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EDITOR'S WELCOME

24th *November 2011, a Ph.D. conference was organized at the University of Debrecen, Hungary. The main objective was to assist young doctoral school students in presenting and publishing their first scientific results. The conference was successful both in terms of number of participants and the broad variety of topics. Doctoral students from all around Hungary and abroad attended the conference. Through a process of selection the editors arrived at 24 papers that are published in this special issue of Apstract.*

The authors are at the beginning of their scientific career. I am convinced that in the future we can read more of their articles in the Apstract or other scientific journals. I wish them success in their future scientific career.

Wageningen, December 2012.

Wim Heijman
Editor in chief

THE EXAMINATION OF THE PROFITABILITY AND COMPETITIVENESS REGARDING THE ENERGY PLANTATIONS OF WOODY PLANTS IN THE REGION OF ÉSZAK-ALFÖLD

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Abstract: Due to the decrease in the quantity of traditional energy sources, in the future an alternative energy production should be sought which provides minimum environmental burden and offers an opportunity to generate energy. The use of biomass provides another option to resolve this problem. The most important features of the biomass are that the quantity doesn't decrease during conversions and are reproduced by natural processes. The main raw materials of the biomass are considered to be the energy plantations, which are economic in areas where the farmer, during the traditional production, can't or with difficulties can cover the expenses, so that profitably sustainable cultivation branches can come to the forefront with less material and energy input. Those cases in which the cultivation of agricultural areas are not economically feasible, there is a possible utilization in our country which is the installation of plantations with energetic aim.

Introduction

In agriculture, when designing the production structure such areas should be considered where the farmer, during the traditional production, can't or with difficulties can cover the expenses, so that profitably sustainable cultivation branches can come to the forefront with less material and energy input. Those cases in which the cultivation of agricultural areas are not economically feasible, there is a possible utilization in our country which is the installation of plantations with energetic aim. As *Table 1* shows, energy plantations can be one of the bases of the producing alternative energy.

Table 1: Main energy feedstock

Serial number	Denomination	Example
1.	Biomass from woodfarming	Woodwaste
2.	Energyplants	Locust, poplar, willow
3.	Farmplants grown for energy production	Energygrass
4.	The production for energy making of production plants grown presently for food and feed	Cereals, corn, rapeseed, potato
5.	Basic materials categorized as by-products at present	Cornstalk, straw
6.	Basic materials categorized as waste at present	Waste of slaughterhouse

Source: Tar et al., 2005

It can be read in several agricultural studies (*Erdős – Klenczner, 2000; Gergely, 2000a; Gergely, 2000b; Marosvöl-gyi, 2004; Erdős, 2007;Kohlheb et al., 2008*) that in the near future, the agricultural strategy doesn't count with sufficient expanse of energy plantation as a possibility for alternative plot usage. One reason for this is that on the low-quality areas with unfavorable relief conditions and tillages producing loss – compared to the rest of the tillage cultures – the farmers do not prefer to set up plantations with high demand for labour. The second group of reasons is that the major proportion of farmers consider the tasks of the agriculture to serve food production, the result and the income cannot be manifested yearly due to the longer production cycle and because of the little information the farmers averse from the wood production. In contrast, a study by *Sulyok – Megyes (2005)* shows that when setting up the plantations a critical point is the profit. Besides the subsidies provided by the European Union, the existence of the state supports would be also important for the investments. This would be necessary because most of the landowners are deterred by the fact that in the first 3–5 years – depending on the variety of species – only expenses occur and this can only partly be counteracted by support for plantations provided by the Union.

The importance of energy tree plantation

The energy tree plantations are plantations with energetic aim set up on fields of agricultural cultivation and fallow areas which provide energetically usable dendromass

quickly and in large amount, and in addition to timber production they also serve rational land use. The energy plantations of woody plant with short cutting cycle (for example: energy locust, energy poplar, energy willow) have to be separated from the conventional forests since these are considered arable crops such as corn, wheat, barley and turnsole. The ecological demand of woody vegetation differs significantly from the agricultural plant cultivation's. While the rotation time used by the agricultural field-work is one year, regarding the woody energy plantations with short cutting cycle, the shortest rotational period is from two up to four or five years.

The most important of the basic requirements regarding the energy plantations is that the tree originated from high-yield species should be as cheap as possible (*Rénes, 2008*), its moisture content and bark proportion should be low; it should be available under any circumstances and in proper time; on a long term – 10-15 years – it can be signed on with the lowest risk. So in the course of setting up energy plantations we aim to provide facilities to produce primary energy from unit area as cheap as possible.

According to the categorisation of the plantations we can distinguish two major groups. One of the categories is based on the cutting cycle by which we discern one, two and several years old tree plantations. Another method of classifying is distinguishing the energy tree plantations by installation. On this basis we separate species liable to sprouting and which can be resettled.

The installation of sprouting plantations – compared to the replanting method – uses well sprouting species with larger amount of plant stems (13–15 thousand). Because of the great number of stems, the first cutting happens at the age of 1–3 year. The cut-off plantation resprouts without applying any kind of exterior intervention then after 1–3 years it can be recut. The exploitation can be repeated 5–7 times since the plantation does not lose its ability to grow quickly and to sprout for 15–20 years. In the case of these plantations well budding, high-yielding tree species are beneficial to use. Choosing the tree species depends on the soil quality and water supply. The European Union has set up a method of calculation by which on those areas where the wheat crop can not permanently achieve four tonnes per hectare, and for the exploitation of the produced wood – dendromass – a relevant market is available, it is expedient and more economical to establish energy plantation (*Marosvölgyi – Ivelics, 2004*).

During the replanting procedure – compared to the previous technology – the plantations are set up with the traditional technology, but with a greater number of stems than normally – 5–8 thousand stems – and at the age of 8–15 years they are produced with clearcutting. After the last cut, soil preparation is carried out on the cut area then replanting takes place. Any tree species can be used for installation. Its disadvantage is, however, that the cost of the propagating material is relatively expensive, it is necessary to make a full soil preparation after every harvest, it is difficult to mechanize and has high demand for labour. The resulting end product will be more expensive in comparison to the other technology. So far it has mainly got accustomed in private farms where the aim is to satisfy their own needs. It can be used both on flat and hilly areas. Based on the calculations of *Bai* and his colleagues (2002) we can count with 8-15 tonnes of yield per hectare yearly and approximately 80-150 GJ/ha/year energy.

In our country the most suitable tree species for installing energy tree plantations are the poplar, the willow and the locust.

Among these, specialist consider the locust the most expedient one as it grows fast at young age, its moisture content is low, its budding ability is efficient and it can be used well as fuel even when wet. Besides these, its excellent attributes are that in the first years it grows remarkably quickly, sprouts well, it is resistant to pests and has only a few parasites, it buds well both from tree stump and root, it is a tree species which can be exploited within 4–5 years, it burns well crudely, without drying, it has high calorific value and the offspring generation after the first exploitation will be more than twice as much as the original stock.

It likes the medium dense, sandy, warm soil with sufficient humus content, but grows well in semi-dry, fresh and semi-moist areas too. For the installation saplings are used and put into the soil by sapling planters. The favorable period for plantation is autumn, but spring is also suitable for it.

In the so-called offspring mode 5–7 cuts can be planned. It is important that there is no restocking expense and multiplied yield can be achieved.

Besides the locust the poplar has great importance too (*Hoogeveen et al., 2004*). The species of poplar demands light, warmth, soil air and water. In our country the thermal and light conditions are sufficient to achieve the expected yields. It is important that the topsoil must be at least 80 cms thick but it can be a little bit shallower if the area is under good water management and nutrient replacement is ensured. On drier areas – this is the typical – the thicker topsoil helps a lot to endure the droughty periods in summer also as tender nursing and proper supplementation of nutrients. During the developmental period the plantation is able to cope with short-term floods, nonetheless in areas which lack water desolation is inevitable.

Hungary's soil types and yielding sites are favorable for the agricultural production. However, on the so-called inland water areas – in the region of the rivers Tisza, Körös, Szamos and Bodrog – due to the yearly floods there is no possibility for traditional cultivation. On these areas almost all kinds of „energy willows" can be cultivated effectively *(Szente, 2007)*. The areas in the floodplains of the rivers which are currently utilized by arable cultivation play a major role in the production of energy plants. The production values of these sites are usually outstanding, huge yields can be achieved (*Kondor, 2007*) as the willow prefers the periodic floods among other territorial conditions. However, it is necessary to pay attention during harvest so that they can be cropped without any problem. Regarding the conditions of floodplains it is important that the one or two years old

plantations – with very short rotating cycle – should be proposed only in limited extent. In contrast to the locust and the poplar, it can beneficial that a lot of cultivated plants can only be produced in limited quantity in the EU based on restrictions so far. However, the energy willow – and the other plants belonging to its category – can be cultivated with support and without limitation. What shows the importance of the willows is that Robertson proved the possibility of producing energy from willow plantations in 1984 (*Robertson – Khalil, 1984*). He marked it beneficial that it is easily propagated by cuttings, resprouts quickly after harvest, in rotation for two-three years it gains high yield over several generations without replanting.

Based on the comparative table – *Table 2* – it can be seen that the woody energy plantations with short cutting cycle assure 120-440 GJ energy yield per hectare yearly.

Table 2: Yields and characteristic data of woody energy plants in Hungary

Wood species	Energy content MJ/kg	Average yield kg/ha/year	Enegy output GJ/ha/year	Moisture content %	Cutting cycle year
Locust	14,8	7900	117	15	3
Poplar	15,1	20000	302	15	2
Willow	14,8	30000	444	15	3

Source: Marosvölgyi, 1998; Bai, 1999; Bai et al., 2002; Marosvölgyi – Ivelics, 2004; Defra, 2007

The yields for specific moisture content are usually given in tonnes/ha/year units. We can only count with a low yield at the first harvest because after the planting, the plants devote almost all their energy into root training. At the following harvest, the yield will significantly increase since the plants can raise more offsprings because of the sprouting.

However, in general we can say that on sandy, relatively dry areas locust can be envisaged, which grows fast, but has a low yield, 5–15t/ha/year. The poplar may bring 13–35 tonnes of tree yield on fresh crop lands per hectare annually. In contrast, on wet, especially floodplain areas, the willows are rather the best because it can produce 30–35 tonnes quantity per hectare annually.

The examination of the profitability of energetics tree plantations

In this chapter, I would like to demonstrate the profitability of the previously described energy plantations. My calculations were prepared for a six-year time interval, because I aimed to compare the tillage crops with these cultures further on.

When calculating the profit contribution, the production value and the production costs must be defined. During the calculation the production values and the changing expenses must be determined for a production period regardless of the calendar year. This period includes the so-called dead period which elapses because of the climatic or technological reasons between two consecutive production periods. In plant production the length of the production period is mostly one year, except for plantation-like production, where a period can even be 20–25 years.

Defining the production values, I took into consideration the realistically achieved yield values, the received support sources and the other incomes. During the designing process, I paid much attention to give accurate estimates to single cultures since the profit contribution can show large differences in case of small-scale estimation mistakes of the planned production value. I defined the yield values based on the product of the crop quantity multiplied by the sales price. I took into account the support levels defined by the current law, and the contracted and estimated prices in marketing. Thus when defining the subsidies I counted with the values of the TOP-UP national complementary and SAPS area-based support. For this source of aid for farmers dealing with growing energy plants may provide further assistance. The calculation of the production values were followed by the calculation of changing expenses, which were difficult to determine because in this category you can't rely safely on statistical data and the databases are also deficient. Textbooks, research institutes and planning aids play important roles. Defining varying expenses mean those costs which can be modified by the change of the size of the sections. I counted with material expenses, personal expenses, the supplementary sector services and with other direct expenses as well. The material expenses, seed-corn expense, cutting expense, chemical fertilizer and pesticide expenses were accounted. The personal expenses were assignable to single sections. Among the supplementary sector service costs, the cost of fuel, maintenance and repair costs got accentuated emphasis. According to one of the studies of Pfau – Széles (2001) regarding the expenses of the maintenance and the repair, we can count with 60–70% material cost, 25–30% a personal cost and 10–15% overhead expenses. In that case if we would like to decide which activities carried out by an agricultural enterprise are considered to be competitive on the terms of profitability, then the value of the profit contribution should be calculated. The values of the planned profit contribution are shown in *Table 3*. When calculating the values of the profit contribution of the energy plants, we should consider that the harvests are not performed every year. In the case of the energy plantations, in those years where the harvest is done I counted with positive profit contribution and in every other occasion I counted with negative. Of course there are exceptions. Since I calculated every year with the amount of the subsidy, in some years, I have received positive profit contribution values when there was no harvest. I calculated 3 years with the locust's and Swedish willow's and 2 years with the poplar's harvesting cycle. I have prepared the multi-annual calculation by defining the value of the profit contribution of the first year and from the second year I used 5 percent income growth and 4 percent cost increase. At the given year the basis of the profit contribution were determined by the data of the expense and income of the previous year.

Table 3: Profit contribution value of energy orchards for one hectare in the examined years

Unit: Ft/ha

Year/Orchard	Locust	Poplar	Willow
Year 1	- 505 335	- 423 674	- 531 170
Year 2	672	134 224	- 2 154
Year 3	352 995	- 184 635	503 738
Year 4	- 160 380	232 401	- 152 955
Year 5	24 745	- 184 635	24 745
Year 5	403 243	232 401	604 233

Source: Own creation

If we make the arable energy plantations compete in a 6 year interval in terms of the maximum profit contribution, than the Swedish willow would get to the first place (*Figure 1*).

Examining the six years, we would reach 446 thousand forint of profit contribution with the Swedish willow while 115 thousand with the locust. Compared to those, the poplar plantations would only be able to produce loss even after reaching the age for cutting. This means that considering six-year period beside the usage of the given resources and applied plantation technology and the installation of the energy poplar would be lossmaking even with subsidy. This is the main reason why the production structures – unlike the other plants – are not considered competitive.

Because of the region's conditions these values are valid only for the totality of examined economies of Észak-Alföld's region, it is not possible to deduce the inferences on national level.

The examination of the competitiveness of energetics tree plantations

I wish to represent the competitiveness of the energy tree plantations compared to tillage plants'. For my calculations I used a multi-periodic linear programming model. For the database of the linear programming I developed unified cultivation technologies, which are based on the data of 16 crop cultivating company which I examined in the Észak-Alföld region. Based on these, I have developed sample technologies of 100 hectares using the help of Microsoft Excel.
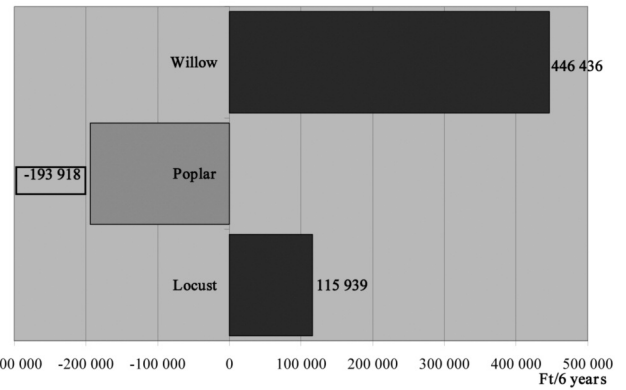
Figure 1: A maximum gross margin in the certain woodplants by the end of the 6th year can reach
Source: Own creation

Table 4: Basic scheme of multiperiodical linear programming model

Source: Own creation

V_p	: Plant production variable n=1,2…,k	BC_{omw} : Balance condition for own mechanic work
V_{ep}	: Energy plant variable n=1,2…,k	BC_{mw} : Balance condition for mechanic work
W_{tp}	: Time period work (working hour)	T_P : Transfer condition for plants n=1,2…,k
W_m	: Machinery work (work hour)	OF : Objective function
T	: Transfer variable	S : Solution
H_{sp}	: Specific cost of hirework	PS : Production system (100ha)
H_v	: Volume of hirework (work hour)	R : Relation (=;<=;>=)
PR	: Power resources	CV : Capacity vector
P	: Plants	A_{lt} : Amount of land territory (100ha)
B_{CfT}	: Balance condition for territory	A_m : Amount of manpower (working hour)
B_{CfC}	: Balance condition for croprotation	A_{ow} : Amount of own work (working hour)
B_{CfM}	: Balance condition for manpower	A_{mw} : Amount of machinery work (working hour)

In the basic scheme of the model I have named the signs of the parameters in the following way:

■ negative sign

▫ negative and positive sign

▨ positive sign

Source: Own creation

After setting up the raw data, it was time to model the sowing structure, which I have done with a multi-periodic linear programming model. The models of the matrix for each year of the production construction are located in the diagonal of the model. The stripping of the technologies is detailed monthly. The interval of the study is six years, which was induced by the more accurate modeling of the perennial energy plantations. The linear programming model involves 60 variables and 160 balance conditions. I built the model of the linear programming with Microsoft Excel. The theoretical structure is shown in *Table 4*.

Of course in the line of the solution – the production structure and the quantity of the lease work– we may only obtain positive values as the negative production structure cannot be defined.

Among the arable crops I chose the wheat, the corn, the turnsole and winter colza because these plants are currently regarded as energetic raw materials that can be produced in large quantity in the agriculture of our country. Whereas among woody energy plantations I chose the earlier presented locust, poplar and Swedish willow.

In the case of the tillage plants, I defined the values of the profit contribution based on the data of 16 agricultural companies, as I prepared sample technologies for the single sections. The applied values of profit contribution used at the tillage plants are shown in *Table 5*. I counted by defining the value of the profit contribution of the first year and from the second year I used 5 percent income growth and 4 percent cost increase. At the given year the basis of the profit contribution were determined by the data of the expense and income of the previous year.

Table 5: Profit contribution value of arable crops for one hectare in the examined years

Unit: Ft/ha

Year/Plant	Corn	Turnsole	Winter wheat	Rape
Year 1	147 811	87 906	128 026	125 147
Year 2	149 289	88 785	129 306	126 398
Year 3	150 782	89 673	130 599	127 662
Year 4	152 290	90 570	131 905	128 939
Year 5	153 813	91 475	133 224	130 228
Year 5	155 351	92 390	134 557	131 531

Source: Own creation
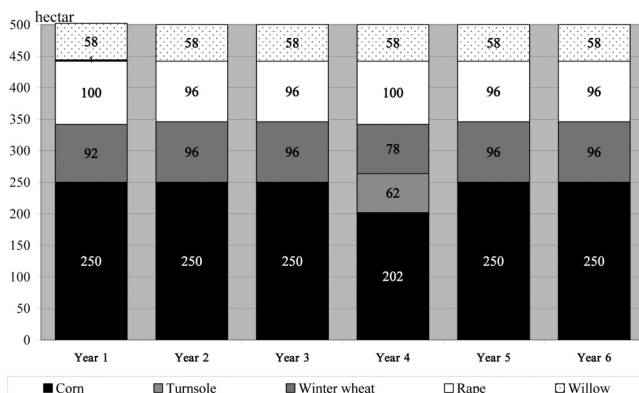
Figure 2: Az alap modell futtatása után kialakult termelési szerkezet 6 évre
Source: Own creation

After building and running the basic model and analyzing the shade prices I prepared three variants: I have modified the profit contributions of the basic model, first the turnsole's, second time the locust's, then the poplar's.

After solving the basic model I received the following production structure for the next six years (*Figure 2*).

The maximum profit contribution which can be achieved by the running of the basic model can approximately be 388 million forint counting with 500 hectares and six years. In the production structure the corn has an unambiguous superiority against the other crops in the six-year period study. The corn took a 100% advantage of the maximum available 250 hectare area every year. The fourth year was an exception, when its sowing area decreased by 48 hectares and the turnsole got into its place with 62 hectares. The winter corn and winter colza stood in second and third place with 92–96 hectares. The minimum area had been submitted to the Swedish willow, with its 58-hectare area.

