Characteristics of Arable Land Valuation in Hungary

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SUMMARY

Since the transition, the different asset valuation methods have gained an increasing importance in agriculture. Land assessment has a high priority in agriculture, since it is the basis and an indispensable resource of the branch. Hungarian land prices are low, which is mainly due to two factors; the lack of land sales, and low farm incomes. Further issues to be addressed are what the old gold-crown system should be replaced with, and also if economic and ecological land evaluations should go together. In this context, it is also necessary to decide whether a uniform land valuation system has to be introduced, or whether the choice of a method suiting the purpose of valuation will always be the most effective.
Keywords: land market; Gold-crown system; yield calculation
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INTRODUCTION

Fundamentally, an economic management approach is used in this study to examine certain elements of land valuation. In course of the work, neither is a position taken nor are details given in connection with the current political events. They are simply mentioned. The only reason for mentioning them is that these events can significantly influence the domestic market price of the land. Furthermore, in the paper the purchase of land is investigated essentially by the help of a non-financing investment speculative approach, while farming and the management of land cultivation are regarded as the primary motivation for purchasing.

The problem of the economic evaluation of arable land is, although with varying intensity, a much-debated issue of agro-economic analyses. In the case of a normally functioning land market the price of land is governed by market conditions and the market price always develops in relation to these conditions. In countries, where there is not much buying or selling of land, the economic value of a parcel of land should be calculated. Some of the factors affecting the economic productivity of a piece of land depend on human intervention either to some extent or on a certain time horizon. Other factors are determined by the economic environment resulting from human influence on a permanent or a temporary basis. Therefore, all the results that can be related to the relative proportion and the unique standard of soil-related economic and ecological factors cannot be taken as pure ecological or economic dividends. The study presents certain elements of this complex problem.

THE FEATURES OF LAND MARKET AND THE MOTIVATIONS OF ITS ACTORS

Now, in the land market of Hungary - in spite of the recovery - the so called 'wait and see' strategy can be experienced. Many potential sellers are waiting for the prices to rise (speculating), while the willingness of customers to purchase is restricted by the lack of capital and the dilemma of ownership and leasing. Supply and demand trends are influenced by the quality of soil, accessibility and geographical location of a land, the branch of cultivation and many other factors. In addition, demand is controlled by a special law in Hungary, because The Land Act has excluded legal persons from land purchase since 1994. In a market economy, however, the possession of capital and financing are typically the strengths of companies, not of individuals.

There is an increased demand for lands of higher value in better-located, more-developed areas of the different counties, for lands of higher value. However, for lower quality or less-facing areas, around aging villages and end-of-road settlements as well as in remote areas, the lack of demand and oversupply are more characteristic. Besides these, neither the scattered, small (less than 1 ha) parcels of land, nor those where ownership is unresolved (undivided common property areas), are readily marketable.

There was only a partial restitution in Hungary: most of the region's earlier small farmers have already retired or died. The majority of their heirs found jobs in other sectors during the transformation of the economic regime and they have become city-dwellers since then. Many of them were not experts on farming and they did not even want to do it, unless unemployment forced them to. In this way, after the change of regime a layer of outside ownership was brought into existence by the greater part of the agrarian reforms. These owners however, are not willing to sell their land or their corporate share (Burgerné, 2003).

FROM THE GOLD-CROWN SYSTEM TO THE D-E-METER METHOD

The Gold-Crown System and its Problems

The introduction of an arable land evaluation system based on gold crowns was ordered by the Act VII in 1875, but solely for taxation purposes. The definition of a gold crown according to the law mentioned above is the following: "The ordinary net income of a land is the value of the average crop obtained from long-term farming minus the costs of farming." The per-year per-farm value of production and the costs of farming were calculated in the case of woods on the basis of a 25-year period of experience, in the case of grapes a 15-year period, and for other cultivation branches 10 years of experience. This value then was set in the current monetary unit, the gold crown.

This is the reason for the fact that the qualification of a land by its gold-crown value was its economic evaluation at the same time. The monetary unit was about the value of a parcel of land (yield). Although the gold crown is no longer a means of payment this method has become a part of today's economic

evaluation of land. The gold crown was actually a complex indicator that could show the quality of agricultural land, based on an evaluation of estimated costs and yields at the end of the nineteenth century.

