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False answers in Hungarian agriculture after accession to European Union

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Abstract— **The research based on primary data examines the answers given by Hungarian farms to the challenges of the changing economic environment following the accession to the European Union. The experience shows that the Hungarian farms have given basically false answers to the changing economic relation system. The subsidies have emerged on the market as „visible hands" and by allowing their impact which distorted the economic rationality, the basic economic aspects of production have been ignored. In the near future it will be especially important to liquidate this abnormal situation. This step will definitely indicate the demand to separate the social and producing agriculture, providing ground for the spreading of farmers' cooperation.**

Keywords— **competitiveness, cooperation, subsidies.**

I. INTRODUCTION

In Hungary, following the social transition, the implemented privatization method resulted atomized and, at the same time, heterogeneous farm structure which is full of contradictions [1] [2]. This farm structure has been conserved later by the more or less successful agricultural policies [3]. Hungary, following its accession to the European Union, has adapted many of its achievements and the methodological means of agricultural regulation. The present research aims to explore the adequacy of answers given by the farmers to the changing economic condition system after the EU integration.

II. MATERIALS AND METHODS

The paper is based basically on primary research. The survey of processes in the Hungarian agriculture following the EU integration was made with questionnaires and deep interviews in a traditionally agricultural area, the South-Eastern part of Hungary, in the region of the Southern Great Plain, in Békés county. The survey was made in 2004-2007. The number of elements of the examined samples (N) was 113 farms, which meant 0.25% representation in Békés county and 0.02% in country level within the group of agricultural farms.

The questionnaires filled in by the farmers comprised questions on the general characteristics of the farm (type of farm, range of activities, size of owned or leased area); questions on natural indicators of farming (production structure, results, machinery endowment, etc); financial aspects of farming (sales prices, input prices, rents and subsidies) as well as questions related to the farmers' willingness to cooperate (frequency and type of cooperation, their information on the institutionalized forms of cooperation).

In the research, the economic size (*ES*) of each farm was determined according to the EU methodology. It was made by multiplying the branch sizes with branch SGM values – taken from FADN – according to the following relation:

$$ES = \left(\sum_{i=1}^{n} SGM_i \cdot s_i \right) \cdot u^{-1} \quad i = 1, 2, \ldots n \qquad (1)$$

where *ES* = Economic size [ESU]; SGM_i = Standard Gross Margin of branch i [EUR·unit^{-1}]; s_i = natural size of branch i [ha, pcs]; u = 1200 EUR Standard Gross Margin; n = number of branches.

On the basis of the farm size determined with the above methodology, the individual farms were grouped according to size categories: (1) 0 - <4 ESU; (2) 4 - <8 ESU; (3) 8 - <16 ESU; (4) 16 - <40 ESU; (5) 40 - <100 ESU;(6) >= 100 ESU. It should be noted, that the above group limits correspond to those in Farm Accountancy Data Network (FADN).

In the sample the average farm size was 34.6 ESU with 125.1 ESU dispersion (Minimun: 0.3; Maximum: 1148 ESU). An average of 88.6% of farm-level Standard Gross Margin (SGM) of the examined farms was from the production of field crops, thus they can be regarded as Specialist Field Crops farms in EU terms.

In order to express the machinery supply of farm, I used the specific asset capital value (EUR·ha^{-1}) earmarked in machinery and assets. Most of the machines used by the farms are amortized therefore their value cannot be considered according to accounting principles because it would give easily misleading results. In order to solve the problem, the machine supply of farms was evaluated at market prices. The specific market value of machines was provided by newsletters, ads, internet portals and farmers. The determination of farm-level assets supply (*FAC*) in relation is as follows:

$$FAC = \left(\sum_{j=1}^{m} p_i(a, r) \right) \cdot A^{-1} \quad j= 1, 2, \dots m \qquad (2)$$

where *FAC* = Fixed Assets Capital [EUR·ha^{-1}]; p_i = specific market value [EUR] of the machine i, asset plotted against age (*a*) and relation (*r*); *m* = number of machines, assets. (As regards methodology, it should be noted, that the actual technical condition, as the third factor determining specific value should also have been considered, but the parameterization of this is very complicated in each case. We made the simplifying presumption that the age of the machines refer to their technical condition, too.) Variable *A* in the equation expresses the total area of the given farm [ha]. The FAC index can be evaluated from two aspects: on the one hand it refers to the quantity supply, on the other hand it expresses the technological level. Unfortunately, the index itself does not help to find the dominant aspect in the given farm. In order to find this aspect, further indices should be introduced and analysed (e.g.: Power machines density index (pcs·100 ha^{-1}), Average engine output (kW·ha^{-1})).