Table 1: The summarized table of variable cells for the first year's sensitivity analysis of the linear programming model (100ha)

Name	Area under cultivation 100 hectar	Shadow price of the activity eFt/100 hectar	Objective function value eFt/100ha	Lower limit	Upper limit
Corn year 1	2,50		14781,1	12556,5	14781,1
Turnsole year 1		-3501,94	8790,6	....	12292,6
Winter wheat year 1	0,92		12802,6	9300,6	13413,7
Rape year 1	1,00		12514,7	11903,6	12514,7
Locust year 1			-50533,5	....	-18016,6
Poplar year 1			-42367,4	....	21074,4
Willow year 1	0,58		-53117,0	-85633,9	-32361,1

Source: Own creation

The turnsole, the locust and the poplar did not get into the production structure. Analyzing the basic model's production structure (*Table 6*) we can see that the turnsole, the locust and the poplar did not get into it. We must analyze the values of profit contribution if we want these crops to be competitive against other field crops. The sensitivity analysis table for variable cells provides us assistance for this. From this table we can read out the shadow prices, marginal costs of the activities. It gives the information about why an activity did not get into the production structure and when it can get into the optimal solution. Besides, it shows that how much the coefficient of an activity's objective function must be increased in order to get into the production structure without the decrease of the objective function's value.

I summarized the table of sensitivity analysis for variable cells in the first year in *Table 6*. It can be seen that the turnsole didn't get in the production structure with its 87.906 forint profit contribution per hectare. If the value of the profit contribution of turnsole would increase from 87.906 forint to 122.926 (*Table 7*), then the maximum use of the existing resources with 100 hectares the Swedish willow would get in the production structure at the expense of the winter wheat and colza (*Figure 3*). Due to this, the role of the willow in the production structure would change.

It can be set out, that the locust and the poplar still didn't get into the production structure.

In the case if we want the locust to get in the production
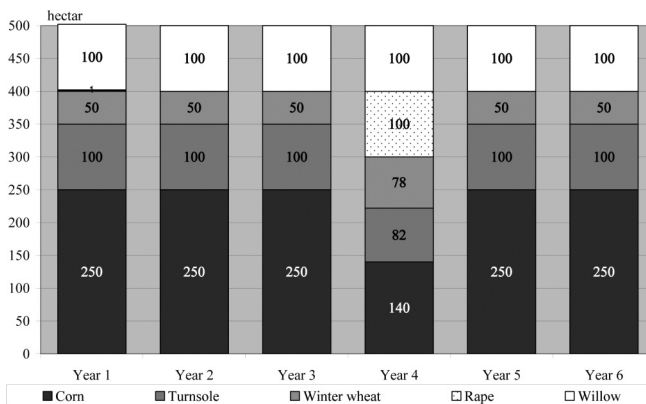
Figure 3: The production system for 6 years counted by the value of the minimal threshold price of the raised coefficient of the objective function of the sunflower
Source: Own creation

structure instead of the turnsole, then the value of the profit contribution for the first year of the locust should be increased from -505.335 forint to -180.166. I have defined this value by that the value of the profit contribution of the base model of the locust was 505.335 forint for 100 hectare and the corresponding increase in allowable value is 325.160 forint. The coefficient of the objective function and the allowable increase must be summed in order to get this value, so in this way we got -180.166 forint per 100 hectares. The lower profit contribution value was determined in this way and the locust would be competitive with other arable crops under these conditions.

However, in the current economics there is no opportunity for the growth of the locust's profit contribution, since the cost of the locust's cutting for one hectare is approximately 288.000 forint. Further costs are the handling, cultivation, material and other cost elements. But in case of this reduce would happen somehow than compared to the basic model the locust and the willow would get into the production structure with 34 and 24 hectares (*Figure 4*).

Returning to the production structure of the basic model we can note that the poplar is not competitive either with

Figure 4: The production system for 6 years counted by the value of the minimal threshold price of the raised coefficient of the objective function of the locust
Source: Own creation

given profit contribution besides the other arable crops. The reason for this is that the whole six-year period has negative balance in the given economics. The profit contribution of the poplar should be a positive value even in the first year in the model (210.744 Ft/ha) so that it can get into the production. Regarding the features of the agriculture it can not occur as the installation of the plantations demands great investment.

However, assuming that the poplar can somehow reach the value of the minimal marginal cost, then besides the poplar's area of 34 hectares the Swedish willow can also integrate into the proposed crop structure (*Figure 5*). The expanse of the areas of other plants in the crop structure is paralleled with the values of the basic model.
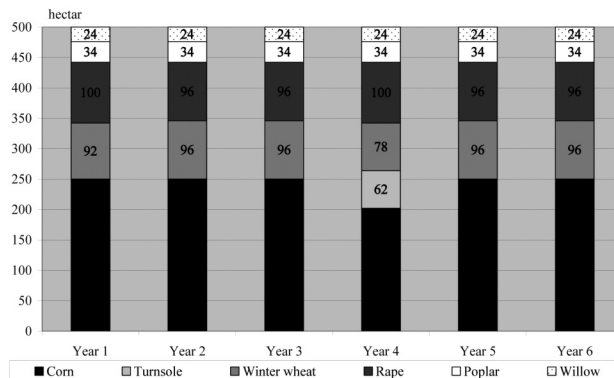
Figure 5: The production system for 6 years counted by the value of the minimal threshold price of the raised coefficient of the objective function of the poplar
Source: Own creation

Result and discussion

The reason why I believe it is important to demonstrate the renewable energy sources is that regarding the estimations of the year 2009, the humanity has used up as much fossil energy sources within a year as the Earth produces within a million years. However, based on the evaluation there will be no global energy crisis in the forecoming years.

During my research I have examined the profitability of the stock of the biomass – the energy tree plantations. Concluding, among the three types of energy plantations based on profit contribution the most competitive is considered to be the Swedish willow. This is followed by the locust with a lower value of profit contribution. Regarding the race condition the worst is turned out to be the poplar since examining the 6-year-old interval this plantation is considered lossmaking (193 thousand forint loss within six years).

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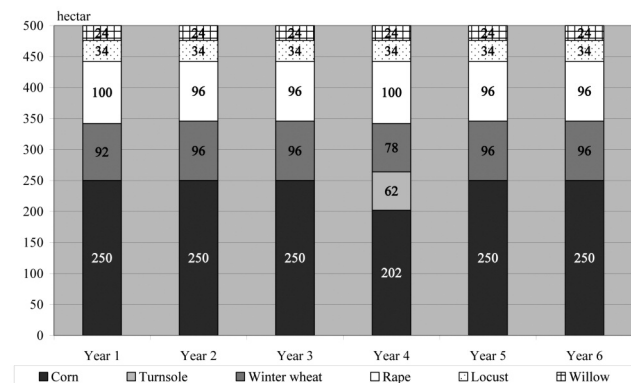
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RELATIONSHIPS BETWEEN COMPETITIVENESS IN THE NORTHERN GREAT PLAIN AND THE ORGANISATIONAL CULTURE OF LOCAL AUTHORITIES

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Abstract: One of the five basic factors in the Lengyel-type pyramid model – institutions and social capital – is essential in the economic growth of the region. Economic success however, does not only depend on participants in the economy, but on social factors such as the roles played by local authorities, including their functions, operation and organisational culture, all of which are crucial factors.

Based on the results obtained regarding organisational culture it can be stated that performance orientation, dominant motivation based on calculated risk, forward planning and regular feedback are expected values at local authorities in all three counties. All local authorities emphasise the importance of the need for forecasting. Respondents find it important that organisations encourage and reward individual action and contributions as expected values. The degree of human orientation expected by local authorities reflects the fact that respect for colleagues and attention to their well-being should be at the highest level. Reinforcing these organisational culture values (dimensions) is the basis for the efficient and successful operation of organisations (local authorities).

The study examines the organisational culture of local authorities in the Northern Great Plain, looking for any relationships it might have with the competitiveness of the region. This study is an element of the wider research into organisational culture. We used the GLOBE (Global Leadership and Organisational Behaviour Effectiveness) survey, which had been successfully applied in the research programme *In Competition with the World* at the Corvinus University of Budapest. Koopman, Den Hartog, Konrad et al. (1999) examined the culture variables of 21 European countries in organisations. Based on Hungarian and international literature it can be stated that a similar survey of local authorities has not yet been conducted.

Introduction

The North Great Plain region is the only region with an increasing population but still with one of the most disadvantaged economic and infrastructural conditions in Hungary; therefore improving its competitiveness is essential.

During our research we assumed that the quality of governance i.e. the organisational culture of local authorities plays a decisive role in enhancing the competitiveness of the region.

Imre Lengyel created the pyramid model in 2003 to model the competitiveness of regions. He separated the measurement of competitiveness and factors influencing competitiveness. He used three economic categories to measure competitiveness, with indicators determining the competitiveness of the region.
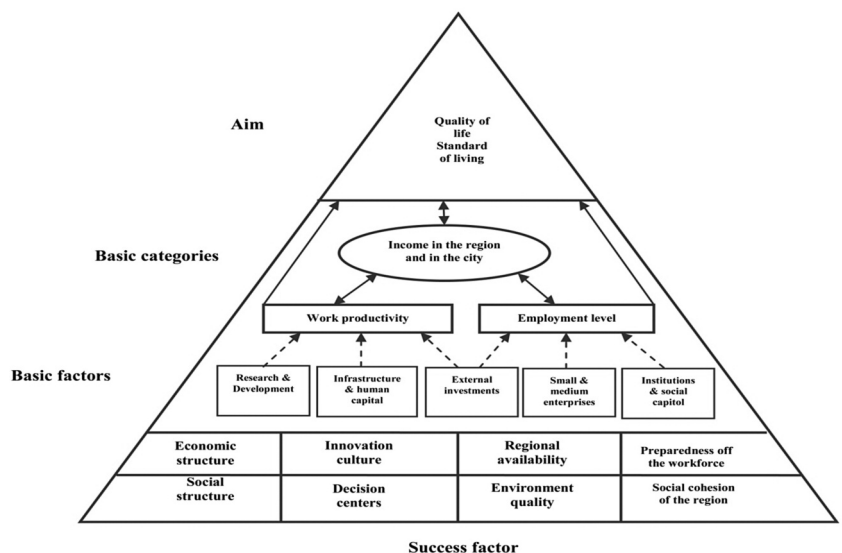
Figure 1: Pyramid-type model by Lengyel
(Source: Lengyel, 2003)

Lengyel classified factors affecting competitiveness into two main categories: basic factors and success factors. Basic factors are those that could be consciously developed to improve the competitiveness of the region, while success factors are those that indirectly influence basic factors. One of the 5 basic factors of the model – *institutions and social capital* – is fundamental in the economic growth of the regions. Economic success however, does not only depend on economic participants but is also determined by such social factors as the quality of local authorities. The presence of companies with decision competency is also important from among the 8 success factors, in addition to government and official centres i.e. administrative and other institutional functions. Possible influencing factors determining the competitiveness of the region can be deduced from the analysis of the Lengyel-type pyramid. The model of our research objectives is illustrated in Figure 2.

Northern Great Plain region

The North Great Plain region, hereinafter the Region, is located in the north-eastern part of Hungary, sharing a border with Slovakia, the Ukraine and Romania. Its total area is 17,729 km^2, and it makes up 19.1% of the country and has 15.3% of the population, i.e. 1.56 million people live here *(HCSO, 2009)*. Table 1. clearly illustrates that it is the second largest and most populous region in the country.

The Region is made up of Hajdú-Bihar, Szabolcs-Szatmár-Bereg and Jász-Nagykun-Szolnok counties. The geographical profile of the Region is dominated by the Great Hungarian Plain; agriculture therefore plays a significant role in the life of the Region, contributing 11% to the GDP value of the region, which is twice the national average (HCSO, 2009).

The migration loss of the Northern Great Plain Region is the highest among the planning-statistical regions, namely because migration is very intensive from the village areas to the more urbanised areas. Migrants are much younger in age than the national average but life expectancy at birth is almost 6 months less than the national average (HCSO, 2008). There were 25 children (aged 0–18) for every 100 adults (aged 18–65) in Hungary in 2005 according to the annual release of the HCSO, while there were 28 children for every 100 adults

Figure 2: Research model
Source: based on the dimensions of Lengyel's model (2003)
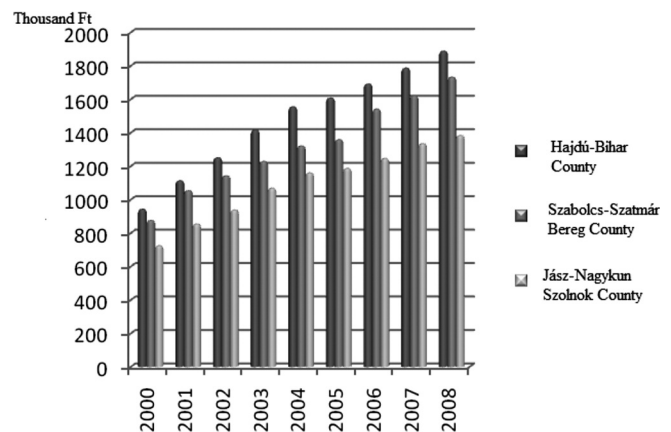
Figure 3: Gross domestic product per capita 2000–2008
(Source: TÁMOP, regional survey, 2011)

in the Region, and the absolute number of children was the highest after Central Hungary (Budapest and Pest County) in 2005 (407,763, and 273,873 children) (HCSO TSTAR, 2011). The domestic product per capita shows the economic situation of the region, illustrated in Figure 3.

The domestic product per capita is highest in Hajdú-Bihar County, and lowest in Szabolcs-Szatmár Bereg County where this value was 27% lower than in Hajdú-Bihar County in 2008. This also proves the widening economic gap. (TÁMOP, regional survey, 2011)

Table 1: Characteristics of the regions in figures

Regionm	Area (km^2)	Population	Population density (capita/km^2)	Counties of the region
Northern Hungary	13,433	1,209,142	90.0	Borsod-Abaúj-Zemplén, Heves, Nógrád
Northern Great Plain	**17,729**	**1,492,502**	**84.2**	**Hajdú-Bihar, Jász-Nagykun-Szolnok, Szabolcs-Szatmár-Bereg**
Southern Great Plain	18,337	1,318,214	71.9	Bács-Kiskun, Békés, Csongrád
Central Hungary	6,916	2,951,436	426.8	Pest County and the capital Budapest
Central Transdanubia	11,116	1,098,654	98.8	Komárom-Esztergom, Fejér, Veszprém
Western Transdanubia	11,328	996,390	88.0	Győr-Moson-Sopron, Vas, Zala
Southern Transdanubia	11,169	947,986	66.9	Baranya, Somogy, Tolna

(Source: HCSO, 2008)

Table 2: Number of enterprises in the region in 2008

Regions	Small enterprise	Medium size enterprise	Large enterprise	Total
Central Hungary	275,034	2,208	427	277,669
Central Transdanubia	70,814	461	127	71,402
Western Transdanubia	68,845	505	108	69,455
Southern Transdanubia	59,395	385	43	59,823
Northern Hungary	60,599	415	76	61,090
Northern Great Plain	**80,477**	**603**	**89**	**81,169**
Southern Great Plain	80,118	580	84	80,782
Total	695,279	5,157	954	701,390

(Source: HCSO TSTAR, 2011)

The economic performance of regions is influenced by the size and development of the system of economic organisation. One of the quantitative indicators of the system is the number of enterprises operating in the region (Table 2). The table clearly shows that in 2008 close to 15% of enterprises operating in Hungary were located in the Region. Business activity shows significant differences between smaller regions. Values higher than the regional average were only present in those small regions which included county towns. More than half of the registered enterprises are concentrated in these small regions. The two ends of the scale in terms of business activity are represented by the small regions of Nyíregyháza and Hajdúhadház. The number of registered enterprises per thousand people in the former is three times that of the latter. 35% of registered enterprises in the Northern Great Plain Region were founded as joint companies. The distribution of businesses according to sectors – almost identical to the national situation – shows that 14% of companies are in the construction industry. However, those in agriculture had a 12% share, which is 5% higher than the national average (HCSO, 2008).

Only 44.1% of the population capable of work can be considered as economically active in the Region compared to the national figure of 53.5%. The employment structure of Szabolcs-Szatmár-Bereg County shows a highly unfavourable picture, as people living in small villages in outlying areas are struggling with long term unemployment problems (ÉAR SP: 2007–2013, 2011). The primary reason for unemployment in many areas is not the change in economic structure but the limited opportunities for commuting and therefore the loss of workplaces for people who reside in these areas but work in other locations. The number of pensioners can be regarded as average; however, this is the result of two different counter-balancing effects. One is the low ratio of elderly pensioners due to the relatively young age of the population; the other is the number of disabled pensioners which is the highest here (ÉAR SP: 2007–2013, 2011).

Low employment and high unemployment can affect the income of residents. Considering data for 2007, income per individual tax payer is about 15% lower than that of the national average. The disadvantage of the Northern Great Plain is more remarkable considering the tax base per permanent resident, which makes up three-quarters of the national average with a high degree of deviation according to region. The relative disadvantage of the Northern Great Plain compared to the data for 2001 and the difference among the areas of the region has reduced somewhat (highlighted data of ÉAK, 2008).

The unemployment rate in the Region increased sharply from 9.2% in 2000 to 14.5% in 2010. The unemployment rate in Szabolcs-Szatmár-Bereg County reached 18.4%, which was the highest among the counties of the Region (Figure 4).
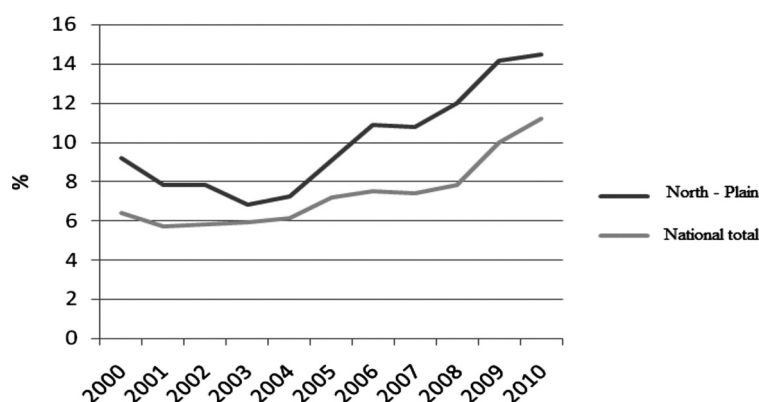
Figure 4: Rate of unemployment in the Northern Great Plain region between 2000 and 2010
(Source: National Employment Service)

Hajdú-Bihar County

The county is located in the centre of the Region; the county seat is Debrecen, which is the cultural and economic centre of the region. Hajdú-Bihar, considering both its size and population, is the fourth largest county in the country. The present day Hajdú-Bihar County was formed relatively recently, as its current administrative framework was created during the county settlement of 1950.

The county is made up of three different geographical units with different geographical and historical development: Debrecen, Hajdúság and Bihar. The religious affiliation of the population shows a varied picture due to this different historical development. The life of the county's residents was primarily influenced by the presence of the Protestant church. This was also reinforced by the fact that the Protestant leadership of towns in the Hajdúság banned the settlement of Catholics living under Turkish subjection until the decree by Maria Theresa, and their disused churches were taken over by Protestant congregations.

The autonomy of the municipalities and the Calvinist faith were inseparable, not only here but also in the Kunság, the reason for this being that the social and economic ideology of Calvinism was better suited to the autonomous population which had just started its civic development at this time (Szakály, 1995; Beluszky, 2001). The Baptist denomination has expanded significantly in the recent period, and there are others which have been a part of the Region's history, although they represent smaller groups, such as the Jewish community and evangelicals.

Farms are typical of the Hajdúság: primarily in Hajdúböszörmény and Hajdúnánás, but their traces can be identified in the settlement structure of Debrecen, too. This settlement pattern developed in the early 17th century and became common by the 18th century. The use of areas under farmland changed in the second half of the 18th and early 19th century due to the spread of the farmstead settlement-farmland system. Barns operating as farms moved to farmsteads, so their functions ceased to exist. Houses were built on farms and civic farmers relocated here to larger estates and the typical country town settlement structure (houses in closed lines in parallel with the axis of the street) was established in the 19th century (Beluszky, 2001).

Debrecen itself followed a unique path: it was the richest of the country towns in the 16–17th centuries; its borders and outer areas were predominantly pasture (primarily the Hortobágy), so large-scale animal husbandry provided the foundation for agricultural production here. The city was led by merchants and retailers. The economic importance of Debrecen was also supported by its ideal location, as it is located on the border of Nyírség, Hajdúság and Hortobágy, in the so-called *pantry of the Nyírség,* which was spared from floods and had a commercial activity expanding to distant regions (Frisnyák, 1995).

Regarding Debrecen, it is also important to mention that although it is called *the capital of Hajdúság,* it was never a Hajdú-town and it is not located in the Hajdúság, but rather on the border. Its economic importance grew further after Trianon, as Oradea became part of Romania. Prior to this however, Debrecen had not really been able to develop, given the overpowering economic and cultural advantage of Oradea. A university was founded in the city in 1912, strengthening its role as a cultural centre within the Region (Frisnyák, 1995).

