.
- The increase in the demand for agricultural products determines an increase in the demand for agricultural land, thus increasing their prices.

Given the fundamental market model, when these forces meet, the land market price is created. In developed, well-functioning market economies, this price is also considered the optimal price, which governs an effective buy-and-sell transaction system. This allows for the market value to be usually equal to the investment value ($MV = IV$) and most of the participants to be marginal.

This study aims to discover this optimal land price, and the casual factors which influence this price. But, it is adapted to an economy in a transition period, such as Republic of Moldova. Since it has an under-developed economy, the market mechanism is ill-functioning. This means that the market value is almost never equal to the investment value ($\mathbf{MV \neq IV}$), and the majority of participants are described as intra-marginal. As a consequence the system for buy-and-sell transactions is broken and ineffective. The market is also described by an imperfect competition.

Many Central- and Eastern European countries went through the land privatization processes, or so called land reforms. In most of them, the land reform has created a class of individual, small landowners. Thus, from the former collective state farms were created numerous fragmented smaller scale landowners [4].

During this period, the markets in these countries were characterized by an imperfect competition. At the same time, transaction costs were a major issue, which comprises dealing with inheritance and co-owners, acquiring information on land, bargaining costs, asymmetric information, dealing with regulations. The combination of imperfect competition and transaction costs has a strong influence on land prices. This is also characteristic for Republic of Moldova

In 1998, the National Land Program (NLP) in Republic of Moldova initiated the privatization of "old" collective state ownership of land holdings. As a result, the share of state ownership has decreased from 100% in 1990, to less than 25% in 2005. Each landowner received (due to the NLP program) an average of 1.3 – 1.4 hectares of land. Adding the average household area of 0.3 – 0.4 hectares, the distribution produced fragmented individual landowners of less than 2 hectares. Thus, land fragmentation in Moldova has two specifics: small size of each owner and land ownership of multiple parcels due to the equity-driven process of land privatization [5].

Like for other Eastern European countries, the whole process of LLP in Moldova has created a class of small and fragmented landowners. Less than 50% of them used the land independently, while the other leased it to cooperatives, LLPs, Joint Stock companies (Department of Statistics, 2009).

According to World Bank Study (2005), half of land in Moldova is in parcels smaller than 10 hectares. The corporate farms have as average of 500 – 800 hectares. Almost one million hectares of land was distributed to 600,000 people. Given a population of approximately 4 million, the large number of landowners combined with the small average size proves the extent of fragmentation as a result of the land reform.

Table 1: Evolution of transactions with land

Year	Number of transactions	Total area (ha)	Average transaction (ha)	Average price/ha (MDL)
2000	9753	1268	0.13	3100
2001	24625	2336	0.09	2928
2002	27759	2682	0.1	3781
2003	49165	3595	0.07	3733
2004	44134	3201	0.07	8001
2005	47382	3250	0.07	9040
2006	51483	3773	0.07	11000
2007	65000	4697	0.07	12104
2008	72000	12911	0.17	10301

Source: Department of Statistics, Cadastral Agency

Land lease market mostly relies on corporate farms which incorporate the land from individual owners.

Land market has been strongly developing in Moldova since 1997, when the law on "Normative price of land and process for purchase and sale" was adopted. The number of transactions and the average price per hectare in table 1 shows this development.

Between 2000 and 2008, the average price (officially registered) increased by 232%. The highest average value was registered in 2007, prior to the crisis, which could be assumed that the global meltdown had also a negative effect on less directly exposed countries. The number of transactions has also surged from 9753 in 2000, to 72000 in 2008, which reflects the development of the land market.

Other important aspect of transactions of the land market regards the lease market (or renting). The land close to urban areas, is almost never leased in nowadays. If more than 15 years ago this land was almost worthless and may or may not have been cultivated, today, it has a ridiculous price in a 20km diameter around the largest cities (for example, the capital). However, when considering other areas where the urban sprawl is more far away, the lease market for agricultural purposes is also very specific. The following table 2, describes the land leasing transactions by several groups of respondents.

Table 2: Leasing and average size of transactions

	Lease In		Lease Out	
	Percent of respondents	Average size (ha)	Percent of respondents	Average size (ha)
Households	1	0	92	1.8
Individual landowners	4	2.8	33	1.8
Collective owners	75	686	9	44

Source: Academy of Science of Moldova

Basically the individual landowners and head of households lease out land, while collective firms (or so called corporate owners) lease in land. The expectations suggest a different result.