An essential feature of the method is that besides the quality and productivity of the land it took into account the economic factors of the era's agricultural production (expenses, sales). The economic elements of the system have remained basically unchanged till today, despite the fact that the biggest changes have happened in the economic factors of agricultural production. This is exactly why the gold-crown system is mostly criticised.

Nevertheless, within an estimating area or village it still shows 'clear income differences' between lands. It must be obvious now that today's records are extremely outdated. The land classification based on one or two pieces of soil data was carried out about 150 years ago. These estimated soil data come from very rare sample areas revealed by every 130 to 150 hectare, and therefore they can represent the diverse soil covering only in traces (Dömsödi, 2010). However, it is still an important part of today's real estate records, and also of the determination of the Land Fund, because it expresses qualitative differences and the different productivity in different parts of the same parcel of land.

The Agricultural Habitat Assessment System

The new land evaluation process, called "hundred-points" in everyday speech, appeared in the 1970s. This method had been developed to replace the gold-crown system and it was based on the scientific knowledge of soil. The first such scholarly developed land evaluation (habitat and economic) methods were published in 1970.

At that time the widely-applied principle of habitat assessment was that the soil, topography, climate and hydrological factors had to be evaluated separately, and then by expressing their values together a habitat rating could be developed. By the help of this method a score was made for all genetic soil types. The maximum score possible was an ideal 100, from which deductions were made based on the differences between the topographic, climatic and other elements of land.

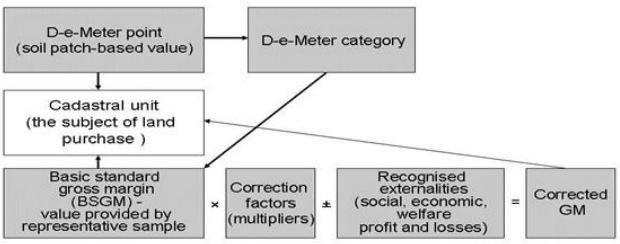
Since its introduction, however, it has been strongly suggested that this solution does not give the expected reliable results, because:

- it keeps both the faults of the gold-crown system and of those land evaluation districts (called 'becslőjárás').
- Data from soil sample areas do not meet the knowledge of soil
- A simple arithmetic average of data from the sample areas provides a false picture about the spatial distribution of land resources.
- The evaluation, carried out by branch of cultivation, incorporates hidden elements of economics (Lóczy, 2002).

The gold-crown system could have been replaced by a land evaluation method based on the scores of production sites, if a modern, scientific evaluation based on the determination of gross or net income per unit area had been created in economics. However, this has not happened so far, so at the change of regime, the gold-crown value system necessarily returned. The habitat assessment work has been halted; today it means a problem even to find the completed boards. In addition, the compensation process itself, which was actually the central program of agricultural transformation, was carried out based the values of the gold-crown system.

The D-e-METER Ecological Land Evaluation System and its Upgraded Versions

The current gold-crown system is not only out of date, but since the time it was created it has had a number of errors (as in the previous subsection). It has become necessary to introduce a new indicator, one that is not only a substitute for gold crowns but which, by promoting sustainable development can be an underlying parameter of land evaluation. D-e-METER is an ecological land evaluation system supported by an online GIS (geographic information system) modelling option, combined with the integrated developments of agriculture. The aim of the ecological land evaluation research was to develop a system that can detect differences in the production conditions of certain regions and show them in figures on the basis of environmental requirements of the major economic crop, the intensity of production and the risk inherent in climatic and geological factors. D-e-METER brings together the quality and fertility indicators of domestic soils in a single frame, plant by plant. The structure of the system provides maintenance for the stability of the value of soil indicators (Gaá et al., 2003).