The Bihar part of the present day Hajdú-Bihar County is made up of Nagy-Sárrét. The Sárrét areas (Kis- and Nagy-Sárrét), although they are plain type areas, are not considered part of the Plains in the locals' *mental map* (the map imagined by people living here, which is not necessarily the same as those created by cartographers) according to Beluszky (2001). A parallel can be drawn with areas such as Bodrogköz, Tiszahát in Bereg, Szatmár, Rétköz, Taktaköz, Érmellék, or even a larger part of the Nyírség (especially prior to the rehabilitation), but also Sárköz in Tolna – which is in the Transdanubian part of the Plains – as they were left out of the region's wider development termed the (development) *path of the Plains* by István Márkus (Márkus, 1986). Country towns were not established here and the structure of large villages remained, which is typical, for

example, in the Hajdúság, leaving the isolated nature and relatively low population of villages unaffected. These areas were isolated from each other by muddy meadows, swamps, marshlands, dead channels and brooks where there were – and still are – floodplains covered with water for most of the year.

Cattle were also kept outdoors during the winter in the Sárrét areas, but the Turkish invaders were unable to enforce their power in areas protected by swamps, and the marshland provided a refuge for locals. Most villages in the Sárrét were unharmed during the Turkish era, nor did villages become lost and deserted, as large empty areas and the hydrographic features of the landscape would not have made this possible either. Homesteads were only established around settlements that received large estates following the drainage of the marshlands and could consequently acquire the typical characteristics of the country towns of the Great Plains (such as Berettyóújfalu, Biharnagybajom, Földes, Komádi, Püspökladány) (Frisnyák, 1995).

Geographical differences increased in the second half of the 20th century and affected the economy as well: agricultural co-operatives became widespread and the estate structure of country towns was taken over by large coope-ratives (e.g. the Vörös Csillag – *Red Star* – Co-operative in Nádudvar). Co-operatives in the Bihari areas however, were smaller and were not established in some areas due to the resistance of farmers (Beluszky, 2001).

To sum up, Hajdú-Bihar County is made up of many geographical and cultural landscape units, including the Nyírség in the north of the county and the geographically attached Hajdúság, Hortobágy, and Nagy-Sárrét in the southern area of the county and part of the Kis-Sárrét and Kőrös-area. The geographical difference is present in the settlement structure and the differences in farming as well: large estates in the north but small, proportionate properties, and villages with small populations in the southern areas of the county. Industry is typically concentrated in Debrecen and dates back to the early modern period in this region, which was further strengthened by the years of socialist planning (Frisnyák, 1995). Hajdú-Bihar County is the centre of the Northern Great Plain Region considering its population and economy. Debrecen is dominant as it is the economic and cultural centre of not only the Northern Great Plain region but the entire area east of the river Tisza. The nature of the settlements of the county adapt to the small geographical regions: in the dry but expansive Hajdúság, small towns and large villages, with large populations in the Hajdú-Bihar part of the Nyírség, while in the Sárrét the settlements are small with fragmented estates. This difference has widened since the 1950's when large agricultural cooperatives were established in the north along with smaller ones in the south, while some were left out of this process.

Szabolcs-Szatmár-Bereg County

Szabolcs-Szatmár-Bereg is the most eastern county of Hungary with its county seat in Nyíregyháza. Szabolcs-Szatmár-Bereg occupies 6.4% of the country making it the

sixth largest county. The county became a border county as a result of major historic and political decisions. The area is bordered by three countries – Romania in the east, the Ukraine in the north-east and Slovakia in the north. The county occupies the most eastern part of the Hungarian Plain and it is not a unified area from a geographical point of view.

The past of the county dates back to prehistoric periods, when settlement also began in these areas. The natural environment at that time was characterised by large forests and water, with marshlands, swamps and islands with the typical fauna of these areas (Frisnyák, 1995). Parts of three historical counties made up the backbone of the present day county during the foundation of the state and were significantly expanded. It was often disturbed by wars (involving the Pechenegs, Cumans, Mongols and Turks) and also suffered greatly during the World Wars. Civic development began among a population living in poor conditions and oppressed by internal conflicts and wars. It is important to mention the families which came from different national groups such as the Lónyay, Báthori, Kállay, and Várdai. The Bathorys provided princes for Transylvania several times, but the Kállay family also frequently played a role in shaping national politics.

The current area of the county took shape in 1930, when Szabolcs, Ung, Szatmár, Bereg and Ugocsa counties were unified and certain parts of the county were attached to Szabolcs-Szatmár, or as it is presently called, Szabolcs-Szatmár-Bereg County, from former administrative areas (HCSO, 2009b).

Szabolcs-Szatmár-Bereg is in the best situation compared to other counties of the region regarding its natural population development (ÉAR SP: 2007–2013, 2011). Natural population growth in this area always exceeded mortality and the national average. Children make up 21% of the population, the working-age population 62% while those over the age of 60 represent 17%. Kisvárda-Záhony, Nyírbátor and Tiszavasvár are microregions with a younger than average population.

The majority of the county is made up of small areas that were almost completely inaccessible floodlands prior to the Tisza-regulation and the drainage of expansive swamps (primarily the Ecsed-swamp). Although settlements in this region escaped the Turkish invasion, they suffered a great deal of damage. Country towns were not established here and there are no homesteads, but the settlement network is denser than in the Hajdúság, or Kis- and Nagykunság, with an intact traditional settlement structure and rural conditions (Beluszky, 2001).

Szabolcs had been part of the historical county until the 1870's, although it is true that it had already been an autonomous area from 1669. The Hajdú-district, made up of the so-called *old Hajdú towns* including (Hajdú)Böszörmény, (Hajdú)Nánás, (Hajdú)Szoboszló, (Hajdú)Hadház, (Hajdú)Dorog and Vámospércs (which belonged to Bihar historical county) followed a unique development course from the end of the Middle Ages but especially during the Turkish wars compared to other parts of the county. Areas bounded by the Tisza and its tributaries, especially Rétköz, are very similar to the Sárrét both regarding fauna and settlement structure. The village structure is made up of small- and moderately large villages, the ratio of homesteads and outer areas is insignificant, most of the population living on fields were cottagers, and feudal ties were maintained longer than in the country town region. Ibrány and Nagyhalász are the two settlements in the county that received large estates following the drainage of land, similarly to Komád or Püspökladány, so their population could also grow (Beluszky, 2001).

Szabolcs was one of the counties that remained intact in Hungary following the Treaty of Trianon in 1920 while two-fifths of Szatmár and only one-sixth of Bereg County was left as part of the country. Those areas of the two historical counties which were not surrendered and remained within the borders of the country had identical features regarding their geographical, settlement geography and ethnic conditions to the historical county of Szabolcs, so there were not many significant changes. Both the population of Nyírség and the Szatmár-Bereg plains still reside here in settlements with a size ranging from 1,000 to 5,000 inhabitants, although in smaller numbers than between the two World Wars (Frisnyák, 1995). The process of establishing cooperatives was more successful in the more densely populated areas of the Nyírség, but less successful in less densely populated and hydrologically divided areas of Szatmár and Bereg.

Szabolcs-Szatmár-Bereg County has good geographical conditions as it borders three neighbouring countries; its infrastructure however is less developed despite the significant development of recent years, which also limits labour market opportunties. It has the densest settlement network within the Northern Great Plain Region and is middle-ranking regarding its population, which means that medium- and small-sized settlements dominate in the county, especially in the Rétközben and the Szatmár-Beregi plains.

Jász-Nagykun-Szolnok County

The county is located in the centre of Eastern-Hungary divided by the Tisza river, with a county seat in Szolnok. The surface of Jász-Nagykun-Szolnok County is a perfect plain and its climate has extreme features. Compared to the two above mentioned counties Jász-Nagykun-Szolnok can be regarded as an unequivocally *plain* county, at least considering its settlement structure and farming, unlike Hajdú-Bihar or Szabolcs-Szatmár-Bereg with areas (primarily *meadows*) where the plain type farming and settlement structure is less typical (Beluszky, 2001).

The history of Jász-Nagykun-Szolnok County can be divided into two main periods. From 895, for about a thousand years, different and changing management units were present which sometimes operated in parallel or overlapped each other due to unique historical circumstances. Finally in 1876, with the establishment of

Jász-Nagykun-Szolnok County, the framework was created which still exists today without major modifications. Szolnok County was established during the second half of Saint Stephen's reign (between 1018 and 1038). It was divided into two large, unattached, areas in the 13th century; a Tisza- and a Transylvanian part. The devastation by the Mongols affected the regional units of the county differently. Many people were able to find refuge in the swamps of the Tisza, Zagyva and Körös; however the population of Jászság and Nagykunság was almost entirely wiped out. The largest county settlement was Mezőtúr, with about 2500–2700 residents, followed by Szolnok, Tiszavarsány, Jászberény and Fegyvernek. Buda was split into three parts with the Turkish occupation in 1541. The county, along with a third of the Hungarian state, came under Turkish rule. Szolnok was occupied by the Imperial army in the autumn of 1685, Turkish rule ceased and missing elements of the county system were gradually reorganised. Heves and Külső-Szolnok were attached to the district of Pest in 1785 along with the district of Jászkun. The Tisza district was separated from Heves County on January 21st 1850 and was awarded commissioner status; then, a year later it was organised into a county with the districts of Szolnok and Törökszentmiklós. Szolnok became a county seat and a city with an organised council.

Nagykunság and the Jászság functioned as a district within Jászkun. The reform of civil administration was implemented in several stages following the political conciliation. The Jász-Nagykun-Szolnok historical county was established with the unification of Jászság, Nagykunság, and the vicinity of the Tisza below Tiszasüly, and Tiszaderzsin in Heves County and Jánoshida in Pest County followed in the XXXIII rearrangement of 1876 by the municipality. The county assembly led by the lord lieutenant, Miklós Kiss, declared the establishment of Jász-Nagykun-Szolnok County at the Scheftsik Garden on September 4th 1876.

Currently, there are 78 settlements in the county with 20 enjoying city status. The population of the county has been decreasing continuously since 1980, which can be explained by a high mortality and low birth rate.

The population of the county has an ageing demographic structure (with 22.5% over 60, and 15.5% under 14), and the ageing index has increased from 88% to 107.1%. Settlements with a young age structure are located in the central part of the county and the Nagykunság. The proportion of the Roma ethnic groups is 8% of the total population (HCSO TSTAR, 2010).

The main regions of the county are Nagykunság, Felső-Kiskunság and Jászság which are primarily folklore and historic type regions. Geographically it belongs to the Central-Tisza Region (Nagykunság), the North Great Plain alluvial fan-plain (Jászság) and the Hátság between the Danube and Tisza (Felső-Kiskunság) (Beluszky, 2001).

The distinction of historic-folklore areas is difficult, with vague and uncertain borders, and the basis of their identities has primarily been determined by religious beliefs: the Kuns are Protestant and the Jász people are Catholic. The Kuns and Jász people settled in the 13th century, their settlement being significantly larger than present day Kis- and Nagykunság. Their integration into the country (feudal ownership, dependancy conditions, adoption of Christianity) however, was problematic and lasted until the end of the 14th century, but this newly formed and fragile feudal structure was destroyed by the Turkish wars (Beluszky, 2001).

The Jász people and Kuns practiced grazing management in animal husbandry and lived in a loose clan structure. Livestock was always kept outdoors in the fields, and the pastures, full of constantly moving large herds of cattle, could not be incorporated into the traditional feudal property structure, which was established within a century of the founding of the state in Transdanubia, and so communities took control of their animals. As there was no need to cultivate pastures and because guarding and shepherding livestock (primarily cows and sheep) could not be performed continuously, the farm work was organised by the community itself. Consequently, country towns became the typical settlements of the county with several thousand inhabitants especially in the Kunság area.

Inhabitants of the Kis- and Nagykunság lived almost entirely in country towns following the Turkish wars and on closely connected homesteads from the 18th century. Six settlements (Karcag, Madaras, Kunhegyes, Kisújszállás, Túrkeve, Kunszentmárton) were rebuilt, along with the villages in the close vicinity. Settlement structure was dense in the smaller Jászság, typically with large villages; only Jászberény, (Jász)Apáti and (Jász)Árokszállás became country towns, but farming in Jászság villages was similar to country towns (Beluszky, 2001).

The tax census on households in 1720 revealed that Jászberény was the third largest city in the Plains preceded only by Debrecen and Kecskemét (with 644 households). Jászapáti ranked in the top twenty (placed 19th), Jászárok-szállás 29th, Mezőtúr 22nd, Poroszló 23rd, Tiszafüred 26th and Karcag 30th among the settlements of the Nagykunság. Szolnok only th ranked 101st at this time (Beluszky, 2001). These data clearly show that country towns and villages with similar settlement structures and large population size are typical settlement types of present day Jász-Nagykun-Szolnok, possessing a relatively strong autonomy. The foundations of the independence and the strong, partly ethnic-religious identity in the county are rooted here. Jász-Nagykun-Szolnok could be regarded as the most geographically unified county from a settlement point of view in the Northern Great Plain region and even in the entire Plains. The country town tradition and a relatively low-density settlement network resulted in a strong awareness of identity.

Local authorities do not present a unified picture regarding population size, nor in terms of geographical location, having typical county characteristics.

Research method

Culture research, which is part of this study, was carried out at local authorities of the Northern Great Plain Region with the application of quantitative and qualitative methods.

Survey based research was carried out as a quantitative method, using the GLOBE (Global Leadership and Organisational Behaviour Effectiveness) survey. Originally, the GLOBE survey was applied in the framework of an international research project into management organisations in over 60 countries. The GLOBE survey was first used to examine local authorities in this study. The survey contains 265 questions, classified into seven groups. The first group covers current organisational culture, the second is about leadership behaviour, the third desired organisational culture, the fourth also covers leadership behaviour, the fifth is about the current- and the sixth the desired social culture, and the seventh question block contains demographic questions. The evaluation of the survey is done on a seven-point Likert-scale, which provides an opportunity for respondents to give a nuanced opinion, but it is still focused enough to make a real choice. Each respondent has to give an opinion about a statement in the organisational and social culture block according to the extent to which they agree.

Questionnaries in this research were completed by the middle managers of local authorities in the Northern Great Plain Region. The total sample included 193 middle managers, with the participation of 24 local authorities in Hajdú-Bihar, Szabolcs-Szatmár-Bereg and Jász-Nagykun-Szolnok counties. The study focused on research into organisational culture dimensions at local authorities.

Organisational culture surveys at local authorities

Table 3. shows how the counties examined assess the current situation of the organisation. Opinions differed widely in Jász-Nagykun-Szolnok as average points were below sample averages, so the specific characteristic was more typical in their case than in the other two counties. People in Jász-Nagykun-Szolnok are pushier, loyalty to the group is important to the leaders, more female leaders would increase efficiency and people do not talk about disagreements.

Table 4. was designed to examine current differences among local authorities according to counties.

The presence of prudence and planning or the fact that people are impudent, tough, aggressive and dominant are relatively less typical at organisations in Hajdú-Bihar. A relatively larger proportion of leaders are female, and they develop relatively better than men.

Table 3: Observed values of the organisational culture of local authorities according to counties

Question	County			Total
	Hajdú-Bihar	**Szabolcs-Szatmár-Bereg**	**Jász-Nagykun-Szolnok**	
People are impudent	4.79	4.68	**3.60**	4.48
Loyalty to the group is important to the leader	3.60	3.53	**3.04**	3.45
People care about each other	3.37	3.72	**3.04**	3.39
Group members are proud of the results of their leaders	3.35	3.55	**2.89**	3.30
The reward system maximizes interests	4.03	4.30	**3.78**	4.05
Innovation aimed at improving performance is well rewarded	4.53	4.98	**3.64**	4.45
Leaders increase their social distance	4.23	4.55	**3.78**	4.21
Group cohesion is more important than self-interest	3.79	3.91	**3.00**	3.64
More female leaders would increase efficiency	4.14	4.26	**3.67**	4.06
People do not talk about disagreements	4.48	4.23	**3.62**	4.21

(Source: own survey)

Table 4: Differences among the values of the organisational culture of local authorities according to counties

Main component	County			Significance
	Hajdú-Bihar	**Szabolcs-Szatmár-Bereg**	**Jász-Nagykun-Szolnok**	
Prudence, planning, objectives	**0.229**	0.162	-0.664	0.000
Dominance, impudence	**0.214**	0.115	-0.603	0.000
Development of men-women	**0.181**	-0.070	-0.271	0.035
Consistency, loyalty	0.078	0.111	-0.321	0.050
Reward system	-0.008	**0.227**	-0.267	0.050
Pride, work performance	0.033	-0.252	**0.232**	0.050

(Source: own survey)

People in Jász-Nagykun-Szolnok are relatively less proud to work there and physically demanding tasks are not always done by men; however, prudence, planning, impudence, agression and dominance along with loyalty and consistency are also present. A lower proportion of leaders are women, men develop better and the basis of reward is not only efficient performance. The basis of the reward system is primarily the efficient performance in Szabolcs-Szatmár-Bereg, and prudence, planning, impudence, agression and dominance are relatively less typical, similarly to Hajdú-Bihar County.

In our opinion, these results can be explained by historic, economic and cultural differences among the specific counties, which are primarily now present in economic differences.

Future development of organisational affairs is shown in Table 5. This shows different features in specific counties.

Table 5: Evaluation of expected results of local authority organisational culture

Question (essentially)	County			Total
	Hajdú-Bihar	**Szabolcs-Szatmár-Bereg**	**Jász-Nagykun-Szolnok**	
Performance incentives are applied	**2.06**	2.51	2.11	2.20
The basis of rewards is efficent performance	**1.65**	1.94	2.07	1.83
Leaders are proud of members' results	**1.90**	2.34	2.29	2.12
The basis of influence is ability	**1.99**	2.47	2.07	2.14
People care about each other	2.37	**2.23**	2.47	2.35
Expectations and rules are clearly defined	2.11	**1.91**	2.38	2.11
Meetings are planned 2 weeks prior	2.48	2.08	**1.98**	2.25
The path to success is planning	2.05	2.32	**1.84**	2.08
Planning for the future is an accepted norm	2.38	2.53	**2.04**	2.34
Physical work is carried out by men	2.23	2.26	**1.91**	2.17
More leaders would improve efficiency	4.06	4.09	**3.22**	3.87

(Source: own survey)

Employees of organisations in Hajdú-Bihar would like ability to be the basis for future influence, loyalty to group should be more important to leaders and leaders should be prouder of members' results. This derives from the fact that a strong noble hierarchy was typical in this county in local administration until the Second World War.

Employees in Szabolcs-Szatmár-Bereg would aspire to have more care for people, to have clear expectations and guidelines and to achieve group cohesion over self-interest. The historic-economic explanation is the different estate structure of settlements, which is strengthened by the fact that three historical counties (Szabolcs, Szatmár and Bereg) with different economic traditions were unified into one local administration unit following the Second World War.

Forward planning should be typical for the organisation in Jász-Nagykun-Szolnok, demanding work should be done

by men and more leading women could increase efficiency. The explanation for this lies in the traditional patriarchal views in the region, which requires a separation of male and female roles, but at the same time acknowledges that female leaders have increasingly efficient roles in certain areas.

The evaluation of the main components enables us to form an idea about the future assessment of the organisation. Table 6. illustrates the future situation of organisational affairs according to counties.