According to local experts, the lease payments in Republic of Moldova are also specific, which consist of: cash, in-kind and mixed. A survey performed by Center for Strategic Studies and Reforms (CISR, 2001) indicates that the main form of payment represents in-kind [3].

MATERIAL AND METHOD

One of the objectives of this study is to investigate the market mechanism which governs individual transactions (buy/sell). The analysis of land markets in Central-European countries indicates specific macroeconomic procedures for land price formation. These procedures employ standardized contiguity (adjacency) matrices (SAM) as the principal component of spatial econometrics method [1].

In order to investigate the spatial nature of variables, several useful regression models have emerged during the last decades, in addition to the conventional Ordinary Least Squares model. The spatial econometrics models employ the spatial characteristics of variables to improve the models. These approaches incorporate the spatial lag into models. However, there is a lack of consensus on how to appropriately evaluate them.

According to Le Gallo, two main issues emerge when sample data has a spatial (locational) component:

- Spatial dependency between observations
- Spatial heterogeneity occurs in the modeled relationships [6].

Traditional econometrics disregards these two issues which violate the traditional Gauss-

Markov assumptions used in regression modeling. Thus, alternative estimation procedures are necessary to model this type of variation and make appropriate inferences.

The spatial dependence in a sample data means that one observation associated with a location i, depends on other observations at locations **j ≠ i**. The main reason is that spatial dimension of economic characteristics is an important aspect of modeling. Regional science theory integrates this notion through spatial interaction, spatial spillovers and hierarchies of place.

Spatial heterogeneity means the variation in relationships over space. As a result, it might be expected a different relationship for every point in space. It can be formally written as:

$$\boldsymbol{y_i = X_i \beta_i + \varepsilon_i} \qquad i = 1,\ldots,n$$

Where: X_i – vector of explanatory variables with the set of parameters β_i, y_i – dependent variable at location i; ε_i – represents a stochastic disturbance. Considering a sample of n observations, it is not possible to estimate a set of n parameters β_i due to degrees of freedom problem. There is simply not enough sample information to calculate estimates for every observation in space.

Calculating location in the model. Prior to analysing spatial dependence and heterogeneity, the first task is to quantify the location of the sample data. Generally, there are two sources of data:

- Geographic information system (GIS) including latitude and longitude. This information allows us to calculate distance from a certain point in space (usually a strategic location), or the distance between observations located in different point space. It is expected that observations that are near each other should exhibit a greater degree of spatial dependence than those more distance from one another.
- The relative position or adjacency (contiguity) of one observation to other. It is based on knowledge of shape and size of observations located in an area. The adjacent units should reflect a higher degree of dependence than observations with greater distance between them.

Table 3: Variables description of Spatial Autoregressive Model

```
function results = sar(y,x,W,info)

PURPOSE: computes spatial autoregressive model estimates
y = p*W*y + X*b + e, using sparse matrix algorithms
 -------------------------------------------------
% USAGE: results = sar(y,x,W,info)
% where: y = dependent variable vector
%  x = explanatory variables matrix, (with intercept term in first column if used)
% W = standardized contiguity matrix
%  info = an (optional) structure variable with input options:
% info.rmin = (optional) minimum value of rho to use in search (default = -1)
% info.rmax = (optional) maximum value of rho to use in search (default = +1)
% info.eig = 0 for default rmin = -1,rmax = +1, 1 for eigenvalue calculation of these
% info.convg = (optional) convergence criterion (default = 1e-8)
%  info.maxit = (optional) maximum # of iterations (default = 500)
%  info.lflag = 0 for full lndet computation (default = 1, fastest)
% = 1 for MC lndet approximation (fast for very large problems)
% = 2 for Spline lndet approximation (medium speed)
% info.order = order to use with info.lflag = 1 option (default = 50)
% info.iter = iterations to use with info.lflag = 1 option (default = 30)
% info.lndet = a matrix returned by sar, sar_g, sarp_g, etc.
 % info.ndraw = 1,000 by default
% info.sflag = 1 if called from SDM, default not used
% -------------------------------------------------
% RETURNS: a structure
% results.meth = 'sar'
% results.beta = bhat (nvar x 1) vector
% results.rho = rho
% results.tstat = asymp t-stat (last entry is rho)
% results.bstd = std of betas (nvar x 1) vector
% results.pstd = std of rho
% results.total = a 3-d matrix (ndraw,p,ntrs) total x-impacts
%  results.direct = a 3-d matrix (ndraw,p,ntrs) direct x-impacts
% results.indirect = a 3-d matrix (ndraw,p,ntrs) indirect x-impacts
% ndraw = 2,500 by default, ntrs = 101 default
```