Source: Szűcs et al. (2006)

Figure 1. The integrated system, which combines the D-e-Meter system with a complex economic land evaluation

The standard evaluation system is based on the D-e-Meter categories charged with economic substance (as is illustrated in Fig. 1). By this, the condition can be fulfilled that the ecological and economic endowments of a land (a parcel) should be handled and evaluated together while determining the economic value of the land. Charging with economic substance means to assign a so-called weighted, standard gross margin value to D-e-Meter point categories. Gross margin values are sets of sampling data. The accounting units of a given area are made up of arable crop production enterprises while monitoring units are made up of individual parcels. Therefore, the D-e-Meter system, by linking and integrating the economic, ecological, cartographic and computer scientific information into a specific booking system, allows an automated land evaluation procedure. In the course of calculating land prices, 'automatism' means that after that the lot number has been entered, the land value and land price belonging to that particular lot number will be displayed in the output of the system (Vinogradov, 2009).

THE ECONOMIC EVALUATION OF ARABLE LAND IN OUR COUNTRY

In the former socialist countries of Europe, land assessment previously was carried out in a calculative way, by means of different approximation methods and models. The reason for

this is that the land market did not work properly and real market prices could not develop.

Currently there are two statutory ways of economic land assessment:

- a comparative method (based on market differences),
- a yield-base calculation method.

Methods for determining market value are contained in Regulation 54/1997 (VII.1.) of the Ministry of Agriculture. The definition of credit security of urban real estate is contained in Regulation 25/1997 (VIII.1) of the Ministry of Finance.

The Market Comparative Method

This approach starts with the collection of data of earlier sold real estate situated in the neighbourhood of the land under investigation. In course of this process, as much data should be collected as possible, from at least three transactions. The market value of a particular piece of real estate can be determined by comparing the most important properties of various sites, creating average data and making individual adjustments. According to an important rule, only the same kind of areas can be compared (e.g.: plow with plow).

The steps of evaluation:

- Making a specific set point on the basis of previously collected transactions (average price per square meter [HUF/m2])
- Collecting unique, value-increasing factors, for instance: if proximity to the city is less than the average 4-5 km, or if an established driveway leads to the land. In such cases the value of the land can be increased by 1-2 percent. However, factors such as being located on a flat area, having a regular shape, being suitable for mechanical cultivation or having easy access to water can lead to arable land having a much higher value than that.
- Collecting depreciating factors, such as heavy vehicle traffic, air pollution, possible damage by wild animals, etc.
- Calculating the result given by the combination of value-increasing and value-decreasing factors (balance adjustment), and determining the market value of the land by multiplying the area with the balance adjustment and the specific set point.

When using this method, the goal is to learn the actual market prices of the areas that have similar characteristics to those of the land in question. As a past decades a real land market has not developed in Hungary in the past few decades, probability of the reliable application of this method is rather small for the time being.

The Yield-base Calculation Method

The Hungarian Agricultural Research Institute has developed a practical method, in which the income is determined on the basis of the current system of land evaluation (gold crown), and the rental value is also involved in the calculation. This method is based on the current land evaluation system. Despite some reasonable criticisms, the correlation calculations have justified that the 'gold crown' still reflects approximate differences in the quality of lands. This is exactly why this system is appropriate (after certain corrections) to create a basis for a monetary evaluation system. The yield-base assessment derives the value of land from the difference between its future benefits and its costs. This kind of arable land evaluation must be carried out in accordance with Regulation 54/1997 (VIII.1) of the Ministry of Agriculture. Another thing that suggests the applicability of gold-crown system is that the current land lease system is built on the 'gold crown', as the rental fee of a land is defined in the price of wheat (per kg) paid for a 'gold crown'. In order to facilitate the application of the method, the result of a comprehensive investigation is available. Its records of it provide a review of the development of the average Hungarian income of land between 1980 and 1990, and also determine the value of wheat (per kg) equivalent of one gold crown, by county and by each cultivation branch.

The formula used for determining the market value based on yield calculation

$$MVL = \frac{(P_j + B) \cdot p}{2 \cdot i} \cdot (1 + k)$$

where,

MVL = market value of land (HUF)

Pj = yield (kg wheat) calculated from the multiplication of the annual income of land (kg wheat / GC (gold-crown)), and the gold-crown value of the assessed property).