Respondents in Szabolcs-Szatmár-Bereg and Jász-Nagykun-Szolnok counties believe that not only should efficient work provide the basis for rewards but people should also care more for each other, should be receptive to others and failure by men should be considered worse and men should develop better than women. The explanation lies in the surviving patriarchal order and the fragmented small estate system in both counties. The opposite is true in Hajdú-Bihar, although its historic background shares many similarities with the two other counties. Hajdú-Bihar is the centre of the region from a cultural point of view and its approach in this regard is more marked than the other two counties. Leaders in Szabolcs-Szatmár-Bereg believe that people should be less concerned about the current crisis, the reward system should maximise mutual interests, unconditional obedience should be less of an expectation and fewer female leaders would increase efficiency. People in Jász-Nagykun-Szolnok have opposing views, while respondents gave points in accordance with the sample average. Respondents in Hajdú-Bihar believe that people should be relatively less impudent, while in Jász-Nagykun-Szolnok the opposite view is held. This could be due to the competitive situation of the two economically disadvantaged counties. Rank and position should have less privileges according to leaders in Hajdú-Bihar and Szabolcs-Szatmár-Bereg counties and in cases of disagreement it is relatively less important whether employees comply. Respondents in all counties agreed that important decisions should be made by leaders but a relatively higher average score was given for this question in Hajdú-Bihar County, which implies that this is less important for them. Rank and position should have less privileges in Jász-Nagykun-Szolnok and important decisions should be made by leaders. This orginates from the patriarchal social structure. Dominance should be less of an objective in Hajdú-Bihar; better performance should encouraged while detailed instructions are relatively less important compared to the method by which objectives are achieved. Contrary to this, respondents in the other two counties believe that the leader should be a man

Table 6: Desirable directions of local authority organisational cultures

Main component	County			Significance
	Hajdú-Bihar	**Szabolcs-Szatmár-Bereg**	**Jász-Nagykun-Szolnok**	
Human care, achieved results	-0.211	**0.157**	**0.266**	0.013
Reward system and efficiency	-0.061	**0.298**	-0.293	0.009
Human impudence, aggression	**0.183**	0.076	-0.438	0.002
Rank and position, leadership decisions	**0.108**	**0.101**	-0.296	0.050
Male-female difference and dominance	**0.214**	-0.205	-0.177	0.018
Assessment of the organisation, errors	**0.230**	-0.216	-0.165	0.011

(The positive value indicates that the factor should be less typical.) (Source: own survey)
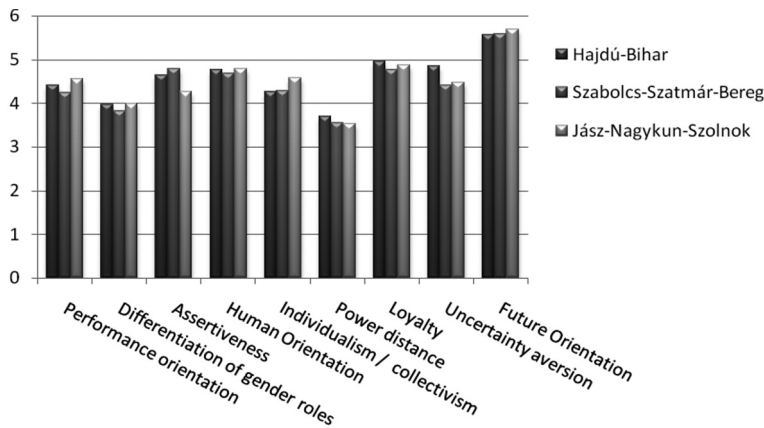
Figure 5: Observed values of local authority organisational culture for specific counties *(Source: own survey)*
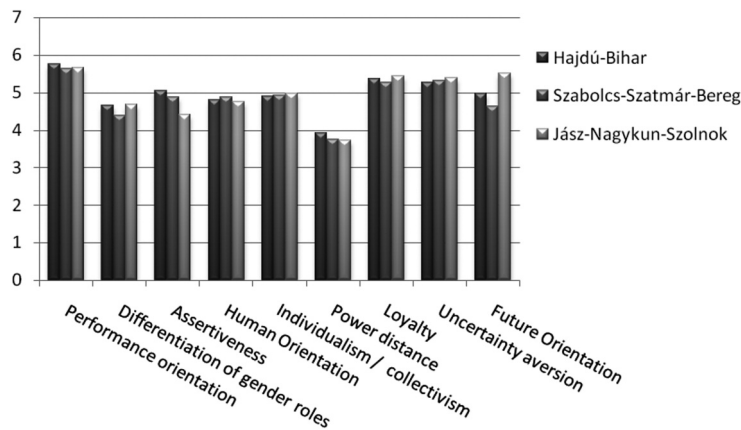
Figure 6: Variables of expected culture at the organisational level according to counties (Source: o*wn s*urvey)

and people should strive for dominance and should give detailed instructions for achieveing objectives. Opinions differ about the evaluation of the organisation as well. Respondents believe that people should be more concerned about how others judge the organisation and should be less permissive regarding people's faults.

The observed values of the organisational culture (Figure 5) in the three counties emphasise their future orientation.

The reason for this lies in the current economic situation and the increasingly competitive sector. The power distance and avoidance of uncertainty is of low value. There is also loyalty and human orientation in the organisation at present. The future cannot be planned without team work and cooperation. The significance of impudence lies in future orientation and the definition of objectives in general; assertiveness is unavoidable in the case of an organisation that concentrates on the future and seeks its opportunities there.

Performance orientation and assertiveness, as well as power distance are desired in the the future in Hajdú-Bihar County (Figure). Respondents would like to strengthen human orientation in relative terms in Szabolcs-Szatmár-Bereg. Compared to the other two counties respondents in Jász-Nagykun-Szolnok are inclined to want more differentiation between gender roles, individualism/collectivism, loyalty, avoidance of uncertainty and future orientation, along with performance orientation.

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RELATIONSHIP BETWEEN THE QUALIFICATION AND LABOUR MARKET SITUATION OF DISABLED WORKERS IN HUNGARY

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Abstract: My PhD research focuses on special rehabilitation firms (they are specialised to employ disabled people) and their employees. Two questionnaires for the above mentioned firms and their employees were created in order to gather information on their activities as well as to explore the relationship between the firms and their employees. Altogether 1030 employees and 109 employers filled in the questionnaires. The current study shows the results of this survey. It can be stated that this paper shows the risk of finding a workplace after a certain time period. According to the latest trends I analyse the labour market situation of people living with disabilities with survival analysis. The survival analysis is able to manage partial information, as well. After summarizing all claims of participants we can make an impression in this area and demonstrate the problems for the labour market generally. I use the Log-rank, Breslow and Tahane-Ware probe..

Introduction

Nowadays the growing rate of economically inactive population is a considerable problem in Hungary. Rural development has become more and more important issue in Hungary since rural areas also contribute to the efficiency of the national economy (Kárpáti et al., 2010). There were radical changes in the economy as well as in the labour market in the 1990's. The rate of employment and activity was the lowest between 1996 – 1997. After that in the consequence of the economic boom it was growing till 2000. Between 2000 and 2007 it showed stagnation, including some short temporary growing periods (I1).

There are two main ways to determine the degree of disability. 'People living with disabilities' can be arranged in two groups considering that the incapacity is a congenital malformation – this means an infiltration into the labour market with disability – or an impaired health status caused by a medical emergency or an accident – this means the person had worked in the labour market without disability and later he had to cope with the changed situation according to his impaired health.

Dramatic differences in labour market outcomes are observed on the basis of disability (Acemoglu and Angrist, 2001 and DeLeire, 2000 cited by Jones 2005). In the UK, for example, the current employment rate is just 32.8% for the disabled, compared to a rate of 80.3% for the non-disabled. In addition, the size of the disabled group has grown and their labour market outcomes have deteriorated over the past twenty years (Bound and Burkhauser, 1999 and Bell and Smith, 2004 cited by Jones 2005). Their low rates of partici-

pation raise concerns about the presence of employer discrimination and social exclusion of the disabled (Burchardt, 2003 cited by Jones 2005) and the implications of high rates of social security benefit claimants on public spending (McVicar, 2004 cited by Jones 2005).

Let us analyse the definition of disability. Any study of disability faces problems in defining those in the sample who have a 'disability', since it is not a clearly defined condition. A number of studies have drawn upon the distinction made by the World Health Organisation between disability, impairment and handicap, whereby:

- Impairment is defined as a psychological, anatomical or mental loss, or other abnormality (e.g. blindness, mental retardedness, loss of hearing, diabetes, heart disease, asthma, colour blindness, difficulty in lifting heavy objects or climbing stairs);
- Disability is any restriction on or lack of ability (resulting from an impairment) to perform an activity (e.g. work) in the manner or within the range considered normal;
- Handicap is a disadvantage resulting from an impairment or disability.

The disabled are more likely to be absent from work due to sickness and length of absence is likely to be longer in their case. The able-bodied on average have higher educational qualifications than the disabled, but shorter labour market experience and slightly lower tenure with the current employer, reflecting the association of disability with age (Kidd et al., 2000).

Generally speaking it would be better for the Hungarian economy to employ disabled people because the number of

inactive population could be lower and the state wouldn't have to provide them with supplies. According to the Hungarian Law, if there is not possible to give job to these people, support has to be provided them by the state (I2).

The situation of people living with disabilities is very special on the labour market. Their participation on labour market is very limited (Pfahl et al., 2010). In Hungary – according to the international trends – vocational rehabilitation and workmen's compensation are provided by the state (Kálmán et al., 2002). The disability is no more considered for one person but for some activities (Münnich, 2007). The holistic, ecological approach becomes more and more trendy (Pordán, 2007), that circumstances and the abilities of people living with disabilities have to be harmonized (Münnich, 2006). The problem is that these people don't have the right to make a decision on their job, too (Bass, 2008) although they are in the practice stable, precise and are capable of hard work (Holló, 2007).

Materials and Methods

In this stage of the research, results have been reached so far are presented. The research focuses on special rehabilitation firms and their employees (they are specialised to employ disabled people). Two questionnaires for the above mentioned firms and their employees were created in order to gather information on their activities as well as to explore the relationship between the firms and their employees. Altogether 1030 employees and 109 firms filled in the questionnaires. The second questionnaire focused on special rehabilitation firms. The current study shows the results of these surveys.

Results and discussion

I work with the survival analysis because I want to demonstrate how much risk a disabled person has in finding or not finding a workplace after a certain time period. The examined event is finding a workplace after being qualified as disabled; the survival time is the number of months within they find a workplace. Using the survival analysis we can analyse partial information as well. In the survival analysis people with partial information are called 'censored cases' (Kovács – Béri, 2007). In my survey some people didn't give the beginning date of their labour relation, so they probably didn't find a job until the time of the survey. This time period is partial information, because they can find a workplace later, so this can happen later after this survey. To estimate the survival curve I use the analysis of Kaplan-Meier (1958), which is adaptable in cases of discrete values (number of months). "The Kaplan – Meier curves of the survival functions are stepped functions. To compare two Kaplan – Meier curves we analyse the distance between the curves. The vertical distance shows the differences between the survival rates of the different groups at that moment.

Analysing the horizontal distances we can see how much time it needs to be the survival rates equal in the different groups" (Kovács – Béri 2006). Analysing the two groups the horizontal distance shows how longer it takes for a certain per cent of people in the first group to find a job compared to a certain per cent of people in the second group. The vertical distance shows the ratio of people finding a job within a certain time period in the two groups. Groups can be created in many ways, for example: by qualification, age, impaired health status, etc. I use the Log-rank, Breslow and Tahane-Ware probe to analyse the difference between the two groups' survival function. Data processing was performed by SPSS for Windows 15.0.

The above mentioned tests are very similar, but they are different as they handle the survival times, the methods weight survival times differently. The Breslow test takes into account with greater weight the earlier forthcoming occurrences, the shorter survival times. The Log – Rank test takes into account each survival time with the same weight, while the Tarona – Ware test gives a mean solution. The Log – Rank test is the most efficient if the survival tests have an exponential or Weibull distribution and censored cases can be found only randomly. The test is very sensible to the later differences between the survival times. The Breslow test is the most effective if the survival times have lognormal distribution and less effective if we have a lot of censored cases. In my survey I accepted the difference as significant if at least two tests showed differences between the groups.

Table 1: Estimated main statistics after survival curves by qualification

Qualification	Mean	Standard deviation	Coefficient of variation	Median	Lower bound of the conf. interval	Upper bound of the conf. interval
Primary	45.20	6.69	14.80	12	8.70	15.30
Elementary	39.33	3.62	9.20	12	8.94	15.06
Secondary	44.17	2.74	6.21	24	19.66	28.34
College graduated	48.03	8.12	16.91	13	5.65	20.35
Full sample	42.55	2.04	4.80	18	15.76	20.24

Source: own research, 2011

The average time between being qualified as disabled and finding a job is the shortest in case of elementary qualified people, the highest is in case of college graduated people. In case of primary and elementary graduated people the deviation of the survival times is under 10 per cent, so the subsamples are homogeneous according to the survival times, there are no extreme variations by the other subsamples. The highest deviation can be found in the case of college graduated people.

As regards the full sample, it can be stated that people with different qualifications can find a job within 42,5 month in the average. The medians of the survival times shows, when disabled people can find a workplace in the certain

qualification category with 50 per cent chance. According to the full sample half of the people found a job within 18 months, the other half didn't find a job even after 1,5 years. The median is the highest in case of people with secondary education, 50 per cent of this group didn't find a job within even 2 years. In case of 50 per cent of people with the lowest qualification the time between being qualified as disabled and finding a workplace is between 8 and 15 months; the largest range can be found in case of college graduated people. Half of the college graduated people found a job within 6–20 months. For people with secondary education we found the highest value for the lower and upper bounds of the median. This means that they can find a workplace with 50 per cent chance just within 20 and 28 months. To sum up the results it can be stated that people with lowest qualification level find a job with 50 per cent chance earlier from the time of being qualified as disabled and the average time of finding a work place is shorter, too. The bounds of the confidence interval of the estimation of the median are lower, and the length of the interval is narrower, as well.
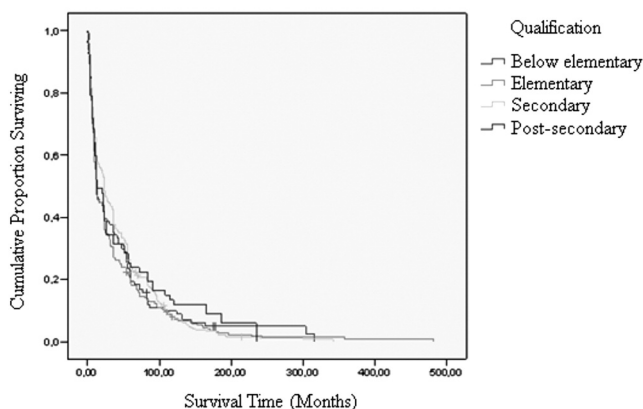
Figure 1: Survival curves by qualification
Source: own research, 2011

Consequences

I worked with the survival analysis because I wanted to demonstrate how much risk a disabled person has in finding or not finding a workplace after a certain time period. The examined event was finding a workplace after being qualified as disabled; the survival time is the number of months within they find a workplace. Using this method we can analyse partial information as well. I analised the full sample regarding this questions. As regards the full sample, it can be stated that people with different qualifications can find a job within 42,5 month in the average. The medians of the survival times shows, when disabled people can find a workplace in the certain qualification category with 50 per cent chance. According to the full sample half of the people found a job within 18 months, the other half didn't find a job even after 1,5 years. The median is the highest in case of people with secondary education, 50 per cent of this group didn't find a job within even 2 years.

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ANALYSIS OF THE PRODUCER PRICE OF HUNGARIAN RAW MILK IN INTERNATIONAL COMPARISON

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Abstract: Although the dairy market crisis eased in 2011, Hungarian dairy farmers still find it difficult to produce milk profitably. As a result of the crisis, many dairy farmers abandoned milk production or reduced the size of their dairy herds in 2009 and 2010. Today, many of farmers are also considering ceasing production, in spite of the fact that the global dairy industry is facing an upturn.

A dairy farm can operate profitablyy in three ways: 1) if it can reach a relatively high level of producer price 2) if it can increase milk production per cow 3) if it can achieve a relatively low cost of production. In the present study, I primarily analyse the development of the Hungarian producer price of raw milk in international comparison. Next, I list those factors which directly or indirectly influence the producer price of raw milk. Finally, I examine the relationship among disposable income, milk consumption and milk price.

Since the start of 2009, the dairy market has been confronted with a period of extraordinary law prices. After bottoming out, prices had begun to slowly stabilise during the second half of 2009. By the end of that summer, international prices had started to strengthen and the last quarter of 2009 was characterized by a steady rise in prices. The strong recovery in prices experienced after 2009 was triggered by increased demand, mainly from oil exporting countries, but also from China.

The price increase, however, reflected a significant increase in input costs in Hungary; the high level of feed prices and the unfavourable change in the macroeconomic environment must be stressed. The rising excise duty on diesel fuel and the VAT increase had a direct impact on Hungarian dairy farmers. These negative factors have increased the costs of the sector, narrowing the ability of those active in it to operate efficiently

Keywords: producer price of raw milk, influencing factors, disposable income, international comparison, Hungary

1. Introduction

For many dairy farmers and companies, 2009 was a remarkable year. The financial crisis in the global economy caused international demand for dairy produce to decline in late 2008 and had a dramatic impact on product prices during the first half of 2009. For the first time since the mid-Nineties, global consumption per capita declined. The financial crises had an impact on every aspect of the dairy business: production, trade, consumption and prices (Bulletin of the IDF, 2010). Nevertheless, the second half of 2009 and all of 2010 brought changes. World trade increased rather slowly during the first part of 2009, but showed a remarkable recovery during the second part. During the first half of 2010, prices recovered and, in addition, production also improved (Blaskó, 2011).

The number of the world's dairy cows is around 250 million head. More than two-thirds of all herds can be found in developing countries, although developed countries account for only one-third of total world milk production. The reason for this is the higher yields in developed countries (FAO-OECD, 2010).

On the basis of market assessments made by FAO-OECD (2011), world milk production was 701.4 million tonnes in 2009, reaching 713.6 million tonnes in 2010, and is estimated to grow by 2 per cent, to 730 million tonnes, in 2011. Production is forecast to increase by 2.7 per cent, to 750 million tonnes, in 2012. Much of the growth is likely to ensue in Asia, due to increasing consumer demand. In addition to the EU-27 The top ten milk producer countries of the world are India, the USA, China, Pakistan, the Russian Federation, Brazil, New Zealand, Turkey and Ukraine (Blaskó, 2011).

Global demand for liquid milk is expected to grow by about 30% in the coming decade. This means that the current 270 billion litres of annual global milk consumption will reach 350 billion litres by the end of the decade. However, this increase in consumption will be not detectable everywhere. It is estimated e.g. that in the United States and in the European Union, a slight decrease in milk consumption can be expected (TETRA PAK, 2011). In Europe, people will consume 2.5% less milk products in 2020, in comparison with the current 63 litres/capita/year average. On the other hand, the milk consumption of the Asia-Pacific region, is forecast to experience very high growth, at almost 45% (Szarvas, 2011). The average level of milk and milk product consumption is forecast to reach 103.1 kg/capita/year globally in 2011. As regards the consumption of developed countries, the average level is expected to approach 233.7 kg/capita/year, while in developing

countries, this figure is only 69.4 kg/capita/year (FAO-OECD, 2011).

The ratio of global trade of milk and milk products to production was 6 per cent, i.e. 44.3 million tonnes in 2009. This value increased to 47.8 million tonnes in 2010. In 2011, the amount of milk and milk products in international trade is estimated to reach 50.7 million tonnes, which represents 6.9 per cent of total milk production. In 2012, the trade share of total milk production is forecast to be 52.7 million tonnes. Purchases by Asian countries are anticipated to be moderately higher, with import demand being maintained or increasing in China, Indonesia, the Republic of Korea, the Philippines, Singapore and Thailand. Imports by Algeria and Egypt are also expected to grow substantially. On the export side, sales of dairy products are expected to increase in Argentina, Belarus, the EU, New Zealand and the United States (FAO-OECD. 2011).

The European Union is the largest contributor to world milk production, providing approximately 10% of the world's dairy cows, which means almost 25 million head. The EU-27 produced 153 million tonnes milk in 2010 and this figure is estimated to reach 157 million tonnes in 2011, which represents a 1% growth in production (FAO-OECD, 2011). France, Germany, the United Kingdom, Italy, Poland and the Netherlands give 67% of total milk production within the EU-27. Hungary, with its 1% contribution to EU-27 production, ranks 19th. Predictions for the milk production of the EU-27 are moderately optimistic. According to these predictions, milk production in the EU-27 will expand by approximately 4% until 2020, which will arise mainly from the so-called "old" Member States, from the EU-15 (Fórián, 2011).

The average liquid milk consumption in the EU-27 was 32.2 million tonnes and 64.5 kg/capita/year in 2009. These values show a 1.2% decrease in comparison with the year 2008. Within the EU-27, the top six consumers are Estonia, Ireland, Finland, the United Kingdom, Sweden and Denmark. As with liquid milk consumption, butter consumption also decreased in the EU-27 in 2009. Its average value was 1.7 million tonnes or 3.5 kg/capita /year. France, Germany, the Czech Republic, Austria, Poland and Estonia are at the top of butter consumption list. Cheese consumption of the EU-27 was almost 8.3 million tonnes in 2009 and this figure increased by almost 1% in comparison with 2008. Average per capita cheese consumption was 16.6 kg/capita/year. Greece, France, Germany, the Netherlands, Italy and Finland consumed cheese in the largest quantities.

