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Estimating Economical Value of Farmlands (A Case Study Using Hedonic Model in Arsanjan)

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ABSTRACT

Land is important factor for production since it is locally and qualitatively. In this article, market value of the land in estimated through Hedonic Model and independent variables such as the distance of Farmlands from main road and consuming market, area of the farmland, soil productivity percent, and diversity of products are involved. The data was collected through interviews among 150 farmers of Arsanjan. The results reveal that the distance of land from consuming center and its area have a negative relationship with its value while performance and diversity of products positively affect the value of a land.
KEYWORDS: estimating the value of land, Hedonic Model, Arsanjan, Iran.

1. INTRODUCTION

Professionals of agricultural economics may believe that human resources are the most important factors in production. However, from a farmer's point of view, land is of utmost importance. Land is irreversible and is amortized in long term and is considered as a compliment to other factors. Land is a mean for saving and investment, especially when the rate of inflation is too high. It also should be noted that land, unlike the other factors influencing production, is a fix source and cannot be supplied through other factors.

The Hedonic Model was used for the first time by Hass (1992) to evaluate the value of farmlands in Minnesota. Some the other data from 1916 to 1919 were also included in the study and factors such as under-cultivation area and land location were introduced as influential on the value of lands. In addition, Wagg (1992) used this Model in the value of perishable products such as vegetables and so on. In a study in Tehran, Kupahi (1379) used Hpm to show that the type of soil, climate and other physical conditions are the features that affect a land's production and hence its value. Using Hpm, Mahmudi (1383) in another study in Tehran claimed that when a land price is increased, its application is changed in a way that its productivity increases.

Transportation costs or distance from market were introduced as key factors affecting land value in a study by Von Thunen (1996) in England.

Lynch and Lovell (2002), using Hpm in a study in the U.S.A, concluded that there is a negative relationship between the value of land and its distance from city and main road and its area. A positive relationship was observed between land value and its distance from market and water level.

2. MATERIALS AND METHODS

Hedonic Price Method

In Hedonic Method, the price of a product is estimated as a function of the characteristics of that product. For example, a firm which only produces a product (Y), product function for (Y) may be defined as following:

$$Y = f(z) \quad (1)$$

Where (Z) is a vector of factors.
Assuming that the firm is after maximizing the benefit, we have:

$$\Pi = pf(z) - wx \quad (2)$$

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Where (P) is the price of the product and (X) and (W) are vectors of price and amount of fix and variable factors respectively. For each special factor (x_i), the above equation can be written as follows.

$$W_i = \sum_{j=1}^{m} \left[T_j \frac{\delta z_j}{\delta x_i} \right] \quad (3)$$

Here (T_j) is equal to $p \sum_{j=1}^{m} \left[\frac{\partial f}{\partial z_i} \right]$ and indicates the value of jth characteristic. This equation shows that the price of (i) is equal to the sum of final value of each characteristic by the final efficiency of that characteristic in term of factor (i).

The general from of land market-value estimation model is as following:

$$P = X\beta + \varepsilon \quad (4)$$

Where (P) is the vector of selling price of each hectare of the land, (X) is the matrix of variables affecting the land price, vector (β) contains parameters that should be estimated and vector (ε) is a representative of random error showing unseen characteristics of the land.

Normal distribution is assumed and the model used in this study is as follows:

$$y = f(x_1, x_2, x_3, \ldots, x_{15}) + \varepsilon \quad (5)$$

In practice, this model can be linear or #. . . .#. (Y) is the value of each hectare of agricultural land, (x_1) is the distance from Arsanjan, (x_2) is the distance from the nearest village, (x_3) is the distance from the main road, (x_4) is the distance from market, (x_5) is the land area, (x_6) is the percent of the land used, (x_7) is the percent age of unplanted land, $(x_8 - x_9 - x_{10})$ are the percent age of soil goodness, (x_{11}) is the number of products that can be planted in the land, $(x_{12} - x_{13} - x_{14})$ are representative of wheat, barley and corn respectively.