B = yield (kg wheat) calculated from the multiplication of rent considered characteristic of the immediate surroundings of the land (kg wheat / GC), and the gold-crown value of the assessed property (kg wheat)

p = the average domestic stock market price of wheat (HUF/kg) established in the year before evaluation

I = capitalization rate (%/100)

k = the correction factor (%/100) used to modify the calculated market value of the land within consolidated criteria.

The criteria, and the recommended threshold figures used for determining the correction factor *k* must be expressed in percentages. Having been calculated in accordance with the above formula, the market value of a land (default value) should be corrected on the basis of known criteria. The effect that each individual criterion has on market value must be expressed in percentages, the summed-up value of which is equal to the correction factor k (Mizseiné, 2009).

The interpretation and problematic issues of the data contained in the calculation formula:

- According to the regulation referred to, the annuity income *Pj* should be set by the MA. In the absence of that, an average value determined by Szucs et al is used in practice, though it cannot reflect the actual income situations (Szucs, 1998).
- The *B* lease should be determined on the basis of information gathered from the larger tenants operating in the neighborhoods of the land in question. In this case, the problem of long-term lease contracts arises, where the value determined earlier is likely to remain well below the current value considered as realistic, for a long time. Therefore, it would be advisable to apply only the values of recently concluded lease contracts.
- There is not an established methodology for determining the *p*. The legitimate claim of many valuators is that if over the years there is a significant change in stock prices, its must be followed by the value of the land as well. So, the average of 3-5 years would be appropriate to be taken into consideration.
- According to regulation, the capitalization rate *i* should be set by credit institutions. Since the rate of interest varies according to credit institutions, a distortion is caused in the

calculation. Therefore, as a result of diversity, its exact content is undetermined.

➢ The correction factor *k* can change its default value to the following extent: (*k*.min = -0.8 and *k*.max = 2.5).

Knowing all this, we can conclude that apart from the correction factor in the formula, further modifications or clarifications must be taken into consideration in order to be able to estimate an approximately fair value.

THE YIELD-BASED ESTIMATION OF LAND VALUE (LAND PRICE) BY THE ECONOMIC APPROACH

It is clear from what is written above that the quality of soil can basically influence the result or efficiency of all agricultural activities. So, one can say that companies are primarily differentiated by the soil quality of land, which, according to the economic approach, can be determined as the income producing ability of arable land expressed in figures.

Through the eyes of an economist, the economic value quantifies and expresses (by the actual instrument of payment, HUF) the ecological quality of land as well.

The Yield Calculation-based Value Estimation Method

Both in the literature and in practice (especially in the developed European countries), widely used formulas and methods are applied to estimate and determine the price or value of arable land in some calculative way.

Here this paper provides an overview of a land estimation process that is based on yield calculation. The reason for this is that its application is not too complicated; expert knowledge is not required. Moreover, the data used in the method are up to date, not fed by gold-crown system sources. Values are provided by the capitalization of the calculated income.

$$LV = \frac{LI}{i}$$

where:

LV land value (HUF/ha)

LI land income (HUF/ha)

i capitalization rate

For the sake of clarity and in order to draw valid conclusions after analyzing the computed data, a great emphasis should be placed on the following.

Many pieces of information should be gathered in order to determine land income. These are shown in Table 1.

The next element, the determination of which has a special importance, is the capitalization rate method. Unfortunately, the precise content of the method is not detailed in the calculating formula included by MA Regulation 54/1997 (VIII.1). This is the reason why I worked in the theoretical context of a calculative rate (i = ih + iv). This is used to determine the economic content of the capitalization rate, while calculating the economic profitability of an investment (Illés 2002).

In this way the starting point of determining the capitalization rate is the reference yield of risk-free investments, namely the long-term government securities. Actually, in the first quarter of 2012 this was fluctuating between 8-9 percent[1] .After that a risk premium[2] should be given to it, which is known as the ß factor in the literature.