The second major exporter of milk and milk products in the world is the EU-27, with 9.9 million tonnes, following New Zealand. The level of import is much lower the EU-27 imports 1.2 million tonnes of milk and milk products. Both in the export and import structures, cheese represents the highest proportion.

In the last two decades, the number of Hungarian dairy

cows declined from 630 thousand to 309 thousand animals. In the beginning of this process, the decreasing number of cow livestock was not perceptible in the amount of raw cow milk production, which was around 1.9–2.1 million tonnes. In the last years, the increasing yield per cow was not able to compensate for the decline in national milk production, thus Hungarian raw milk production has been continuously falling for ages. Currently, national milk production is 1 641 thousand tonnes (HCSO[1] Hungarian Central Statistical Office, 2011).

1987 was an outstanding year in per capita consumption, because Hungary then managed to approach the consumption level of Western European countries. Currently, the average level of milk and milk products consumption is about 145–165 kg/capita/year, which is only half of the average of the most developed European countries.

EU accession was defining in all aspects; it had significant impact on our foreign trade position (*Figure 1.*). After 2004, Hungary become a net importer of milk and milk products. Currently, Hungary primarily exports liquid milk to Italy, Romania and Slovenia, while milk products with higher added value are imported into Hungary from Germany, Poland, Slovakia and the Czech Republic. Our foreign trade balance is negative.
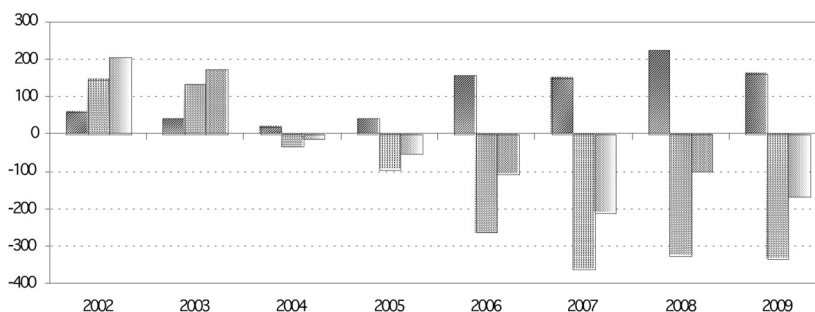
Figure 1: Foreign trade position of Hungary in the field of milk and milk products
Source: HCSO, 2011

2. Materials and methods

The general objective of the present study is to answer the following three questions:
- What is the development of the producer price of Hungarian raw milk in international comparison?
- What are the factors that directly or indirectly influence the evolution of raw milk price?
- What kind of relationship can be observed among disposable income, milk consumption and consumer milk price in Hungary?

To reach the above-mentioned objectives, I primarily used national (RIAE[2] Research Institute of Agricultural Economics, HCSO) and international (FAO, OECD, FAPRI, EUROSTAT, DG AGRI) databases. The major trends in time series prepared by the databases and relating to national and international producer prices of raw milk were analysed by

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[1] Hungarian Central Statistical Office
[2] Research Institute of Agricultural Economics

the application of chain- and base-ratios. By using the latest available references, I tried to explore the reasons behind the aforementioned major trends.

3. Results and discussion

3.1. Global, European Union and Hungarian price trends

Since the start of 2009, the dairy market was confronted with a period of extraordinarily low prices. The financial crisis in the world economy had a dramatic impact on product prices during the first half of the year 2009. After bottoming out, prices slowly stabilised during the second part of 2009. At the end of that summer, international prices started to strengthen. The strong recovery in prices was triggered by increases in demand, mainly from oil exporting countries, but also from China. The last quarter of 2009 was characterized by a steady rise in prices (Blaskó et al, 2011). The trend described above is illustrated by *Figure 2.*, which introduces the changes in the producer price of raw milk from year to year. *Figure 2.* demonstrates the change in milk producer price for the EU-27, the USA, New Zealand and Hungary. Ranking first, New Zealand provides almost half of the international trade of milk products; thus, the world market price of milk essentially depends on the milk production of New Zealand. The EU-27 is the second major exporter on the global milk market, followed by the USA. My objective is to compare the international changes with the changes in Hungarian milk price. The deepening crisis in the year 2009 can be investigated in the evolution of the producer price of raw milk, from which, regarding prices, the dairy sector managed to recover in 2010 (*Figure 2.*).

Figure 3. illustrates the evolution of the producer price of raw milk in the Member States of the EU-27. In accordance with *Figure 3.*, based on the Hungarian raw milk price, which is considered 100%, the EU-27 average is 15% higher than the Hungarian producer price. The most outstanding positive differences can be investigated in the cases of Cyprus (+71%), Malta (+62%), Finland (53%) and Greece (+50%), whereas lower levels of producer prices for raw milk can be experienced only in Romania (-9%), Lithuania (-8%), Poland (-7%) and Latvia (-4%), as compared to Hungary.

The Hungarian dairy market can be characterized by rising raw material prices. *Figure 4.* also illustrates that the price of raw milk after its bottoming out in 2009 – it was 54-55 HUF/kg – start to approach the peak of the year 2008,
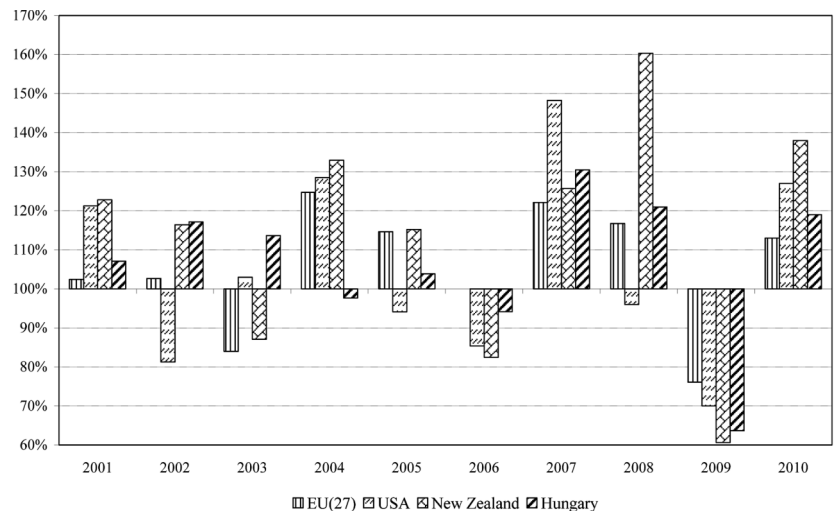
Figure 2: The changes in the producer price of raw milk in the world between 2001 and 2010 (previous year=100%)
Source: Own calculation on the basis of FAO-OECD, RIAE-MPIS[3] Research Institute of Agricultural Economics – Market Price Information System
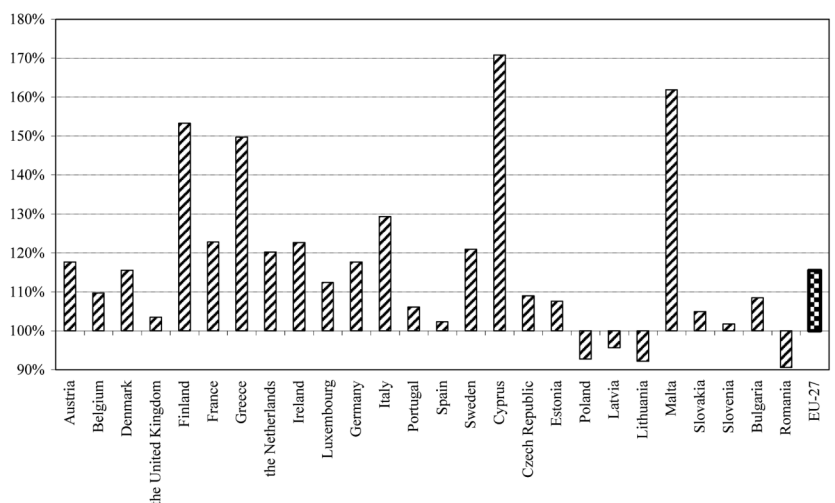
Figure 3: The evolution of the producer price of raw milk in the EU-27 Member States in September 2011 (Hungary=100%)
Source: Own calculation on the basis of RIAE database

when the price was above 94 HUF/kg. The reason for the high level of milk prices experienced in 2008 was that in the growing financial crisis, stock market transactions and other activities had an indirect impact on the agricultural sector, among others on the dairy sector. Thus, the dairy industry was not directly affected by the financial crisis, but the sluggish global economy in 2009 indirectly influenced the dairy sector in a negative way, which can be observed in *Figure 4.* In addition to the aforementioned stock market transactions, the financial crisis also had an impact on consumption and the decreasing demand directly influenced prices. In the background of the upward trend experienced after 2009 was the increase in EU prices and the devaluation of the Hungarian Forint. The price increase, however,

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[3] Research Institute of Agricultural Economics – Market Price Information System

Figure 4: The evolution of the average producer price of domestic raw milk between October 2007 and October 2011
Source: Own construction on the basis of RIAE-MPIS

reflected a significant increase in input costs; the high level of feed prices and the unfavourable change in the macroeconomic environment must be highlighted. The rising excise duty on diesel fuel and the VAT increase had direct impacts on the situation of Hungarian dairy farmers. The above-mentioned negative factors, which have increased the costs of the sector, narrowed the scope of the sector's stakeholders in conducting efficient operations.

The profitability of dairy plants decreased to a critical point, since the exports of raw milk increased significantly and dairy plants had to face with the shortage of domestic raw materials. All these factors negatively affected their production efficiency.

Although the dairy market crisis has eased, Hungarian dairy farms still find it difficult to produce milk in a
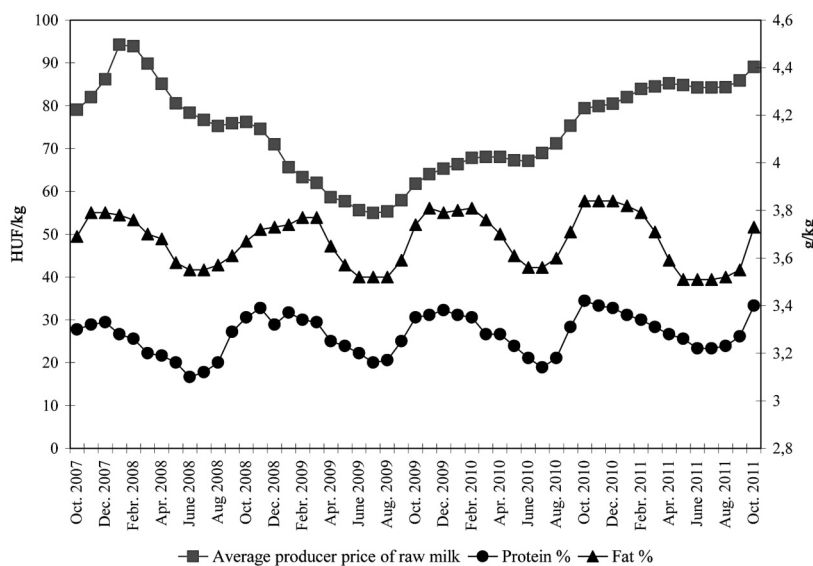
profitable way. As a result of the crisis, many dairy farmers abandoned milk production or reduced the size of their dairy herds. Even more recently, many of them are also considering ceasing production, in spite of the fact that the global dairy industry is facing an upturn (Szarvas, 2011).

In regard to the unforeseeable market situation of the past years, the contractual relationship with stable and calculable price levels between the producers and the processors could be upgraded.

3.2. Factors influences producer prices

In this section of the present study, I list those factors, which directly or indirectly influences the evolution of the producer price of raw milk (Vágó, 2008).

The nutritional content of raw milk, i.e. its fat- and protein contents, directly affect milk prices. In the short term, the composition primarily depends on the nutrient content of forage and physiological changes resulting from the alternation of seasons. Thus, this factor fluctuates seasonally, contributing to the major part of the seasonal fluctuation of milk prices (*Figure 5.*).

After weather, the nutritional content of raw milk depends on foraging and bovine species (genetics). The Holstein-Friesian cow, which is main breed used on the Hungarian dairy farms, is a high yielding cow, producing milk with relatively low nutrient value in comparison with the Jersey, with produces lower yields, but with much higher fat contents.

The next most decisive factor is the quality of raw milk, which also directly influences producer prices. The quality is determined by hygiene aspects, independent of nutritional content, or example by plate count, somatic cell count, organoleptic, physical and chemical properties of milk. The quality parameters, similarly to those of nutritional content, show considerable seasonal fluctuation, mainly related to temperature.

In addition to the nutrient values and the quality parameters, the supply side, i.e. the disposable quantity of raw milk, also has an impact on the development of the producer price. Seasonal changes in production volume can also be observed, since in the summer months, raw milk has a lower nutritional content and quality, but it is produced in larger quantity. However, the evolution of the domestic average milk price is obviously determined by the change in export options, as well.

In addition to the supply side it is also necessary to examine the demand side, i.e. the level of consumption or the demand for dairy products. On the basis of the HCSO (2011), it

Figure 5: Evolution of the fat and protein contents of raw milk and their connection with the average producer prices between October 2007 and October 2011 in Hungary
Source: Own construction on the basis of RIAE-MPIS

can be stated that Hungarian consumption of milk and milk products lags behind the European Union average;, its level is only half of the average consumption of the most developed European countries. In Hungary, the average consumption level of milk and milk products is about 145–165 kg/capita/year, which not only falls behind the European consumption level, but is also really far from the healthy level of milk and milk product consumption, which is about 260–270 kg/capita/year. The target for our country is to reach the consumption level of 200 kg/capita/year, which was almost approached in 1987, when Hungarian consumers consumed 199 kg/capita/year milk and milk products on an average. Milk and milk products form a valuable and important part of healthy diet; they are the richest source of calcium. One half litre of milk a day can cover 60-70% of our calcium need. It is particularly important for children and adolescents to consume milk and milk products daily, since the normal bone mass develops in our first thirty years. In addition, it is also highly recommended for elderly people to consume milk daily, because late in life, they need more calcium (Rodler, 2004). The public health aspect of the low consumption level is the so-called "Hungarian silent epidemic", osteoporosis, which affects more than 1 million people in Hungary (Szakály, 2006). Dairy products represent the only category of food which contains more calcium than phosphorus. Earlier examinations of National Institute for Food and Nutrition Science related to the adult population prove that 80% of women and 70% of men do not reach the daily 800 mg calcium needed daily (Szakály, 2007). Hungary, as regards calcium consumption, ranks among the worst countries in the European Union Member States. If Hungary wanted to reach the average consumption level of the EU Member States, the domestic consumption of dairy products should be increased to 230 kg/capita/year, but this is very difficult to achieve in light of the distinctive Hungarian diet and the current average consumer purchasing power. Therefore, for the foreseeable future, a 180–200 kg/capita/year consumption level for milk and milk products could serve as a more realistic goal for Hungary (Szakály, 2007).

Investigating the relationship between family income and milk and milk product consumption, Vágó (2008) calculated that there is almost a 2.5 times difference in milk and milk product consumption between the tenth of the population with the lowest and the highest incomes. In particular, he determined that there is a 3.3 times difference in cheese consumption between the two aforementioned income categories. Within the structure of milk product consumption, the ratio of liquid milk decreases as household income increases, which is practically compensated by the increase in cheese consumption.

Overall, it can be concluded that the income situation considerably influences the quantity and structure of dairy consumption. With the increase in household income and the improvement in living standards, there is also a growth in the consumption level of milk and mainly milk products.

However, the expansion of consumption does not have a direct and automatic impact on the demand for domestic products and prices. The expansion of consumption is typically generated by the supply side, since imported milk products, pushing down prices, lead to an increase in the consumption of dairy products in favour of imports.

Costs arising from raw milk production do not directly influence producer prices, as the bargaining power of the producers and the processors is decisive in to what extent production cost is respected in producer prices. The change in costs affects the development of prices most of all in the long term, in the same way as any change in production technology does, which influences prices through average cost. The international market trends and the established international prices influence domestic prices through foreign trade. Moreover, the change in the bargaining power of market stakeholders is also able to cause change in the domestic price level. From the side of the producers, the bargaining power can be strengthened by producer organisations. In addition, prices are considerably influenced by the knowledge of the producers about the market prices, supports, market regulation tools and by their reactions to changes in prices.

4. Conclusions

In conclusion, a global increase in milk production can be observed, which is primarily motivated by the increase in demand in developing countries. In addition to the increase in milk production, there is growth in milk consumption, as well. In the developed countries, the consumption level of processed milk products is rising, while in the developing countries, people consume more liquid milk.

Predictions for the milk production of the EU-27 are moderately optimistic until 2020. According to these predictions, milk production in the EU-27 will expand by approximately 4%, which will mainly arise from the EU-15.

The situation of the Hungarian dairy market is still unfavourable, since even the increasing production prices can not compensate for the high feed and fuel prices. Thus, it is difficult for the Hungarian dairy farmers to produce in a profitable way. Domestic dairy plants are not in a better position either, since they have to cope with a rather increasing shortfall in raw material due to the growing amount of raw milk export. All these negative factors could induce the appreciation of the role of the contractual relationship between the producers and the processors.

Analysing prices, it can be concluded that the producer price of raw milk started to develop in the world market after it bottomed out in 2009, and that the crisis seriously affected the sector. In 2010, raw milk prices increased by 38% in New Zealand, 27% in the United States, 13% in the European Union and 19% in Hungary, in comparison with prices in 2009.

According to the prediction of the FAPRI (2011), the increase in the producer price of raw milk will come to a sudden stop in 2012, and a continuous decrease to a total 7% lower price is forecast by 2025, compared to the price for the year 2000.

In Hungary, the producer price of raw milk is currently 15% lower than the EU-27 average, although in relation to the price in July 2009, the actual price is almost 60% higher.

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THE ECONOMIC AND SOCIAL ROLE OF PRIVATE FARMS IN HUNGARIAN AGRICULTURE

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*Abstract:*The situation and importance of private farms in Hungary have significantly changed and are still changing due to the political and economic regime change of 1989-90 and subsequent events. The *aim* of this study is to provide – unlike the practice of the last two decades – an impartial review of the social and economic role of Hungarian private farms. To demonstrate the changes occurring in private farms, we rely on the data of the *Hungarian Central Statistical Office (HCSO-KSH)* such as the General Structure Surveys, the Farm Structure Surveys, and tables from the online stADAT database.

From the point of view of *methodology,* time series analyses (2000–2010) were performed in the framework of this *secondary research*. Our *hypothesis* that private farms in Hungary deserve much more attention than previously, from the perspective of the output of Hungarian agriculture, food consumption and, last but not least, employment (the environmental factor was not examined this time) has been clearly confirmed. The role and significance of this group have also been exceedingly important since EU accession, particularly in the fields of horticulture and animal husbandry, and the strengthening of these positions is indisputably a national economic interest.

1. Introduction

As was pointed out by the co-authors *Burgerné* and *Szép* (2006), several studies were prepared in the 1990's on the domestic and foreign assessment of *private farms*.

However, in considering the time horizon of the examination, we only explore the viewpoints presented in publications published in the last decade.

In his book about family farms, *Dobos* states that 'the main question is whether Hungarian agriculture should be based on family farms or on large estates which are mainly interested in the production of, and the continuous increase in, capitalist profit' (*Dobos,* 2000:12).

This question has been answered by the events of the last decade, yet the Hungarian professional community and political leaders are still sharply divided about the role of private farms and agricultural companies and partnerships in social labour distribution (*Fertő,* 2011).

We would like to start by admitting that we agree with the opinion that 'efficient agricultural production can be conducted with various farm sizes. Small-scale and large-scale farming can both have advantages under certain circumstances and human resource conditions. This is why the diversity of farms must be accepted in agricultural policy in order to be prepared for future challenges' (*Csáki ed.,* 2010:18).

We also share the view, which was expressed a few years ago but is still current, of the researchers at the Research

Institute of Agricultural Economics (AKI) which states that providing a description of, and public information about, the real condition of private farms is a vital and important task for the sake of clear-sightedness, and in forming the basis for decisions made in the context of agricultural and rural development policy and in order to effectively utilize the EU resources provided for rural development (*Hamza – Tóth,* 2006: 69).