Should be mentioned that these two sources of information are not necessarily different, as given the coordinates of an observation, there could be constructed the neighbourhood structure based on a certain distance.
The evaluation of land market in Republic of Moldova can be appropriately performed through spatial econometrics modeling, which as a premise accepts the significant dependency between prices and location of land areas.
The spatial dependency in a data set can be formulated in the following way:

$$y_i = f(y_j) \quad i = 1,2 \ldots.n \quad i \neq j;$$

where y_i is the market price of parcel of land **i**, y_j is the market price of parcel of land *j* and *f* defines the functional relationship which includes the neighbourhood of these parcels. The primary data are associated in specific spatial entities which produce a higher economic efficiency. For example, the consolidated land areas (which create a common agricultural field) are more preferable to diffused land lots. The factors which critically influence the offer price of agricultural land are soil quality, location, proximity to roads and agro-technical conditions.
The spatial econometrics modeling used for analysis. The proposed econometric model for the calculation of the optimal land price is Spatial Autoregressive Model (SAR):

$$y = \rho W y + X\beta + \varepsilon$$
$$\varepsilon \subset N(0, \sigma^2 I_n)$$

where:
y – is the equivalent measure of land price
X – set of exogenous variables which determine the economic characteristics of landowner
W – standardized contiguity (adjacency) matrix (**SAM**)
ρ – spatial autocorrelation coefficient of parcels of land
β – linear regression parameters, geographically weighted
ε – stochastic component, normally distributed with mean equal to zero and variance σ^2
I_n **–** identity matrix of order **n**.
It should be mentioned that in case **ρ** is equal to zero, there cannot be observed spatial dependency between endogenous variable y_i, and the linear regression parameters **β** can be calculated through Ordinary Least Squares (OLS). This is a special case of the **SAR** model. This model is performed using MATLAB, including an add-on – Econometrics Toolbox developed by J. LeSage from the Department of Economics, Toledo University, USA [7].
The description of econometric model defines the specific notions of spatial regression analysis. In *Table **3*** are presented the variables included in the model. According to this table, the initial data of causal factors are included in the variable results.total, while the value of endogenous variables obtained during the survey are included in the variable results.y. After the land price evaluation with the assistance of program SAR, the results are attributed to the structural variable results.yhat. which will be graphically presented as the comparison between the value of this two variables of the resulting factor.
The coefficient of determination $\mathbf{R^2}$**,** which defines how well the spatial model reflects the real situation, is attributed to the structural variable *results.rsqr.* The parameters of regression $\boldsymbol{\beta_i}$ can be extracted from the variable *results.beta*, which is a vector of order k (the number of exogenous variables included in the model). The scalar **ρ** from *results.rho* reflects the influence of the spatial relationship on the transaction price.

RESULTS AND DISCUSSIONS

For the application of spatial econometrics model is selected data only from a region of Moldova, Calarasi District, commune of Sadova. The number of parcels of land is 199, which represents the number of included observations. Each landowner can have more parcels of land, while the total number of owners is 45. The primary data used regards the economic characteristics of parcels of land and its owners.
The spatial autoregressive model uses 3 main components:

- The spatial (location) component
- The endogenous variable
- The explanatory or exogenous variables

As noted in methodology description, the location is calculated using the Geographic Information System (GIS), including the coordinates of the parcels of land. The unit of measure is calculated in meters. The spatial adjacent matrix is computed as distance from a strategic point. In this case, the town hall is considered the appropriate choice.

Table 4: Descriptive statistics of exogenous variables

Number of observations	199			
Exogenous variables	Surface	Income	Investment	Employees
Mean	0.26	7,020	10,641	4
Standard deviation	0.17	8,890	11,533	3
Median	0.22	5,000	6,000	3
Min	0.03	500	600	1
Max	0.86	50,000	60,000	15

The choice of the endogenous variable is not necessarily the actual price in currency. Generally, in under-developed market economies a more abstract measure of real estate appraisal could be considered (actually it is encouraged). The main reason is that the transaction prices registered at the Cadastral Agency are not the „real" prices, as the participants try to evade payment of taxes or other commissions. In this case, the endogenous variable is chosen an *equivalent measure of value (EMV)* which represents a more abstract notion of value – and is defined by an utility level. It is characterized by a coefficient measure, which can be transformed into the actual market prices by multiplying with another average national (or regional) coefficient. It will be denoted as EMV for this study. Transaction prices registered at the Cadastral Agency are not the „real" prices, as the participants try to evade payment of taxes or other commissions.