Table 1
The outcome categories used to determine land income (LI)

Denomination	Contents	Problems with the application of LV formula
EBITDA	The amount of operating profit and amortization	It is suitable for LV calculation
Operating profit	Revenues minus: - Material costs - Personal expenses - Depreciation and amortization - Other expenses	It is not suitable for LV calculation, due to: - Uncertainty in the yearly distribution of amortization costs - The long-term investments (melioration, drainage, etc.) significantly increase the quality and value of a piece of land, and they revalue it. Therefore, the buyer is rightly expected to compensate for it. The new landowner will enjoy the benefits of these long-term interventions, even if he changes the branch of cultivation.
EBIT	The same as operating profit	Not suitable for LV calculation. (for similar reasons as the operating profit).
Net Income	Revenues minus: - Material costs - Personal expenses - Other expenses.	Suitable for LV calculation

Source: The author's editing

Table 2
The elements of the capitalization rate used to determine the value of arable land

Denomination	Value (%)
Market reference yield of government securities	8.5
Macroeconomic risk	1.5
Market risk	2.0
Drought, flood etc. risk	1.0
Total	13.0

Source: The author's calculations and editing

Table 3 shows the internal structure of the calculative interest rate from a management approach and it also provides information for the farmer (whether it is a large agricultural company or a family working on the land) about what yield to expect in another branch of the same risk sector. Based on this consideration, the farmer can decide how much the real market price of his land is, and estimate how much risk he can take. Just as I have presented it in the previous sections, in the course of determining the price of a piece of land, results should be kept under permanent review. They should be re-estimated and fitted to the current agricultural policy and market conditions.

Such a high level of interest rate for capitalization (13 percent) would result in very low land prices. From the investors' point of view, a 13 percent gain cannot be considered an unrealistic expectation, regarding Western European context data and the risks described. Therefore, further investigation into the value of each capitalization rate category is necessary (as for current information, trends), and they should be included accordingly. Because of the special features related to land assessment and land price, agricultural valuers and experts apply a capitalization rate between 4.5 and 6.5 percent.

[1] *Based on data of the Public Debt Management Agency.*

[2] *The risk premium (ß factor) and the rate of the categories used to estimate it were determined on my own. The number of these categories may rise and fall, and their rates can vary as well. This change can always be influenced by the location and size of the land, macro-and micro-economic conditions, weather, supply and demand trends, and many other factors.*

Table 3
The yield trends of bank interest and lease charges between 2007 and 2013 (in the case of a 350, 000 HUF/ha investment)

Year (Data listed in %)	2007	2008	2009	2010	2011	2012	2013
Bank interest rate	8.0	8.0	6.0	5.8	4.0	4.0	3.0
Yield of Lease	7.5	8.0	9.0	10.0	10.2	10.2	10.4

Source: Author's editing, based on the data of Tisza Cash Zrt and Kardos (2009).

Tisza Cash Inc. has dealt with land trade, intermediation and related services since 1998. Its profile is unique in the country, and it is a major player of the market. The company considers the Hungarian land as suitable for investment and promises a promising yield. On the basis of experience of many years, their medium and long term annualized rate of the expected yield is around 20-30 percent. The explanation of this is that the land doubles its value in every 3-4 years, or leasing arrangements provide constant revenue, which is 3-6 percent per a fixed amount per year, tax free.

It is not easy to determine the correct capitalization rate, because it may be done only after a thorough consideration of several factors. These are for example the motive of the purchase, the current supply-demand situation, the agro-economic policies the potential domestic and EU funds, etc. In addition, a further review is needed to find out the ratio of the created capitalization rate and the land income, and also to see how it fits in with the domestic market conditions.

When the above estimates are done, the value of a piece of land can be easily estimated by yield-based calculation. This can be summarized briefly in four steps:

- The first step in yield calculation is a land-use analysis. In course of the analysis tests are carried out to find out in advance what economic impacts can be expected in case of solutions different from those of today.
- The second step is making an income statement. It is an estimation of future revenues and expenditures. The accounting information available may provide a good basis for estimation, however; it cannot be a substitute for calculations specific to the case.
- The third step is estimating payment plans.
- In the fourth step, the capitalization rate should be determined.

Key Aspects of Land Purchase and Certain Discretionary Aspects of Purchase Price

In the economic approach, yields are examined from the point of current prices and costs, and the income-producing ability of a land should always be determined. In this way, the production efficiency of an arable land is being analyzed in given market conditions, since the evolution of land resulting in different levels of costs is of the greatest interests for anyone. So, the effort of land owners and land managers to increase the fertility of their land is fully understandable. There are basically two ways of doing it.