In order to explore the level of mechanization of a given farm and its self-sufficiency level regarding mechanization, the „*extraneous machine work need*" index was implemented. On the basis of the technological needs imposed by the production structure of the farm, the index shows the amount of labour value which cannot be ensured by the given farm on its own resource base, so it should be somehow purchased from external sources. The determination of labour value was made with the fees of hired services, on the basis of the following relation:

$$NoEM = \left(\sum_{i=1}^{n} e_i(s, d) \cdot l_i \right) \cdot A^{-1} \quad i= 1, 2, \dots n \qquad (3)$$

where: *NoEM* = Need of Extraneous Machinery [EUR·ha^{-1}]; e_i = is the quantity of work process i [unit], which can be determined in the relation of sowing structure (*s*) and the lack of means (*d*) hampering the perfect implementation of related agrotechnical operations. l_i = is the fee of hired services of work phase i according to the local practice [EUR·unit^{-1}]; *A* = is the total agriculturally used area in the farm [ha]; *n* = number of missing assets.

Gross Production Value index (*GPV*) was used for marking the performance of the farms. It can be determined by the multiplication of branch size, branch productivity and the average sales price.

$$GPV = \left(\sum_{i=1}^{n} h_i \cdot q_i \cdot p_i \right) \cdot A^{-1} \quad i= 1, 2, \dots n \qquad (4)$$

where: *GPV* = Gross Production Value [EUR·ha^{-1}]; h_i = natural size of branch i [ha]; q_i = naturally expressed result, productivity of branch i [t·ha^{-1}]; p_i = average sales price of products of branch i [EUR·t^{-1}]; *n* = number of branches.

I used assets efficiency indexes (*AE*) to express the efficiency of the utilization of the machinery-assets capital fixed in production. The assets efficiency index is the quotient of the value of gross production of the plant producing sectors and of the market value of the total machinery assets.

$$AE = \frac{GPV}{FAC} \qquad (5)$$

where: *AE* = farm-level Assets Efficiency [-]; *GPV* = Gross Production Value [EUR]; FAC = Fixed Assets Capital [EUR].

The capacity exploitation of technical resources in farms was made on the basis of figures by Takács-György [4] and Gockler [5]. The estimated global utilisation value at farm-level was calculated on the basis of works carried out within the farm. Normal hectare was used as exchange value.

$$CE(\eta) = \frac{w_r(A, s)}{w_p(v, a, r, c)} \qquad (6)$$

where: η = capacity exploitation [%]; w_r = actually utilised capacity in the farm, in relation to the area of the farm (*A*) and its sowing structure (*s*); w_p =

theoretically available capacity on the basis of the size of machine and assets stock (*v*), age (*a*), relation (*r*) and performance category (*c*).

I conducted the research using one and two variables statistic methods (calculation of average and relative deviation, calculation of correlation) and using the graphical boxplot built on the statistical methods. As regards boxplot analysis, it should be noted – due to the variety of marking systems of statistical programs - that we can speak about significant differences between groups if their confidence intervals do not overlap each other. The present program (EViews 5) marks the confidence interval with grey colour.

While mapping the co-operation relations, my examinations focused basically on the co-operations connected with technical resources. The concept of co-operation is interpreted in two relations. The co-operation in a narrow sense means basically the lending of machines and equipment, or the labour performed for each other as an assistance. The co-operation in a broder sense includes the lease providing relations, too.

In order to express the co-operation willingness (CW) of farms in its narrow sense, the responders evaluated their inclination to co-operation in a range from 1 to 4. According to this: 1 – does not intend to co-operate with anybody at present and in the future, either (completely unwilling); 2 – co-operates rarely, occasionally, and does not plan to change in the future; 3 – co-operates with fellow farmers with medium frequency, is not averse to make these relations closer; 4 – often co-operates and plans to continue it in the future, too (completely open).

Using the experience from questionnaires and interviews with the farmers I examined what is the type, strength and direction of the cooperation between the farmers. To illustrate the relations revealed this way, using the example of two neighboring communities, I composed a “web of relations”.