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The next step is description of exogenous variables, which define the causal factors. These variables were collected during same survey in the district. For the purpose of data description, these variables are limited to the ones which indicate significant contribution (higher than 10%) to the coefficient of determination R^2 of the econometric model.

The following exogenous variables are considered:

I. Surface area – calculated in hectares (ha). One hectare is equivalent to 10000 square meters. This variable is included because it is assumed that the parcel size (in units) affects the land value.

II. Income – calculated in lei (national currency). It represents level of income of the respondents, the landowners. It seems obvious to include this variable as it seems to directly affect the land price.

III. Investments – calculated in lei. It represents an important variable because it represents the amount of expenses concerning land maintenance.

IV. Number of employed personnel – denoted in number of persons, usually including the owner and his family, and seasonal workers. It seems logical to include this variable because of the different productivity levels and specific agricultural production [4].

Data was filtered and processed, and blank observations were removed. Many of respondents did not perceive the questions to be appropriate and left many items uncompleted.

There are a total of 199 parcels of land included in the study. Each land owner can manage one or more parcels – there are a total of 45 owners. For each parcel of land are denoted the cadastral code defined by the proprietary form, and the geographic information system (GIS) – longitude and latitude in meters. With the assistance of the program **XY2CONT(xc,yc)** is computed the standardized adjacency (contiguity) matrix **W**.

According to the cadastral data, in Fig. 1 are represented the spatial positioning of all 199 parcels of land. In the graphical representation there can be observed the degree of adjacency of parcels, which means that the parcels of a land owner are either close to one another or at a small distance. A perfect consolidation would suppose a consistent downward diagonal line from left to right.

There are 2 important points concerning the location of land:

• First, the geographical coordinates are calculated as distance from a certain location. It would be logical to take a strategic location such as the town hall or a production deposit. In this case, the distance from town hall is considered as more appropriate due to the fact that that there is no central depositing system.

• Second, this study investigates how the spatial factor influences the real estate appraisal. Thus, the result of the spatial autocorrelation coefficient ρ should describe how distance from the town hall (in this case) affects the land value. Meanwhile, distance from the town hall integrates a broader notion, as usually the center of a town is described by proximity to infrastructure, human resources and roads.

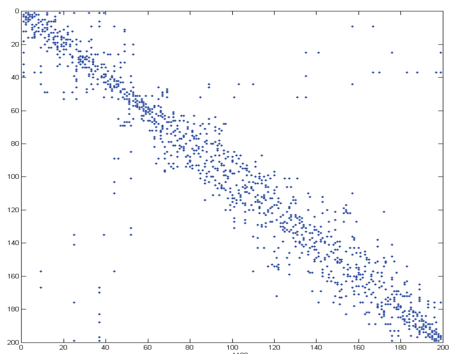

Fig.1: Relative location of parcels of land

As previously noted, the dependent variable EMV was estimated using the mixed autoregressive-regressive mode, with the assistance of the program SAR.

The value of exogenous factors X represents the matrix which contains explanatory variables. The standardized adjacency matrix W is calculated using the program **XY2CONT(xc,yc).** The spatial component in the EMV estimates is determined by the parameter ρ which can take values ranging from -1 to +1. This range was used for this modeling.

Maximum likelihood estimation of the spatial model is based on a concentrated likelihood function. The following 5 steps are performed for parameters estimation of the linear spatial model, enumerated in Anselin [2]:

1. Performing OLS for the model: $y = X\beta_0 + \varepsilon_0$

2. Performing OLS for the model: $W_y = X\beta_L + \varepsilon_L$

3. Compute residuals $e_0 = y - X\hat{\beta}_0$ and $e_L = y - X\hat{\beta}_L$

4. Given e_0 and e_L, calculate ρ that maximizes the concentrated likelihood function:

$$L_C = C - (n/2)ln(1/n)(e_0 - \rho e_L)'(e_0 - \rho e_L) + \ln|I - \rho W|$$

5. Given $\hat{\rho}$ that maximizes L_C, compute

$$\hat{\beta} = \left(\hat{\hat{\beta}}_0 - \rho\hat{\beta}\right)$$

$$\hat{\sigma}_\varepsilon^2 = (1/n)(e_0 - \rho e_L)'(e_0 - \rho e_L)$$

Total number of variables is 5:

X1 – Surface area

X2 – Income

X3 – Investments

X4 – Personnel

Y – EMV

Total number of observations is 199. The results after applying the program SAR are shows that the sum of squared residuals is equal to 0.03, which is sufficiently low and acceptable. The spatial model fits the evaluated initial data well enough, with a coefficient of determination equal to **0.49**. This means that the variables included in the model – explain 49% of total variability. However, not including in explanatory variables other determinants as land quality, distance from household, lack of finance, taxes and other, impose a considerable stochastic ε component. The contribution of several other factors not included in the model is evaluated later through regression analysis.

Most of the explanatory variables are statistically significant and acceptable with a confidence interval of 95%. At the same time, considering the high value of coefficient of partial determination R^2_i, the t-statistic has an acceptable value.

The spatial of land value which is calculated through parameter ρ is equal to **-0.08**, which represents how much the value is influence if the land is situated 1km from the center of the town (the town hall). This result is significant because it has the following implications:

Considering that the average price for 1ha of transacted land (in 2008) is 10301 MDL, the value of land which is located 1km from the town hall is decreasing with 834 MDL. This result is significant and at least interesting. This proves that location is a significant factor in real estate appraisal. Also, using this result might be interpreted for land consolidation. For example, if the parcel of land has a large size, which on average might comprise several parcels, its price is evaluated as a single one. This diminishes the influence of the location component on value.

The next step is to analyse the contribution of explanatory variables in land pricing. The average price of land transacted for 2008 is equal to 10301 MDL (according to reported "real" transactions). This absolute price of land is used to calculate the influence of explanatory variable.

The results regarding the X_i variables in table 3, represent:

- The surface area is a significant factor and has a negative contribution. The estimated coefficient is -0.022037. This means that if the surface area increases by 1 hectare the land value diminishes by approximately 226 MDL. This result is a bit unexpected, and has several implications: it is cheaper to buy a parcel of land with a larger area, as the price paid decreases per hectare. Usually, the value of consolidated land is considered more expensive, which means that this estimate is attributable to less precise data, or different region. A larger sample and more precise data might show different results.
- The income variable, which constitutes the wage from non-land activities, has a positive contribution. This result was expected as landowners with higher incomes do not feel the financial pressure to sell the land cheaply. The estimated coefficient is +0.004, which means that increasing the income by 1000 MDL, the value of land increases by 50 MDL per 1 hectare. The average annual income is 7020 MDL, meaning the land value increases by 350 MDL per hectare.
- The investments (or expenses) have a negative contribution. The estimated coefficient is -0.056, which reflects that increasing the expenses by 1000 lei, the value of land diminishes by 58 lei per hectare. This result is of no surprise.
- Personnel (employees) – has a negative contribution. Thus, increasing the necessary personnel by 1 person, the land value decreases by 517 lei. This result is also expected.

The difference between the actual and estimated data represents the residuals which are included in the variable *results.rezid*. Figure 2 graphically exhibits: the estimated land prices and a comparison with the actual land prices, and also the residuals deviations for the parcels of land.

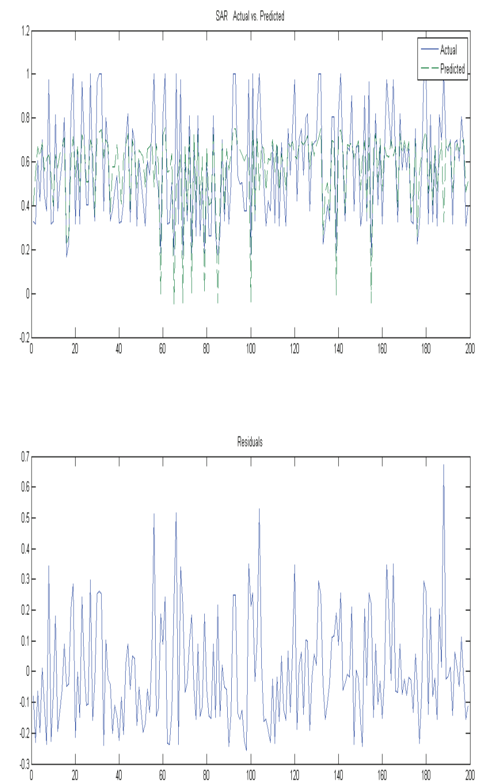

Fig. 2: Actual and estimated values of land and residuals

The leasing transactions are an important part of any land market. The table 6 presents descriptive statistics for variables describing the leasing transactions included in the survey in all 3 communes. The numbers in the table are the average of 3 years, from 2007 to 2009.