In the first, the so-called 'working capital-related interventions' are carried out from time to time. It is typical that these are repeated every year, like fertilization. In this case, the intervention can be assessed from a yearly perspective and its costs-yields relations should be examined on an annual scale.

The other option is when 'fixed asset type' long-term interventions are performed. These can be for instance melioration activities, such as land reclamation, drainage, etc. However, these are really costly expenditures, for which payback cannot be expected after a year of farming. Therefore, calculations are performed for several years in connection with return on the intervention, while actually treating it as an investment.

It is natural, and should never be ignored, that lands of different quality respond differently to the same input. The level of expenditures is related to land quality as well. Thus, it has to be decided how long it is worth increasing the level of spending for different land quality. This actually can always be determined by the comparison of marginal revenue and marginal cost of the land.[3]

Depending on soil quality the relation of marginal revenue and marginal cost can develop in a different way. In the case of land of good quality, costs can be increased, and the two values will meet at a relatively high spending level. (Beyond this level, however, the manufacturing cost of the product will be higher than the price at which it may be sold) In the case of land of poorer quality, expenditures must be reduced, because the point mentioned above occurs at a much lower spending level.

In accordance with the current price and cost conditions however, the maximum level of spending needs to be reassessed from time to time. If the price of the product (that is, the marginal revenue) is increasing, costs can be increased even in case of a poorer quality land and the two values will meet later. However, if the price of the product declines, this should result in the reduction of spending in the case of good-quality lands as well. Expenses can be reduced for a while, of course, but revenues continue to steadily decline in the long run, the farmer should consider a possible change to the branch of cultivation.

It cannot be overemphasized that the buyer should be very careful while purchasing. He should not rush to buy because in the long run this will fundamentally influence the results of the economic management of the land. If a land purchase seems to be too risky in any respects, it is better to cover the land needs of the enterprise by renting.

CONCLUSION

Throughout two decades of the domestic market-economy, Hungary has not been able to prepare for the liberation of land. However, on 20 December 2010, the European Committee permitted the lengthening of the Moratorium on arable land purchase in Hungary, till 30 April 2014. One of the most important reasons for this is that the inequality in price between Western European and Hungarian land has not been eliminated.

Clearly, it is not an easy task to determine how much the "market" price of land should be in Hungary. Besides complexity, which actually means that ecological and economic aspects should be considered and evaluated in an equal way and also while estimating the price of land, further problems such as the immature land market (detailed above) and the already described shortcomings of the gold-crown system, have arisen.

If the two systems - the ecological and the economic land evaluation – are so cumbersome to create together, to operate and continuously keet up to date, perhaps we had better

[3] *The evolution of marginal cost after a certain level of production shows an increase, which means that the production of an additional unit of goods is more and more expensive, while the value of the marginal revenue is constant. This is because of the fact that in most cases the product that was first to be manufactured can be sold at the same price as the last one. In addition, this kind of development of marginal cost is consistent with the 'diminishing returns theory', that is, by a linear increase of expenses; yields start gradually decreasing after that a certain yield level has been reached.*

conclude that it is not realistic for such a system to be brought into existence, and instead merge the figures of the two method too - is that the experts of the two disciplines (soil science and economics) do not always accept the results and methods of the other branch of science.

I do not think it is likely that a single land evaluation method is always the most appropriate. In my view the method

In order to resolve inequalities between the Hungarian and Western European land prices, primarily those farmers should be granted land by a market-based allocation that do not intend to speculate on the land, but who would like to cultivate it and make a living out of it. Thus, the income producing potential of land is likely to increase, which will probably contribute to the

disciplines. An even more difficult problem - and probably the cause of the failure of the so-called 100-point land evaluation should be made conditional upon the purpose of evaluation and the results should also be assessed and used on this basis. There is no uniform land evaluation system even in the most developed European countries. The methods used there are determined by the countries and their goals.

convergence of the market price of domestic land with the level of land prices in Western Europe. If this process is carried out successfully, land valuation disputes extending over several decades, calculation differences and estimation difficulties will also be resolved, or will completely disappear.

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