III. RESULTS

The survey has revealed the low profitability of farms. Typically in the smaller size categories the production is loss-making without subsidies, but there is significant subsidy-dependence in case of bigger farm sizes, too. The low profitability can be led back to many reasons. The first reason is the production structure of the farms. The profitability would improve if the production structure was selected according to the market indications. In the crop structure of most of the farms, however, the proportion of cereals – which has low profitability but some subsidies - is determinant. Some improvement in tendencies can be tracked in the examined period but it is due mostly to the compliance with the conditions of subsidies and not to economic rationality. The second reason for decreasing profitability is the atomized sizes of farms compared to the economic actors on input and output side. The statistical examinations proved in the tendency that more favourable positions can be reached by growing farm sizes on the purchase and sales sides. It should be noted, that in many places a group of farmers initiated the purchase of some joint input. This initiative concerned, however, only a few farmers, the spreading of this type of co-operation still remains to be seen. The third problem is the separation of land ownership and land use. The subsidies connected to land are capitalised in the rents, thus assigning considerable extra loads on farmers. The weight of the problem is well demonstrated by the fact, that more than half of the land used by farms is leased.

The examination of machinery supply of the farms was a highlighted area in the research. The experiences show that the farms can be regarded as independent in the farm-size categories of large-medium, but much rather in large ones (Tab. 1). The degree of exploitation of available machine capacities, however, can be economically acceptable only in the largest farms. Within the three-year period, the survey of tendencies in machine supply has shown the developments of medium and large-scale farms. The development subsidies has had less role in the realised developments, because these development projects used dominantly SAPS grants – given basically with income policy objectives - as sources. Above a certain, critical farm size these subsidies represent such amount of source in the given farms, which can be utilized for investments of development purposes. Calculations proved that these investments were not totally justified in economic sense.

Table 1 Mechanization in farms

Descriptors	0-4 ESU	4,1-8 ESU	8,1-16 ESU	16,1-40 ESU	40,1-100 ESU	Over 100 ESU	Σ
Average power machines* capacity (kW)	34,7	54,5	54,7	73,0	83,5	74,0	67,2
Average age of power machines (years)	29,1 (s=9,0)	14,7 (s=6,5)	16,2 (s=8,6)	13,3 (s=6,5)	9,8 (s=4,3)	13,1 (s=3,4)	14,5 (s=8,9)
Average engine output ($kW \cdot ha^{-1}$)	3,52 (s=5,16)	3,65 (s=3,43)	2,31 (s=3,13)	2,78 (s=1,79)	2,26 (s=2,29)	1,79 (s=0,83)	2,55 (s=3,30)
FAC ($EUR \cdot ha^{-1}$)**	468 (s=672)	624 (s=616)	436 (s=916)	828 (s=596)	756 (s=584)	368 (s=120)	676 (s=684)
NoEM ($EUR \cdot ha^{-1}$)	202.8 (s=76,0)	154,4 (s=66,5)	124,4 (s=73,2)	47,2 (s=40,8)	29,2 (s=30,4)	19,2 (s=26,8)	60,4 (s=336,8)

* power machines are: tractors, harvester machines, lorries, mechanical loaders, self propelling sprayers
** 1 EUR = 250 HUF

During the survey it was a priority to examine co-operativeness aiming to rationally use the technical resources. The statistical analysis has proved that the cooperativeness – among other examined factors – relates to farm size (Fig. 1) and subsidies negatively, and to the deficiencies in machine supply positively (Fig. 2). These interrelations, however, were not significant, but proved only in the tendencies.

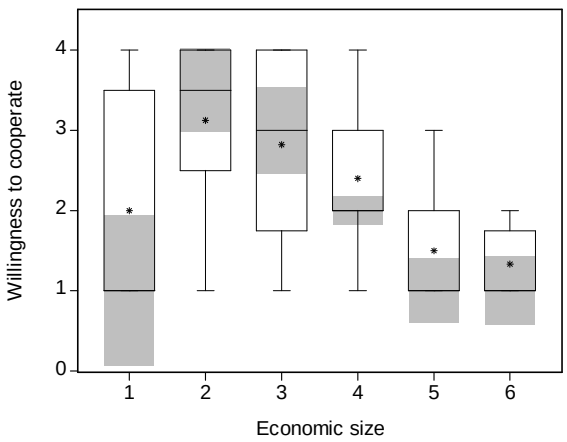

Fig. 1 Boxplot analysis of co-operation willingness in relation to economic size

The research identified two basic types of farmers' relations. The first is the „clear" cooperative relation, which was manifested in the lending of machines, equipment and physical help, and the second is the hired service relation, which can be regular or occasional. In other approach, one-way (simplex) or two-way (duplex) relations can be differentiated. In case of simplex relations, one of the parties provides services to the other for money. In case of duplex relation, there is a return service, and the settlement of accounts is based either on money, or on clearing.