The farm with the highest productivity is considered the most fertile and the other farms are evaluated in relation to this farm, (x_{15}) is the rent cost of the land. This model was developed based on normal least square method and Reset Ramsey test was used to correct it.

3. CONCLUSION AND DISCUSSION

In the present study, the value of agricultural land was estimated based on Hedonic Method. Regression of observed price of a good on its qualitative features was needed in such a method. Hence different data about the land were collected. To evaluate the model, all the data and the figures related to all variables in each sample during a period were used. The results of this analysis are presented as follows(table 1):

(1): Elasticity of (x_1) Shows that each percent of increase in the distance between the land and the town, the price of the land is decreased by 0.01%

(2): Elasticity of (x_2) Shows that each percent of increase in the distance between the land and the nearest city, the price of the land is decreased by 0.064 %

(3): Elasticity of (x_3) reveals that each percent of increase in the distance between the land and the main roud, the price of the land is decreased by 0.0018%

Table(1) Results of Hedonic models in Arsanjan

Name variables		coefficient	t-statistics	prob	elasticity
Latitude	c	10.55377	76.97500	0.0000	10/55377
Distance from Arsanjan (km)	x_1	-0.000903	-16.95149	0.0000	0/01
Distance from the nearest village (km)	x_2	-0.023574	-6.394928	0.0000	0/064
Distance from the main road (km)	x_3	-0001316	-2.896356	0.0044	0/0018
Distance from the market (km)	x_4	-0/026791	-2.8913940	0.0075	0/11
Total area (hectare)	x_5	-0.104002	-4.159993	0.0001	11/05
Under-cultivation land (hectare)	x_6	0.011822	-3.016673	0.0031	0/135
Non-planted area (hectare)	x_7	-0.000005	-2.541282	0.0122	0/0000004
Type of soil: heavy	x_8	-0318915	-8.612771	0.0000	0/042
Type of soil: semi-heavy	x_9	0.000006	2.543819	0.0121	0/00000046
Type of soil: semi-salty	x_{10}	-0.733112	-13.20538	0.0000	0/122
Number of cultivable crops	x_{11}	11.33462	10.24530	0.0000	0/74
Wheat harvest (kg)	x_{12}	0.000002	2.106454	0.0370	0/00687
Barley harvest (kg)	x_{13}	0.000008	4.832014	0.0000	0/00901
Corn harvest (kg)	x_{14}	0.000002	5.759641	0.0000	0/00824
Annual rent with water	x_{15}	0.0000001	9.261162	0.0000	0/271

(4): Elasticity of (x_4) Shows that each percent of increase in the distance between the land and the market, the price of the land is decreased by 0.11 %

(5): Elasticity of (x_5) Shows that each percent of increase in the distance between in the land area, the price of the land is decreased by 11.5 %

(6): Elasticity of (x_6) Shows that each percent of increase in the distance between in the planted land area, , the price of the land is decreased by 0.135 % it can be concluded that the sold.
Smaller lands are more amenable to be.

(7): Elasticity of (x_7) reveals that each unit of the increase in the area of implanted land, the price of the of the land decreases by 0.0000004%.This result shows that high levels of implanted land will lead to decrease in the price of that land. May be these lands are suffered from lack of water and therefore their prices are lower.

(8): Elasticity of $(x_8 - x_9 - x_{10})$ shows that each percent of increase in $(x_8 - x_{10})$ will lead to decrease in land price by 0.042% and 0.122% respectively. Also, each percent of increase in (x_9), price of the land increases by 0.00000046%

(9): Elasticity of (x_{11}) shows that each percent of increase in the diversity of planted products will increase the land price by 0.74%.

(10): Elasticity of $(x_{12} - x_{13} - x_{14})$ shows that each percent of increase in production of wheat, and corn, increases the land price by 0.00687%, 0.00901% and 0.00824% respectively.

(11): Elasticity of (x_{15}) shows that each percent of increase in rent cost, the price of the land increase by 0.271 %.

The findings mostly replicate those of the past researches. The results are totally the same as previous studies, especially with regard to variables "distance from the town", "distance from the main road", "distance from the main road" and "soil productivity".

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