However, it has to be mentioned that the *economic dimension* of agriculture is one-sidedly overemphasised as opposed to the social (employment, subsistence farming) and environmental dimensions.

The co-authors *Burgerné* and *Szép* conducted an inquiry-based questionnaire survey at the end of 2003 and the beginning of 2004 involving 613 private farms in Western Hungary and the Southern Great Plain. One of their major findings was that the situation of agriculture worsened in the years prior to the EU accession, and that younger farmers with larger holdings and a higher level of education could produce more efficiently and with greater profitability than the others.

In 2010 *Burgerné* published her book – entitled 'The Economy of the New Member States and the Candidate Countries of the European Union' (*Burgerné,* 2010) – which examines the economy, especially the agriculture, of 15 countries from the beginning of the regime change until 2007. It is divided into two parts, a general section and a detailed section consisting of a description and evaluation of

each country. It is the most comprehensive study in Hungarian on the agriculture of the examined countries. One of the author's important conclusions is that 'the development of agriculture lagged behind the development of general economies. The ownership and farming structure created by agricultural reforms after the regime change did not assist in increasing efficiency' (*Burgerné,* 2010: 323).

Unfortunately, the statistics of the European Union do not distinguish between private farms and agricultural companies and partnerships. The author considered the farms with a land area below 50 hectares as predominantly private farms, while farms with a land area above this value included the larger agricultural companies and partnerships. Considering productive land area, it was ascertained that the number of farms under 5 hectares is high in all the countries. In Hungary, both agricultural companies and partnerships over 50 hectares in size and private farms with a land area under 5 hectares can also be found in considerable numbers.

As reported by *Burgerné*, mini-farms – i.e. farms below 1 ESU (European Size Unit) – were created in a large numbers by the new agrarian reforms. In spite of their small size, in 2006 these farms employed 40% of the agricultural employees and 24% of the total full-time employees (*Burgerné,* 2010).

Relying on the results of the research 'Regoverning Markets' started in 2004, *Forgács* (2006) analyzed the vertical system of relations of two agricultural sectors in three Central and Eastern European countries (Hungary, Poland, Romania) in terms of the appearance of large food-retail networks, and has drawn important conclusions.

As far as we are concerned, among his conclusions the following are the most important:

- the large number of small farms formed in the region is not the outcome of a natural development but of a radical social transformation process taking place within a short time,
- the majority of these farms are not market-oriented but produce wholly or mainly for their own consumption, as a consequence of which they only face the unfavourable effects of food-retail chains indirectly,
- in the case of small-scale producers who want to market their products to obtain additional income or to earn a living for their families, significant changes are required. The tools of their successful adaptation might be to increase farm size, improve technology, and enhance compliance with demanding quality requirements and the willingness to cooperate.

In his later study dealing with the situation of small-scale Hungarian agricultural producers in a Central and Eastern European environment, *Forgács* (2008) emphasized that the triple (economic, social and environmental) approach was justified. He convincingly explains his statement – which as yet has not been duly acknowledged -that 'economic competitiveness cannot be the sole criterion for the survival of agricultural small-scale farms during the period of the establishment of a market economy' (*Forgács*, 2008: 17).

The author mentions three main reasons for the decreasing number of small-scale agricultural producers:

- the intensive spread of multinational companies,
- the drastic curtailing of the highly social Common Agricultural Policy (CAP) in the case of the EU-10 countries, and
- the lack or low level of self-organization among agricultural producers.

Forgács also explains that 'the fate of the majority of small-scale farms was mainly decided during the period between 2004 and 2010, not only in Hungary but also in most of the EU-10 countries (op. cit. p. 34).

The author is one of the few to expressly state that rural development programmes 'did not provide an escape route for small-scale producers who got into a hopeless situation to solve their employment and income earning problems (op. cit. p. 35).

Another remarkable statement is that 'the reduction in the number of small-scale producers has not only economic and social effects but also environmental consequences' (op. cit. p. 36).

Nagy's (2006) PhD thesis examines the conditions of the viability of family farms.

In the last decade, several of the researchers at the Research Institute of Agricultural Economics have dealt with the economic and social problems of private farms. (Here we will not assess the analyses related to the Farm Accountancy Data System, FADN).

Several studies (*Hamza et al.,* 2002*; Hamza et al.,* 2001*; Tóth,* 2000*; Tóth ed.,* 2000*; Dorgai ed.,* 2004) investigated the issues connected to agricultural employment. In their study 'The changing role of agriculture in rural employment with special regard to Hungary's EU accession', *Hamza et al.* (2002) made several proposals with regard to the changing circumstances:

- it is very important to establish new workplaces which offer either main or supplementary income, and to mitigate, or stop, the process by which rural areas lose their capacity to sustain and retain population and to provide employment,
- an employment policy which prepares the way for EU accession is needed,
- an education system meeting the requirements of the market economy should be established,
- agriculture which has a primarily social function and agriculture which can be exposed to market influences are to be treated differently,
- instead of full-time employment, flexible and combinable solutions (self-employment, part-time employment, etc.) complying with the guidelines and practice of the EU's employment policy are required.

After EU accession, the researchers of the Research Institute of Agricultural Economics (*Hamza-Tóth,* 2006) made extensive investigations in connection with the private farm's capacity to maintain its role in providing a livelihood by analyzing the databases of the Hungarian Central Statistical Office (HCSO) and the Research Institute of

Agricultural Economics and relying on the results of empirical research.

Forming appropriate alliances is an essential condition for the prosperity of domestic small- and medium-scale farms (typically private farms), the necessity of which has been pointed out by many domestic and foreign experts. The theoretical and practical potential for, and obstacles to, this are discussed in the book by *Gábor G. Szabó* published in 2011 under the title 'Co-operatives in a Food Economy', which is based on a comprehensive review of specialized literature and international experience (*Szabó G. G.,* 2011).

In the volumes (*Csáki-Forgács, eds.,* 2008) compiled from the lectures delivered at the joint IAAE-EAAE seminar (Agricultural economics and transition: What was expected, what we observed, the lessons learned) held in 2007, and published by IAMO, several studies examine the economic structure of new EU member states from various perspectives. Data and analyses of the private farms of various countries were published: Italy was analysed by *Liefert*, Hungary by *Burger – Szép*, *Hubbard*, *Szabó G.* and *Szabó G. G.*, Romania by *Turtoi et al.* and *Luca*, the CIS countries by *Lerman*, and Poland by *Paloma* et al. It is apparent that private (mainly small- or medium-scale) farms have a significant role in production and especially in employment in the agriculture of all the countries, although to various extents.

In the volume of essays and studies entitled 'The Changing Landscape of European Agriculture – Essays in Honour of Professor *Csaba Csáki*' (*eds., Fertő – Forgács – Jámbor,* 2010), several noteworthy studies strongly related to the topic of this paper were published. *Koester* and *Petrick* seek an explanation for why it is that in Russia giant agricultural holdings were developed. The authors mention mental characteristics rooted in the historic past as the main reason. *Lerman* investigates the improvement of the agriculture of Central Asian countries, with special regard to the very important role of private farms. *Ballman* and *Schaft* analyse the transformation process of East Germany's agriculture, a typical characteristic of which is that, unlike in the western provinces, legal entities with large average land holdings (co-operatives, limited liability companies, joint-stock companies) play a very significant role in agriculture. Private farms manage only about one quarter of agricultural lands, as opposed to 90% in the western provinces. The authors remark that agriculture is one of the few sectors where productivity exceeds that of the westerns provinces.

Baráth (2009), when studying the development of Hungarian and German agriculture after 1990, paid special attention to the different trends in farm structure.

The book edited by *Liu and Luo* (2004) from the studies of several Chinese scientists and published with the title 'Can China Feed Itself?' gives an excellent review of the achievements and problems of Chinese agriculture, which is based on the household responsibility system. The articles primarily discuss the difficulties of cereal supply (production and trade) and identify crop fluctuations and poor agricultural infrastructure as the main problems. (It is a little known fact that the basic idea of the multi-stage – but in the final analysis – successful Chinese agricultural reform begun in 1978 was inspired by the effective operation of Hungarian farm households).

In their study, the editors of the proceedings volume (Perspective of the Agri-food System in the New Millennium) of the Bologna conference in 2001 of the International Association of Agri-food Economics (Association Internationale d'Economie Alimentaire et Agroindustrielle, AIEA2) examine the economic and social structure of the Chinese agricultural sector, and provide a remarkable typology of family farms on the basis of the data of the First National Agricultural Census in China in 1997. Their review greatly facilitates the understanding of the success of the Chinese agrarian reform of 1978 (*Fanfani – Brasili,* 2003).

We would like to highlight that the enhanced support for small-scale farms is included in the new objectives of the 2013-2020 Common Agricultural Policy (CAP) (*Jámbor, 2011, Popp,* 2011).

Overall, it can be stated that the importance of private farms increased after the completion of the land restitution process. Numerous small-scale farms were formed in Hungary after the regime change, however, their number began to decrease around the millennium and is still decreasing today, which is the result of concentration and the gradual disappearance of non-viable small-scale farms. In Hungary, most private farms are managed by older people, mostly over the age of 55. At the millennium, 49.9% of private farmers were over the age of 55; today this rate exceeds 50%, which predicts the senescence of the agricultural community. The age structure of farmers did not change significantly between 2000 and 2010. Only 1.8% of private farmers have a college or university degree. 70-80% of farm leaders do not have any agricultural qualifications; they perform their work on the basis of the experience gathered over time. Although the primary task of agriculture is food production, we should not forget the fact that it also ensures the rural areas' capacity to create and maintain job opportunities, and play a role in landscape and environment protection. Accordingly, private farms play an important part in Hungarian agriculture in spite of the fact that they usually have less favourable output and efficiency indicators than agricultural companies and partnerships.

2. Databases and methods

There are *two databases* in Hungary that provide an opportunity for the comprehensive examination of the social and economic role of private farms: data collected in the Farm Structure Surveys of the Hungarian Central Statistical Office and the Farm Accountancy Data System (FADN) database maintained by the Research Institute of Agricultural Economics. The latter limits the examinations to private farms above 2 ESU (European Size Unit), as a consequence of which the number of farms surveyed in 2010 by the

Research Institute of Agricultural Economics did not reach 90 thousand, unlike the 567 thousand farms kept on record by the Hungarian Central Statistical Office. In this study, we do not analyse the Farm Accountancy Data System (FADN) database of the Research Institute of Agricultural Economics, as this will be assessed in our next paper.

For the interpretation of the data, we note that the databases of the Hungarian Central Statistical Office referred to below consider households reaching or exceeding the *minimum farm size* applicable at the time of survey as private farms. This minimum farm size for the General Structure Survey of 2010 was as follows: a productive land area of at least 1500 m^2 (arable area, kitchen garden, fruit orchard, vineyard, grassland, forest, reed and fish pond separately or together), or at least 500 m^2 of orchards, or vineyards together, or at least 100 m^2 of glass-house or other covered land area, or for farm animals, at least one larger specimen of livestock (cattle, pig, horse, sheep, goat, buffalo, ostrich), or 50 head of poultry (chicken, goose, duck, turkey, guinea-fowl), or 25-25 rabbits, furry animals or pigeons for slaughter, or 5 beehives, or the provision of agricultural services in the last 12 months (*KSH*, 2011a)

From the point of view of *methodology,* time series analyses were performed in the context of this *secondary research*. The results of our investigations are supported by tables, pie charts, line charts and trend computations.

3. Results

3.1. Changes in the number, land area and livestock of agricultural enterprises and private farms

3.1.1. The changes in the number of farms between 2000 and 2010

Hungary has a different farm structure than most EU member states. Hungarian agriculture can be characterized by a bipolar farm structure consisting of larger enterprises and small-scale farms. The importance of medium-scale farms started to grow after the regime change; however, they have not become a determining factor even today. On the basis of the data of the General Structure Survey 2010, it can be stated that the number of agricultural enterprises has, apart from occasional downturns, increased slightly since the millennium, while the number of private farms[1] Private farm: a farm operated by a household engaged in agricultural activity, or by a private entrepreneur with a tax number, that

reaches or exceeds the defined minimum farm size. has continuously and greatly reduced (*Figure 1*). This process also continued after EU accession, and by 2010 there were about 1 thousand more agricultural enterprises (+13%) and 200 thousand fewer private farms (-24%) than in 2003. This process is verified by the result of a trend calculation as well. The regression equations are presented in Figure 1. The values of the coefficient of determination (R^2) were calculated for both legal forms, which was 0.56 for agricultural enterprises and 0.93 for private farms. In accordance with this, the data in the first case fit the trend line with lesser accuracy, while in the second case with great accuracy.
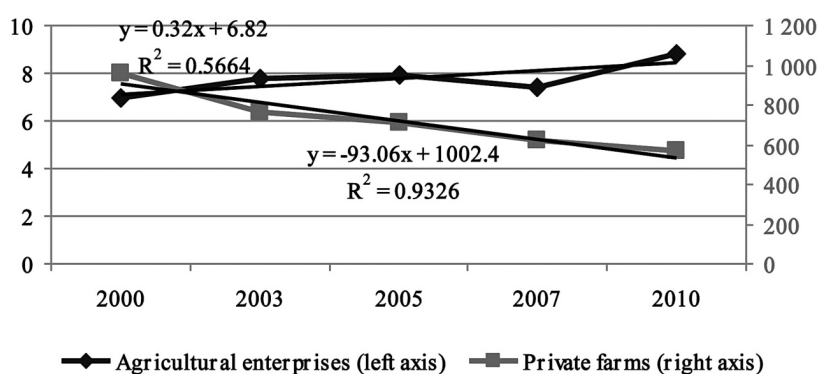
Figure 1: Changes in the number of farms between 2000 and 2010 (thousand farms)
Source: Authors' own construction based on KSH, 2010

On the basis of the preliminary data of the 2010 General Structure Survey, 8.8 thousand agricultural enterprises and 566.6 thousand private farms were surveyed in the summer of 2010. This latter data indicates that very low values were defined for the minimum farm size when evaluating private farms, at the same time, almost 1.1 million households also performed some kind of agricultural activity (in gardens belonging to houses or holiday homes). Here we would like to note that the affected population in the Farm Accountancy Data System (FADN) of the Research Institute of Agricultural Economics is limited to 80–90 thousand private farms above 2 ESU (European Size Unit).

In accordance with the above, it can be stated that a considerable number of Hungarian households are involved in agricultural production; therefore, their social role is not negligible either (*Kapronczai*, 2010).

3.1.2. The changes in agricultural land by category of legal forms

In our opinion, it is not the productive land area but the agricultural area that can be practically examined. Productive land area includes the area under forests as well, yet forestry in Hungary has an insignificant role in terms of both income production and employment.

Similarly to previous years, 99% of land-owner farms use

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[1] Private farm: a farm operated by a household engaged in agricultural activity, or by a private entrepreneur with a tax number, that reaches or exceeds the defined minimum farm size.

agricultural areas, the average size of which in 2010 was 337 hectares for agricultural enterprises and 4.6 hectares for private farms *(KSH,* 2010*)*. Since 2000, the average agricultural area of agricultural enterprises fell by 37 percent, while for private farms it increased by 84 percent. The distribution of agricultural areas among the categories of legal forms is impeded by the fact that the Hungarian Central Statistical Office introduced the term 'area unidentifiable with holdings' as of 2003, as a result of which the land used by private farms dropped by 1268.2 thousand hectares from 2002 to 2003, but then in the following year it increased by 505.3 thousand hectares *(Table 1)*. This was accepted by the profession basically without raising any objections, and the issue of areas unidentifiable with holdings has been a perennial issue since then.

Table 1: Changes in agricultural area by category of legal form (thousand hectares)

	2000	2002	2003	2007	2010
Agricultural enterprises	2 363.5	2 111.2	2 145.7	2 176.4	2 158.6
Private farms	3 121.1	3 484.3	2 216,1	2 541.5	2 514.3
Area unidentifiable with holdings			1 502.9	1 089.1	669.9
of which: not agriculturally utilized	369.3	271.7	288.2	273.9	116.1
Total	5 853.9	5 867.2	5 864.7	5 807.0	5 342.8

Source: KSH, 2011b

On the basis of the above, in can be stated that, on the one hand, the agricultural area decreased after the millennium for both categories of legal form, yet *the greater part of this area is used even today by private farms*. *On the other hand, within the agricultural area the whole area covered by gardens and the majority of vineyards and orchards are owned by private farms (Figures 2–3)*. It is true that most of the vineyards and orchards possessed by private farms cannot produce products that are competitive in the world market; however, their role from the aspect of domestic consumption is very significant.

In 2010, arable land was used by 60% of agricultural enterprises and by 55% of private farms, which represents a 13 percentage point increase in the case of agricultural enterprises, and a 7 percentage point reduction in the case of private farms since 2000.

The usage of grasslands shows a reverse change regarding the two legal categories as compared to 2000: the number of agricultural enterprises using grasslands has risen by 17 percent, and the area of grassland per enterprise has reduced by a quarter, while the

number of private farms using grasslands has decreased by almost a third, and the area of grassland per farm has expanded by 65 percent (*KSH*, 2010).

3.1.3. Changes in the stock of major farm animals

It is well-known that the main structural problem of Hungarian agriculture is caused by the crisis of animal husbandry which has been continuing for two decades. In the last decade, the primary problem was caused by the drastic decrease in the number of pigs and hens, which mainly occurred on private farms, making the livelihood of numerous families impossible. The column charts below clearly illustrate these changes *(Figures 4–5)*. It can be seen that while private farms' share in cattle and sheep stock has grown slightly (nearly 90 percent of sheep stock is owned by private farms!), their role in the stocks of pigs and hens has reduced very significantly since EU accession. All this has had an unfavourable effect on both domestic consumption and export commodity supplies. There are several reasons for the significant decline in livestock feeding on fodder on private farms: on the one hand these sectors obtained considerable state subsidy before EU accession, while in the framework of the Common Agricultural Policy, grants could only be applied for to support ruminants. In addition, the demanding regulations in connection with manure management, manure disposal and animal welfare required investments that were impossible for smaller farms to carry out.
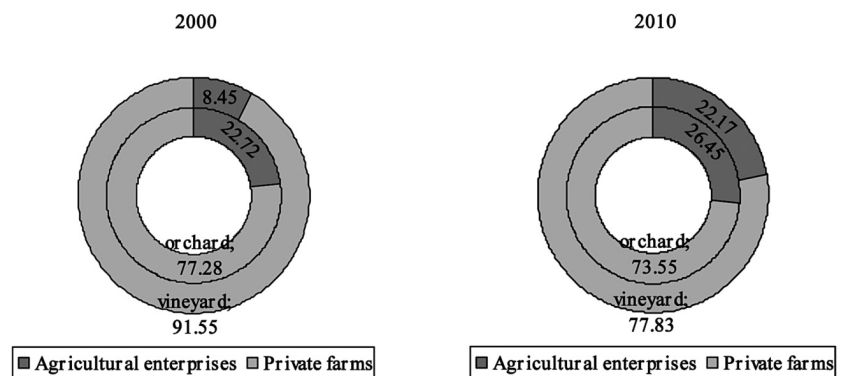
Figures 2–3: The distribution of the land-use categories of vineyards and orchards by legal form, in 2000 and in 2010,%
Source: KSH, 2011b
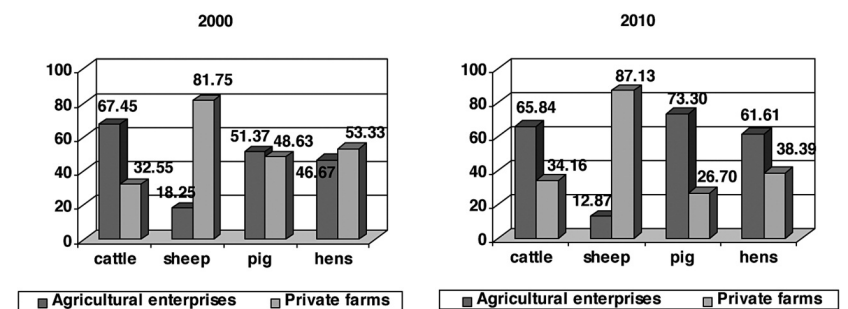
Figures 4–5: The distribution of livestock by legal form in 2000 and in 2010 (%)
Source: KSH, 2011e

3.2. The distribution of farms by type and purpose of production

3.2.1. The distribution of farms by type of production

The changes in the distribution of the categories of legal form by type of production are demonstrated in *Table 2*. Significant changes took place in the proportions of the types of production in the two legal forms during the period examined.