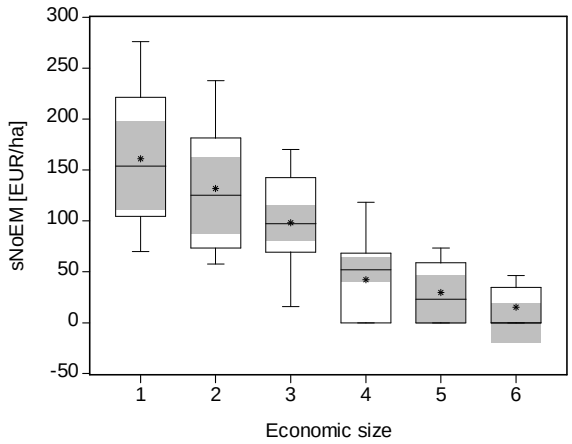

Fig. 2 Boxplot analysis of extraneous machine work in relation to economic size

The empirical experiences prove on the one hand, that the efficiency of „clear" cooperative relations is very low, and on the other hand, the lease provider relations are determinant in the present farmer relations, and this type of „quasi" cooperation alternative will have important role in the solution of lack of capacity and surplus of farms. (Fig. 3)

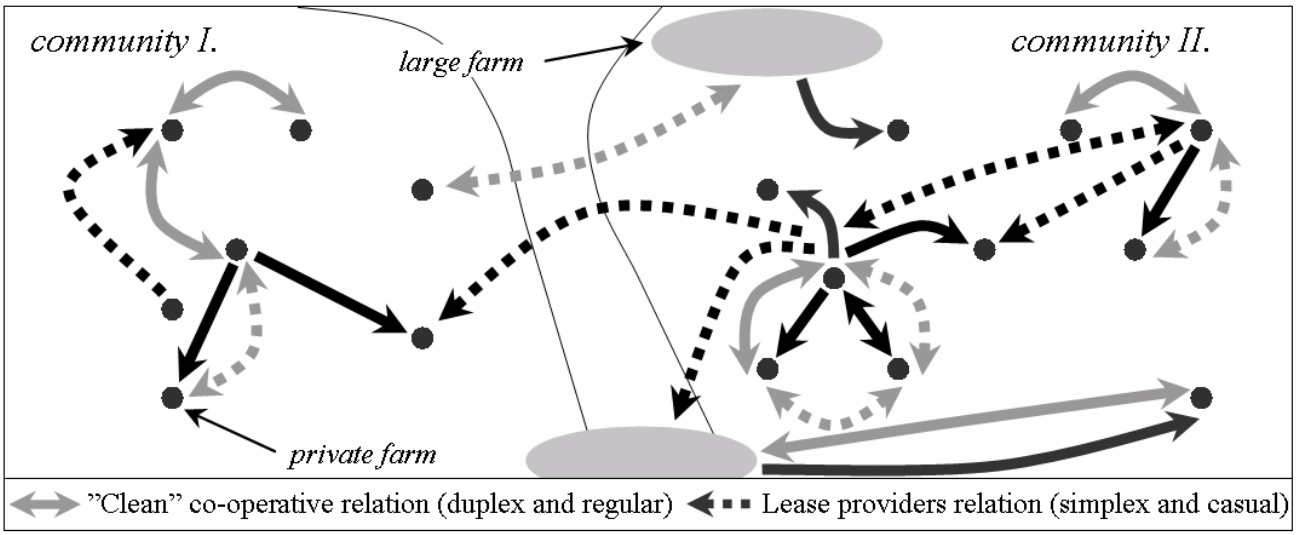

Fig. 3 Co-operation web of farms

IV. CONCLUSIONS

Following the accession to the EU, the Hungarian farms have given basically false answers to the changing economic relation system. The subsidies have emerged on the market as „visible hands" and by allowing their impact which distorted the economic rationality, the basic economic aspects of production have been ignored. In the near future it will be especially important to liquidate this abnormal situation. This step will definitely indicate the demand to separate the social and producing agriculture, providing ground for the spreading of farmers' cooperation.

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