The numbers were analysed from the leasing perspective, and factors which might influence the transactions. Thus, the households were classified in 2 categories: lease-in and lease-out participants. Also, the average of the total survey is provided. Out of the total number of respondent, only 24% prefer to lease-out at least a part of owned land, while only 6% prefer to lease-in.

The majority of landowners have between 5 and 6 parcels, which means the market is highly fragmented. It can be observed that the average value for both categories is almost the same, which signifies that the number of parcels owned does not determine the participation in the lease transactions. A more pronounced difference can be examined from the size of owned parcels. Respectively, the smallest landowners prefer to offer their land for rent, while the larger landowners prefer to lease-in more land. The difference is significant – 2.4 ha relative to almost 5 ha.

Table 5. Descriptive statistics for variables describing the leasing market, average for 3 years (2007-2009)

		Total survey	Lease-out	Lease-in
Age of landowner	Years	56	60	52
Age of wife/husband	Years	53	54	44
Family composition	Nr.	3	2	4
Total surface area	ha	2,43	1,98	4,98
Number of parcels	Nr.	5,39	6,00	5,22
Lease payment	MDL/ha	2070	2144	1765
Expenses	MDL	6640	2645	7523
Family income, total	MDL	15138	12328	16721
Number of respondents	Nr.	1617	383	94

Source: Academy of Science survey

Another distinctive feature regards the age, family composition and human resources. The research of these variables reflect that families which lease-in land are on average younger than those than offer land for rent. Thus, the average age of the lessee is 52 years old compared with 60 years old of the lessor. The same conclusion can be reached concerning the his/her wife or husband. The composition of the family also plays a role. The lessee households usually are more numerous than lessor ones. These results confirm the expected ones and also the situation in other countries: younger and more numerous families prefer to own (or cultivate) more land than older families with less working capacity.

Another important indicator of leasing is the payment. The difference in result can be explained by a random insignificant error, with the average payment representing approximately 2000 MDL.

Location plays the primary role in land appraisal due to two main reasons: proximity to favourable or strategic places, and spatial dependence between characteristics of adjacent real estate assets, which should not be ignored. This study uses distance from town hall, which integrates a broader notion of the location component. Usually, it comprises closeness to infrastructure, human resources, storage, household, roads and other. The result of the empirical study shows that the value of land decreases by almost 8% for each kilometre further from the town hall. It is worth noting that this result does not apply for strategic regions, such as the urban sprawl near the capital, where sellers ask for 1 ha of land with agricultural designation as much as 2.4 million MDL (or 155,000 euro) , which is an excessive (ridiculous) price compared to the average “official” transaction price of 10301 MDL (= 665 euro/ha). According to the National Cadastral Agency, the average offer price for 1 ha of land in Moldova was actually 8,000 euro in 2011.

CONCLUSIONS

It is of no surprise that the land market in a transitional economy, as Republic of Moldova, is described by a buy-and-sell transaction mechanism functioning ineffectively and low land values due to poor efficiency. However, the statistics suggests improving land dynamics. The land development can favour several stakeholders, such as investors, government, citizens. This study is performed mostly from the investor’s perspective and can have two main applications.

Firstly, the model discovers the significant variables which influence land value. It represents a pricing model, which might be used by investment funds or other organizations interested in the land market. For example, investors interested in purchasing cheaper land should look for low-income land owners, low maintenance expenses, larger parcels of land, and further away from the town hall.

Secondly, there exist financial and management tools to improve the land market dynamics. A financial mechanism, like a Land Bank (as in the Netherlands or Romania) could be created to facilitate these transactions. Another option would be attracting land banking investment funds, which would have the goal to improve the buy-and-sell transaction system, develop the financial tools necessary for increasing efficiency, improving the financial structure and others.

There are several ideas that might be studied in future research: replicate this study for land with different designations, change or add other explanatory variables, describe the urban pressure effect in a strategic region.

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