Table 2: The distribution of farms by type of production, 2000, 2010 (percent)

Type of production	Agricultural enterprises	Private farms
In the year 2000		
Crop farming	40.6	39.7
Animal farming	9.6	22.0
Mixed farming	36.3	38.2
Farms providing agricultural services	13.5	0.1
Total	100.0	100.0
In the year 2010		
Crop farming	49.0	48.9
Animal farming	5.5	22.2
Mixed farming	39.6	28.8
Farms providing agricultural services	5.9	0.1
Total	100.0	100.0

Source: KSH, 2011c

The major conclusions that can be drawn from *Table 2*:

- the proportion of crop farming increased by about 10 percent among private farms in a decade,
- the rate of animal farming has decreased in the case of agricultural enterprises, but remains essentially unchanged among private farms,
- the proportion of mixed farming among agricultural enterprises has increased slightly, while in the case of private farms the proportion has decreased by about the same extent that the proportion of crop production has increased (it seems likely that some of those farms involved in mixed farming gave up animal husbandry and changed over to the more profitable crop production profile).
- The proportion of farms providing agricultural services is still minimal among private farms and has significantly decreased in the case of agricultural enterprises.

3.2.2. The changes in the distribution of private farms by purpose of production

The changes in the distribution of the purposes of production are demonstrated on the basis of *Figures 6–7* below.

On the basis of the General Structure Survey of 2000, it can be stated that a considerable number (almost 60%) of private farms were engaged in agricultural production with the sole purpose of providing for their own consumption. At the millennium, only 32% marketed the surplus. The proportion of farms producing mainly for the market was about 8% in 2000.

Today, examining *all the private farms*, it becomes apparent that besides the considerable reduction in the number of farms, the proportion of those *producing only for their own consumption* has scarcely changed, whereas the rate of those *producing mainly for the market* has more than doubled (21%), while the proportion of those *marketing the surplus* has fallen by 12 percent.

The proportion of farms *producing mainly for the market* has risen for all types of production. In 2010, 25% of crop producing farms, 22% of mixed farms and 4% of animal husbandry farms belonged to this group.

The proportion of those *producing only for their own consumption* has slightly increased among animal husbandry farms, reduced among crop producing farms and remained unchanged among mixed farms.

The proportion of those *marketing the surplus* has drastically decreased in all three groups, especially among animal husbandry farms where it dropped from 16% to 9%.

It is worthy of note that the proportion of those *producing only for their own consumption* is by far the highest among *animal husbandry farms* (in 2010 it was almost 88%), while the proportion of the other two groups is markedly low compared to the other two types of production.
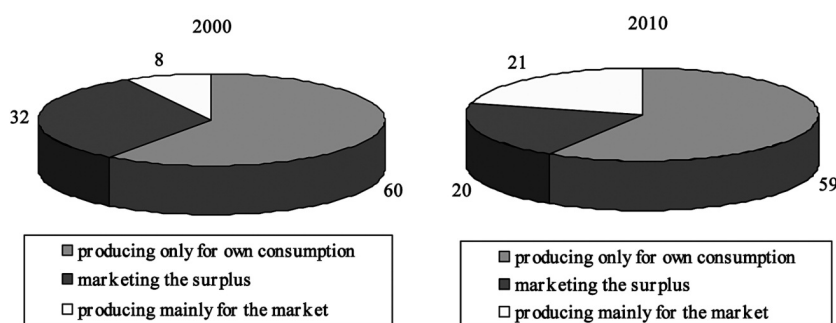
Figures 6–7: The changes in the distribution of private farms by purpose of production (%)
Source: KSH, 2008b; KSH 2011a

3.3. Changes in employment in agricultural enterprises and on private farms

When examining agriculture, it is difficult to specify the number of people working in the sector. This question is very hard to answer as there are several different verified data calculated in accordance with international methodology available in connection with the utilization of labour.
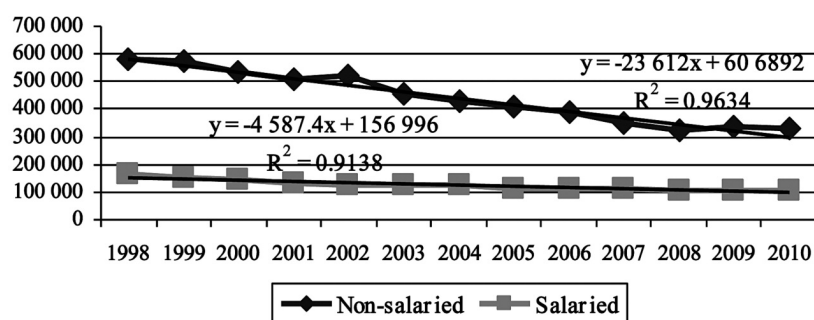
Figure 8: Changes in agricultural labour utilization by salaried and non-salaried AWU
Source: KSH, 2011d

The introduction of the term Annual Working Unit (AWU) has provided a solution for this problem, enabling the conversion of several hours of work to full-time employment (1800 hours/year), making the work performed in agricultural enterprises and on private farms comparable.

EU practice distinguishes between salaried and non-salaried work, the latter signifying agricultural work performed by members of households on private farms.

This unit refers to agricultural work performed as a supplementary activity as a labour input, i.e. it takes into account the agricultural work of non-agricultural employees as well. It is not the number of workers but the amount of work that is considered. As of 1998 the Hungarian Central Statistical Office has supplied data on the value of agricultural labour input expressed in AWU.

Between 2000 and 2010, the total value of AWU decreased by almost 35%, where salaried AWU reduced by 27% and non-salaried AWU by 38% (These values in the base year of 2003 were: 25%, 15% and 28%). Non-salaried AWU was utilized typically at private farms, whereas salaried AWU was utilized predominantly at agricultural enterprises *(Figure 8)*. The graph below clearly illustrates that the value of non-salaried AWU in the period examined has decreased much more rapidly than that of the salaried AWU; however, *the majority (76%) of agricultural labour was still utilized at private farms* in 2010. Taking into consideration the permanent and salaried employees working at private farms, the proportion is obviously higher than this. The high values (0.96 and 0.91) of the determination coefficients of linear tendency indicate that data fit the trend line well, showing great accuracy.

Table 3 reveals that the labour utilization of private farms dominates in all types of production. It is especially notable that annual AWU utilization is 17-times higher in animal

Table 3: The value of agricultural labour utilization by type of production, 2010 (thousand AWU)

	Crop farming	Animal farming	Mixed farming	Total
Agricultural enterprises	14,8	3.7	59.0	77.5
Private farms	152.9	61.6	147.4	361.9
Total	167.7	65.3	206.4	439.5

Source: KSH, 2011a

husbandry private farms than in agricultural enterprises. As compared to 2000, the volume of agricultural labour input has decreased, with non-salaried work decreasing significantly and salaried work decreasing to a lesser extent.

The considerable reduction in labour input and, at the same time, in non-salaried agricultural labour input can be attributed primarily to the rapid decrease in the number of private farms.

3.4. Changes in output and gross value added by sectors

This issue is assessed in a different way to customary practice. We wish to point out that the role of households – given the economic and social background of private farms – is outstandingly important in the output and gross value added of the sector involving agriculture, forestry, hunting and fishing.

Table 4: Changes in gross output by agricultural sectors between 2001 and 2010 (at current prices, in million HUF)

	Gross output		
	2001–2003	**2004–2006**	**2007–2010**
Enterprises	1 008 548.67	1 061 356.00	1 227 789.75
Households	927 160.67	993 599.00	983 540.75
State	11 516.33	9 045.33	3 865.00
Total	1 947 225.67	2 064 000.33	2 215 195.50

Source: KSH, 2011f

On the basis of the data in the table above it can be stated that – on average over the past four years – 55% of agricultural gross output was derived from enterprises and 44% from households, whereas the output share of the state was insignificant.

As compared to the base period (2001–2003), an increase of 22% could be observed in the case of enterprises, and an increase of 6% in the case of households (there was a slight decrease in comparison to the previous period).

Table 5: Changes in gross value added by agricultural sectors between 2001 and 2010 (at current prices, in million HUF)

	Gross value added		
	2001–2003	**2004–2006**	**2007–2010**
Enterprises	274 550.33	317 647.33	321 718.00
Households	456 077.00	537 967.00	527 772.50
State	7 687.00	6 263.34	2 088.00
Total	738 314.33	861 877.67	851 578.50

Source: KSH, 2011f

The national output of agriculture has risen by 14% overall compared to the base period.

As regards gross value added, there were different proportionate shares. In the time period examined, the proportion of the household share within the agricultural gross value added was much higher than that of the enterprises, the proportion being 60:40 on average over the past four years. In comparison to the period 2001-2003, a similar increase could be observed for households and enterprises, which was 17% and 16%, respectively.

4. Conclusions

- In spite of the significant reduction in the number of *private farms* in the last decade, they cultivate the *greater part of the agricultural area* and 70 and 80 percent of orchards and vineyards, respectively.
- It is a little known fact, not only by the general public, but also by professionals that in Hungary households produce *44% of agricultural output* and *60% of agricultural gross value added.*
- There is a higher proportion of labour-intensive plant production (vegetable-fruit) and mixed farming in the activities of private farms than in companies. A significant part of the country's livestock (primarily sheep stock) is still kept on these farms. As farms specialised for animal husbandry, the fodder consumption branches dominate.
- The products produced by private farms as *commodity supplies* are primarily crop farming products. At the same time, it is notable that 90% of animal husbandry private farms produce only for their own consumption. *Research on the goals of private farms reveals* that with the massive decrease in the number of farms, the proportion of *farms producing only for their own consumption* has slightly changed; however, the *proportion of farms producing mainly for the market* has more than doubled and the rate of *farms marketing the surplus* has dropped.
- In the past few years the fact that *more than 80% of agricultural labour utilization (AWU) occurred in private farms* has not been given appropriate attention. Unfortunately, labour utilization, particularly in the younger age groups, shows a declining tendency. This tendency predicts rather unfavourable processes in the rural areas and for the future of agriculture.
- As described above, we emphasize that the position of private farms should be reinforced as they make up a central role in the future prospects of the Common Agricultural Policy.

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ISSUES IN THE ECONOMIC DEVELOPMENT AND UTILIZATION OF EU FUNDS IN A DISADVANTAGED SUB-REGION OF THE SOUTHERN GREAT PLAIN REGION

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Abstract: The development period between 2007 and 2013 had a historical significance for Hungary as the funds that were provided by the European Union and were supplemented by the domestic and public sectors naturally offered great possibilities for the country's sub-statistical regions and regions to inspire their development and innovation. In order to use these funds efficiently it is essential to incorporate the developments into the area's capabilities, to harmonize them and to increase the role of the sub-statistical regions and regions. This study ranks the sub-regions of the Southern Great Plain Region in terms of their economic characteristics and identifies the most disadvantageous ones. Using as an example a specific sub-region it determines the local effects of EU payments with the application of different statistical methods.

Introduction

There are unarguably regional differences in the European Union. The per capita GDP is unequally divided between the eastern peripheral part of the European Union and the central and western regions. The GDP of peripheral areas is far below that of the developed regions which is why it is a strategically important task for these areas to catch up. In order to strengthen its regional competitiveness, Hungary is trying to invigorate two fields: the region and the sub-statistical regions – this is a challenging objective as neither of them are administrative units. The present situation of the most disadvantageous sub-statistical regions and their development possibilities are pressing strategic questions. The recently accepted 311/2007 (XI.17) governmental decree – concerning the classification of the beneficiary regions – presents the development conditions of Hungary's sub-statistical regions based on the collection of comprehensive data. In addition it also acts as guidance for the methods to adopt when applying for tenders while developing different subsidy systems, indicating which sub-statistical region needs the most attention and advanced care.

The study focuses on a number of questions:
– to determine the Southern Great Plain Region's economically most disadvantaged sub-regions,
– to summarize the amount of EU subsidies in the sub-region of Sarkad,
– to analyse in what way and to what extent the subsidies have improved the situation of settlements in the sub-region of Sarkad,
– to establish whether there is any correlation between the support and the change in complex development indicators,
– to establish whether there is any correlation between the support and any deviation from the average of indicators of settlements

Material and Methods

This study analyses mainly secondary data, based on the works of Hungarian and foreign experts in the subject. The sub-statistical regions of the Southern Great Plain were divided into clustering groups based on economic indicators. The cluster analysis, with the data of the 25 sub-statistical regions, was carried out with SPSS 17.0 statistical software. This software is mainly used to develop detailed computerised cluster analysis in the scientific literature (Székelyi and Barna 2002). Cluster analysis is a popular methodology among statistical approaches. It is similar to factor analysis which examines the subsets of connections. Cluster analysis does not differentiate between dependent and random variables, but rather examines the mutual connections within the set of variables.

Statistical data was made available by GEOX GIS Ltd., which includes complex indexes on the income, demography, economy and infrastructure of the sub-region of Sarkad between 2004 and 2009. The total subsidies gained by the sub-region were calculated from the website of the National

Development Agency (NDA) within the framework of the National Development Plan (NDP) and the New Hungary Development Plan (NHDP). On the website of the Agricultural and Rural Development Agency (ARDA) I calculated the total area-based subsidies obtained by the settlements of the sub-region, the payments for agrarian-environmental management, the subsidies for deprived areas, and young farmers' starting subsidies. The cluster analysis was also carried out with the statistical program SPSS 17.0, in which the various complex indexes were the variables and the monitored units were the settlements. The main goal of the cluster analysis was to rank the monitored units in relatively homogeneous groups on the basis of the chosen variables in such a way that the monitored units in the same group resemble each other, but differ from units in other groups. During the cluster analysis I used the Ward-method and the classic Euclides distance measure. I chose the Ward-method, because it aims to minimize the clusters' internal heterogeneity. I used the Pearson correlation coefficient to determine the connection between subsidies gained and complex indexes, because I was searching for relationships between the criteria measured on the measurement scale (Malhotra, 2001).

Results and discussion

In Hungary distributions of disadvantaged sub-regions (Local administrative unit 1) were introduced by Faluvégi and Tipold (2007), who developed five index groups (economic, social, infrastructural, employment and welfare) and evaluated sub-regions considering 31 indexes. Based on these indexes 33 sub-regions were placed in the most disadvantaged category, which needed help from complex programmes.

The study examines the sub-statistical regions of the Southern Great Plain. The survey was conducted in order to cluster the sub-statistical regions in terms of economic indicators. The cluster analysis was based on the details of 25
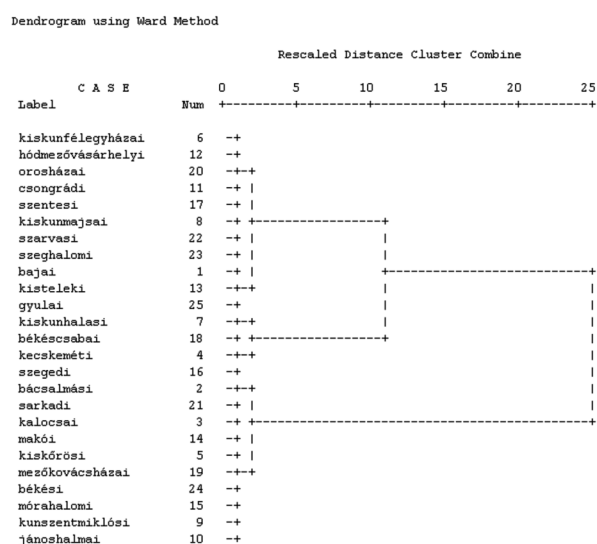
Figure 1: The dendrogram of the Ward-method
Source: Author's own calculation with Spss 17.0 software

sub-statistical Southern Great Plain regions and completed with the use of SPSS 17 software. The sub-statistical regions were grouped together based on golden scale variables. I made a hierarchic cluster analysis of the cases on the basis of these variables – I set the cluster number to 4, based on previous research.

The software, after implementing all settings, produced the dendrogram shown in Figure 1:

The dendrogram shows that 4 well-separated groups were formed on the correct level, and a new variable was introduced which includes the cluster-classification of the sub-statistical regions.

Table 1 and 2 show the results of a statistical comparison of the original classification and the classification by the Ward-method.

Table 1: Group average according to the first four variables of the cluster analysis

Ward Method	The number of operating economic organizations per 1000 people in 2004	The number of visitor nights per 1000 people in 2005	The number of retailers per 1000 people in 2005	Agricultural employment (%) in 2001
1	**0** 51.8000	++ 1881.4000	+ 16.7000	- 15.0400
2	— 42.7000	— 241.7000	- 13.9500	++ 20.9500
3	++ 74.5000	**0** 894.7500	++ 18.0500	— 6.5000
4	+ 55.3333	+ 1063.1667	**0** 16.4000	**0** 17.9167
Sum total.	52.6400	871.2800	15.7440	16.7280

0: around average, — far below average, - a little below average, ++ far above average, + a little above average
Source: Author's own calculation with Spss 17.0 software

Table 2: Group average according to the second four variables of the cluster analysis

Ward method	The ratio of employment in the service industry (%) in 2001	The change in the number of enterprises between 1999-2004	Tax income of local authorities per person (HUF) in 2005	The number of researchers per 1000 inhabitants in 2005
1	**0** 51.7000	- 113.7200	**0** 16825.8000	**0** .2820
2	- 49.4100	- 113.5600	— 10212.0000	— .0640
3	++ 63.3500	**0** 114.7500	++ 31448.7500	++ 1.5050
4	— 47.7333	++ 117.4833	+ 21933.6667	- .2267
Sum total.	51.6960	114.7240	17745.8400	.3772

0: around average, — far below average, - a little below average, ++ far above average, + a little above average
Source: Author's own calculation with Spss 17.0 software

The original output was complemented with the markings that were used by Kovács and Balogh (2007) for easier understanding. The markings are shown at the bottom of the table; the averages inside the groups were compared to the given variable's average. Relying upon these data I can state that the sub-statistical regions in the 1st group show average values according to 4 variables and the in case of 3 indicators the

deviation from the average is also very small. Only the number of customer nights stands out in this group as it exceeds the average indicators of the other sub-statistical regions. The highest number values below the average can be found in group 2, with only the ratio of the agricultural employees showing significantly above the average results. The sub-statistical regions of group 3 have the best parameters; they have the best results regarding 5 variables and in comparison with the other groups the ratio of the agricultural employees has below average values. In group 4 results are slightly above or below the average. The sub-statistical regions in this group cannot be considered average even though they do not have extreme values.

The sub-statistical regions in group 2 have the worst results from the economic point of view. Geographically these sub-regions are located mainly along the Hungarian-Romanian and Hungarian-Serbian borders. According to the cluster analysis the most disadvantageous regions are: Bácsalmás, Kalocsa, Kiskőrös, Kunszentmiklós, Jánoshalma, Makó, Mórahalom, Mezőkovácsháza, Békés and the selected sub-region of Sarkad.

Effects of subsidies after joining the European Union in the sub-region of Sarkad

Hungary joined the European Union on 1 May 2004, but had been entitled to the subsidies of the Structural Funds and Cohesion Fund before that date. Those member states that did not reach 75% of the collective average of per capita GDP had to draw up a National Development Plan, in which they had to elaborate their aims and priorities. The fulfilment of the aims elaborated in the National Development Plan were helped by five operative programmes between 2004 and 2006 (Kerek and Marselek, 2009).

In 2007 a new budgetary period was started in Hungary (2007–2013), in which a new opportunity emerged and over the subsequent seven years Hungary has been drawing on its EU sources and acquiring 15 thousand billion forints for development. The New Hungary Development Plan was completed to make use of the developmental resources, and includes the main structural direction of the investments, and the strategic frameworks for the successful and effective utilization of the resources. Synchronized state and EU developments were initiated in six particular fields to fulfil these aims. These were the areas of the economy, transport, human resources, environment and energy policy, regional development and public utility services (Panyor, 2010).

The disadvantageous situation of the sub-region of Sarkad is the result of a long process, which has been accentuated by the unfavorable outcomes produced by the change in economic system in the region. The first element of this process occured when the big cooperative farms, which provided employment on a large scale, were eliminated, and most of the employees became unemployed. Unfortunately, most of these former agricultural workers could not become agricultural entrepreneurs, because of their lack of entrepreneurial skills (Restructuring program, 2005).

Figure 2 illustrates the subsidies gained by the subregion of Sarkad. It is clear that the per capita subsidies in the central settlement is the highest in Sarkad, and subsidies in Zsadány and Újszalonta, and Kötegyán are relatively high as well.
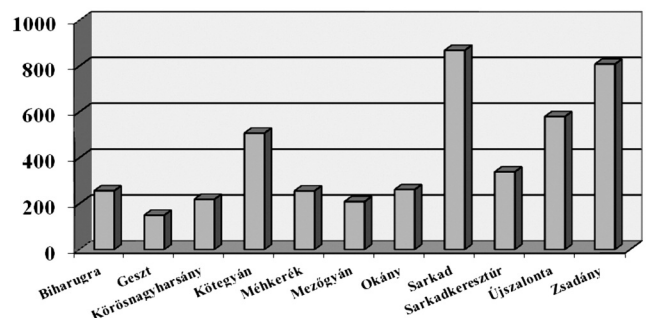
Figure 2: Subsidies per person in the settlements of the sub-region of Sarkad
Source: Personal research based on the publically available data from the NDA and ARDA, 2011

I conducted a cluster analysis based on the four complex index-groups, which resulted in four clearly different clusters. The first cluster contains those settlements whose cluster indexes showed the best results, and the fourth cluster contains those whose cluster indexes showed the worst results. We can conclude that those settlements where the per capita subsidies as compared to the average were over 100%, could improve one position on the cluster (Table 3). Four settlements managed to do so: Kötegyán, Sarkad, Újszalonta and Zsadány.

Table 3: Classification of the settlements of the sub-region of Sarkad according to the results of the national cluster analysis

Settlement	Cluster classification (2004)	Cluster classification (2009)	The degree of subsidy per person compared to the average
Biharugra	2	2	63.3%
Geszt	4	4	37.1%
Körösnagyharsány	4	4	54.2%
Kötegyán	4	3	**125.3%**
Méhkerék	2	2	63.2%
Mezőgyán	4	4	51.7%
Okány	4	4	64.6%
Sarkad	2	1	**214.4%**
Sarkadkeresztúr	4	4	83.6%
Újszalonta	4	3	**143.1%**
Zsadány	4	3	**199.5%**

Source: Personal research based on publically available data from the NDA and ARDA, 2011

Following this, I was curious to discover which region was most affected by the amount of subsidies using the complex indexes. I examined this in two different ways. First I checked the correlation between the amount of subsidies and the change in the settlement compared to all settlements between 2004 and 2009 (Table 4).

Here I experienced that the subsidies gained over the course of the NDP and the NHDP have had an economically

Table 4: The effect of certain subsidies on partial development 1.

		NDP	NHDP	Area-based, Agrarian-Environmental, Areas with Disadvantageous Conditions, Young Farmers	Subsidies sum total
Demographic	Correlation CE	**0.188**	**0.196**	**0.704**	**0.224**
	Sig.	0.581	0.563	0.016	0.507
Economic	Correlation CE	**0.743**	**0.814**	**0.566**	**0.832**
	Sig.	0.009	0.002	0.069	0.001
Infrastructural	Correlation CE	**0.590**	**0.495**	**0.510**	**0.519**
	Sig.	0.056	0.122	0.109	0.102
Revenue related	Correlation CE	**0.222**	**0.555**	**0.154**	**0.534**
	Sig.	0.512	0.077	0.651	0.091

Source: Personal research based on publically available data from the NDA and ARDA, 2011

Table 5: The effect of certain subsidies on partial development 2.

		NDP	NHDP	Area-based, Agrarian-Environmental, Areas with Disadvantageous Conditions, Young Farmers	Subsidies sum total
Demographic	Correlation CE	**0.171**	**0.191**	**0.669**	**0.218**
	Sig.	**0.614**	**0.573**	**0.024**	**0.520**
Economic	Correlation CE	**0.852**	**0.720**	**0.568**	**0.746**
	Sig.	**0.001**	**0.012**	**0.068**	**0.008**
Infrastructural	Correlation CE	**0.689**	**0.396**	**0.516**	**0.427**
	Sig.	**0.019**	**0.228**	**0.104**	**0.190**
Revenue related	Correlation CE	**0.210**	**0.574**	**0.139**	**0.553**
	Sig.	**0.536**	**0.065**	**0.683**	**0.078**

Source: Personal research based on publically available data from the NDA and ARDA, 2011

significant impact on the settlements of the sub-region of Sarkad, so the NDP and the NHDP affected only the economic index out of the four complex indexes. The highlighted part is clearly significant in the chart, since the significance of the correlation coefficient is under 1%.

I also conducted a correlation analysis on only those settlements in the sub-region of Sarkad. I took the mean of the eleven settlements' indexes separately. I determined the deviation of each settlement from the average in 2004 and 2009 and then correlated the difference between the two situations and the amount of subsidy (Table 5).

The highlighted sections show explicit significance. The NDP affected the economy and infrastructure, and the NHDP affected mainly the economy up to 2009. The area-based subsidies and the others ranked here mainly affected demographic aspects. Results marked in grey are close to the significance line, but have no real effect.

Conclusion

The result of the cluster analysis clearly shows that the most disadvantageous sub-statistical regions are mainly along the Hungarian-Romanian and Hungarian-Serbian borders in the Southern Great Plain region. Regarding the economic conditions of the sub-statistical regions our results support the statement that the region is on the periphery of the periphery. Funds from the European Union can represent new perspectives but only an improvement in the relationship among the frontier regions can reduce the isolation of the region. Those settlements that gained greater subsidies than the average improved one position in their cluster ranking. In so far as I examined the developmental change among all the settlements in Hungary, only the effects of the NDP and NHDP subsidies can be verified and only in the case of the economic index. If the developmental change is only examined in the settlements of the sub-region of Sarkad, all the three effects are significant in some of the indexes, but a strong correlation can only be observed in the economic aspect of the partial development.

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PAYBACK ANALYSIS OF E85- AND CNG-POWERED VEHICLES IN HUNGARY

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Abstract: As a result of my analysis it was found that when purchasing a new alternative fuel car only a CNG-powered vehicle could be a reasonable choice, the extra cost of which (depending on its scale) ensures a return within 2 – 7 years, i.e. over the real expected duration of use of the car. However, the spread of these cars is determined by the lack of CNG fuel stations in Hungary. The E85-powered so called FFV-s could become a competitive alternative with lower ethanol prices or moderate government support (for example a registration fee allowance similar to that enjoyed with hybrid vehicles, or reduced taxes)..

1. Introduction

As part of the fight against global warming there is a high reliance on the use of alternative, renewable fuels all over the world. Nothing confirms this better than the fact that the production of first generation bioethanol has increased from 49.5 billion litres to 88.5 bn. litres over the last five years, while at the same time the production of first generation biodiesel has almost doubled – from 9.3 million tons to 18.1 mill. tons (F.O. Licht 2011). However this tendency is accompanied by major political, social and scientific debates, which repeatedly question the positive judgement on bio fuels and consider the increase in production responsible for the price increase of agricultural products, the aggravation of starvation in countries in the Third World, and the clearing of rain forests and demand a limitation on the use of bio fuels or a change to the latest generation of bio fuels (which currently exist mainly in a trial form) (Bai 2011).

However, there is less discussion about the fact that, for instance, the EU-undertakings in the field of renewable fuels (2003/30/EC) cannot be carried out without a significant modification of vehicles, i.e. to ensure widely used first generation bio fuels can be mixed with the conventional fuel in a given percentage without the risk of motor or fuel-air system breakdown (www.zoldauto.info).

Therefore developed countries are attempting to promote the spread of alternative-powered vehicles by a wide range of methods. In the EU there are numerous possibilities for drivers requiring non-conventional fuels (e.g. E85, bio diesel, plant oil, electric cars, bioCNG) and in recent years various alternative-powered vehicles that have recently been designed or rebuilt domestically have begun to appear. The most typical example of this is probably the sharp increase in the trade in E85.

Considering the developments mentioned above, I analysed the return provided by E85- and CNG-powered vehicles from the potential consumers' point of view. In the course of my analysis I only briefly referred to other factors (e.g. range, refuelling/filling time, access to filling stations, safety) influencing the use and thus the spread of these vehicles. Since some renewable fuels are able to operate on recently modified vehicles as well as purpose built new ones, I also carried out the analyses on this scenario. By defining the rate of return on the annual driving performance of an average Hungarian vehicle, I took inflation, the expected price increase in traditional fuels and the affect of excise duty on E85 – 40 HUF/l (Act XCVI of 2011) – into consideration too.

2. Materials and methods

I tried to choose as the subject of my analysis those types of alternative-powered vehicles that are available with their traditional equivalents (Otto-powered). In Hungary CNG-powered vehicles are considered an extreme case, and are not distributed in all cases in the country (e.g. Opel distributes, VW does not); however they can easily be purchased in Austria or Germany and for those who are living near to the border the inadequacy of the national filling station-network does not cause any problem because CNG-powered vehicles are also available for private individuals in Austria, Slovakia and in Romania (Time for Gas 2011).

The prices of vehicles that can only be purchased abroad (certain CNG-powered cars) have been converted into HUF for easier comparison; the exchange rate is 1 EUR=280 HUF, and 1 USD=200 HUF. With these vehicles I did not calculate a registration fee since it is irrelevant in terms of the return

because, as per current regulations only hybrid/electric vehicles qualify for the tax allowance (Act CX of 2003).

In the case of fuels I calculated with the following prices:

- Petrol 95: I used the retail prices of the third quarter of the year 2011 (380 HUF/l) recorded by the Energy Efficiency, Environment and Energy Information Agency Non-profit Company (www.energiakozpont.hu) and I calculated an annual 5% price increase. Over the past years excise duty on fuels has been increased twice within a short period and the VAT-rate has also been modified; thus a considerable petrol price increase has occured (Szarvas 2010). In the previous period (between 2000 and 2008) the level of the petrol price fluctuated between -3% and +4% compared to previous years so if petroleum prices stabilize, this tendency may continue in the mid-term. However in view of the difficult economic situation of the country, a new excise duty increase can occur at any time; due to this risk I calculated for a higher fuel price increase.
- In the case of E85 I used the average price in September (305 HUF/l) based on www.holtankoljak.hu. As in the previous years the price of E85 fluctuated together with the price of petrol, falling short of the petrol price by 90-100 HUF. However this difference was reduced to 75 HUF by passing more than half of the excise duty on to consumers, which makes bioethanol non-competitive for consumers. In the course of the analysis I assumed that the market will slowly return to a difference of about 90 HUF/l.
- In case of CNG I calculated with the constant price – 249.9 HUF/kg of the CNG filling station in Győr (www.biobumm.hu). This is among the lower prices in the EU, thus in the mid-term I calculated for the same price increase as for petrol prices; in the long-term (simultaneously with the increase in CNG driving) I calculated for a price increase (6.5%) in excess of that for petrol.

In all cases the basis for comparison was the petrol models of the analysed brand being of a similar or largely similar power and similarly equipped, as indicated in the list price..

To compare for typical consumers I used the data for consumption indicated by the factory. In the base-case I calculated for a 20,000 km driving performance, which corresponds to the national average annual driving performance of vehicles (www.autostitkok.hu). I analysed how the return would change in the case of greater use i.e. 30 – and 40,000 km.

The analysis was extended to 7 years since on the basis of Appendix No. 2 of the corporate tax law (Act LXXXI. of 1996) personal cars shall be written off within this period. According to Greene et al. (2005) as well as Santini and Vyas

(2005) most consumers in the U.S. expect a very short payback period (less than 3 years) so (considering the more moderate financial potential of Hungarian consumers, and thus their lower expectations as well) it is necessary to point out that if the extra cost of the car does not return within 4-5 years the investment is not profitable if we merely take economic aspects into consideration. In the course of the analysis I assumed that maintenance costs were the same so I disregarded these.

To calculate the dynamic rate of return I included discounting on the basis of the inflation forecast of the Hungarian National Bank (www.mnb.hu).

3. Results and discussion

3.1. Flexi-fuel vehicles

The analysis includes the new Ford Focus 1.6 Trend (flexi-fuel 120 HP, normal model 125 HP) and the Volvo S40 2.0 Kinetic (both are 145 HP) models. As the flexi-fuel Focus is not currently marketed in Hungary I considered German prices as standard. Table 1 demonstrates the results of the analysis. The table shows clearly that an FFV is not worth buying in the current economic situation though this is not due to the extra cost, since this is insignificant, but to the extra consumption, which cannot be compensated for by the lower price of E85. For this reason with an increase in annual driving performance the NPV decreases.

Table 1: Returns for Ford Focus and Volvo S40 FFV-s

Model	Extra cost (th HUF)	Consumption gasoline/ E85 (l/100km)	Driving performance (km)	NPV in the 5th year (th HUF)	NPV in the 7th year (th HUF)	DPP (year)
Ford			20,000	-294	-394	-
Focus 1.6	70	6.0/*8.3*	30,000	-409	-562	-
Flexi-fuel			40,000	-525	-730	-
Volvo			20,000	-425	-561	-
S40 2.0	120	7.6/*10.6*	30,000	-585	-792	-
Flexifuel			40,000	-744	-1,023	-

Source: Author's own calculations

The return would be possible in two cases; firstly if the ethanol ingredient in E-85 were exempted from excise duty again. In this case environmental driving would mean minimum extra costs (NPV in the 7th year between -60 and -140 th HUF) which consumers would be ready to pay. Knowing the domestic tax system, this version does not seem likely. The other option would be the extension of the registration fee allowance (uniformly 190 th HUF); in this case the Ford Focus Flexi-fuel would cost 288 th HUF less and the Volvo S40 Flexi-fuel 830 th HUF less; this allowance would compensate the extra costs of the consumption within

the first 5 years in the case of the Ford and in the total period under analysis in the case of the Volvo – calculating on a 20,000 km driving performance per year.

3.2. CNG-powered vehicles

I chose two family cars; the Opel Zafira 1.6 CNG Turbo Essentia (150 HP) and the Volkswagen Touran 1.4 TSI EcoFuel Trendline (150 HP) from among CNG-powered motor vehicles. The basis of the comparison were the Opel Zafira 1.8 Essentia (140 HP) and Volkswagen Touran 1.4 TSI (140 HP) models. The Opel model is available in Hungary, the Volkswagen is not; therefore in this case I calculated with German prices. Table 2 clearly shows that the Opel Zafira, which is offered at a significantly lower extra cost, returns the investment within 2 years and by the end of the analysed period it provides a 1,400 th HUF saving for its owner, while a return on investment with the Volkswagen Touran – sold with an extra cost more than three times higher – cannot be expected within the analysed period. By increasing the driving performance however, the return period can be decreased to 5 years.

Table 2: Returns for CNG-powered vehicles

Model	Extra cost (th HUF)	Consumption gasoline/ CNG (l/100km; kg/100km)	Driving performance (km)	NPV in the 5th year (th HUF)	NPV in the 7th year (th HUF)	DPP (year)
Opel			20,000	854	1,397	2
Zafira 1.6	585	*7.2/5.3*	30,000	1,538	2,337	1.3
CNG			40,000	2,222	3,278	1
Turbo						
VW			20,000	-661	-152	-
Touran	1711	6.8/4.7	30,000	-212	436	5.7
1.4 TSI			40,000	237	1,023	4.5
EcoFuel						

Source: Author's own calculations

A case study estimates the payback periods of light-duty natural gas vehicles at less than 3 years for average users in Argentina, Brazil, India, Italy and New Zealand. Only in the U.S. was the payback period definitely higher (about 6 years) (Yeh 2007). In Hungary the average payback period is more than 3 years but it could be decreased if the registration fee allowance on hybrid/electric vehicles were extended to CNG-powered personal cars. In this case the extra costs of the Opel Zafira would decrease to 297 th HUF, which in practice would be returned within 1 year with an average driving performance, while the Volkswagen Touran would cost 1,600 th HUF more, which would be returned within 7 years – calculating for an average (20,000 km/year) driving performance.

4. Conclusion

In the current situation, for the casual observer only the CNG-powered personal cars can be considered as a renewable alternative, and only those types that are offered at a lower extra cost, such as the Opel Zafira or the Chevrolet Nubira (Jobbágy et al. 2010). An essential condition for the spread of these vehicles is the development of public filling-stations, towards which fuel-distributors have begun to take slow, tentative steps. From the government's side it would be especially profitable to support this kind of effort, thinking particularly of the production and distribution of CNG obtained from the sewage-plants of big cities, since these vehicles cover their costs within a reasonable time without any support and (by using bioCNG) contribute significantly to the fulfilment of national renewable fuel targets.

E85-powered, flexi-fuel vehicles would give a greater or lesser financial loss to their owners in the current economic situation; thus it is not likely that they would choose these types or run them with fuel. However this situation can easily be reversible, if the unified registration fee allowance – which currently only applies to electric/hybrid vehicles– were extended to E85-powered, flexi-fuel vehicles. In this case an increase in their market share can be expected.

The bio fuel act at present in force (Act CVII. of 2010) does not make compliance with EU requirements in the terms of the use of renewable fuels possible, therefore for the government it would be practical to support the spread of CNG- and E85-powered personal vehicles. Expenditure on support (development of the bioCNG filling-station network) and lost revenue (the registration tax allowance) would be returned from the reasonable level of excise duty on these fuels.

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THE EFFECTS OF GLOBAL REAL ECONOMIC CRISIS ON THE MARKETS FOR FOSSIL AND RENEWABLE FUELS

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Abstract: The 2008/2009 world economic crisis had significant impact on the oil and fuel markets. The crisis developed from the meltdown of American and European mortgage and financial markets and rapidly involved the global real economy. As each country reacted differently to the crisis, the changes in the fuel market also showed significant geographic variation. In our present research, the actions of the US, German and Hungarian fuel markets were analysed for the answer to the reasons for the differences in crisis reactions. We examined the tendency of fuel consumption, the changes of price elasticity for gasoline and diesel and the possible effects of the crisis on the regulatory system.

Keywords: global economic crisis, fuel market, biofuels

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1. Introduction

Crude oil is one important core point of the modern economy, thus actions on the crude oil market interact closely with events in the global economy. This interaction was no different during the 2008/2009 world economic crisis, during which the threat of global market recession drove prices higher to a great extent, accelerated the process of collapse. After that the prices fell to their lowest level and they only began to recover by the economic boost. *Figure 1* illustrates the tendency of crude oil prices.

Figure 1: Crude oil prices between 2007 and 2010
Source: Energy Centre Ltd, 2011

This tendency is slightly modulated by the higher rate of the presence of biofuels, both on the national and global markets (*Figure 2*). Biofuels, as substituting products, have considerable subsidisation and compete with fossil fuels. The

Figure 2: Development of biofuel trade
Source: FAPRI, 2011

figure demonstrates that the recession especially affected the bioethanol trade; turnover from biodiesel was diminished to a much lesser degree. In one respect, the reason for this difference is that ethanol is present on the global market with significantly higher volume. From another aspect, the biggest exporter, Brazil, is flexibly handling the incorporation of bioethanol, hereby regulating – considering world economic tendencies – the bioethanol quantity getting into the world market.

1.1. Regulation system

Markets for biofuels are strongly regulated by developed countries. Regulation is primarily for environmental protection. Therefore, it mostly finds expression in minimal incorporation quotas, tax allowances and penalties that are to

be paid in cases of non-observance of quotas. We essentially verify that the regulation increasingly inclines towards the latter system as support for increased biofuels turnover imposes a significant burden on the budget. We introduce the regulation systems of major world market operators, as follows:

The market for traditional biofuels is basically determined in Brazil by the incorporation rate, which must be directly changed by 20-25% annually, in the USA by the RFS (Renewable Fuel Standard, 2007) modified by the EISA (Energy Independence and Security Act, 2010), in the EU by the renewable fuels rate expected for 2020 by the regulation no. 2009/28/EC.

The EU law limits the emission quantity of various biofuels during their life cycle (through that the applicable agricultural/industrial technologies also), in the case of import biodiesel, the sustainable requirements for production, as well. Thus, biofuels are only included in quotas' fulfilment and can only be supported from 2011 (in cases of factories launched before 2008, from 2013) if their production and utilization decrease the emission of GHGs by at least 35%, compared to fossil energy sources. With the currently applied general technologies, emission decreases exceeding 35% can be reached only with the utilization of rapeseed (- 38%) and corn (-47-49%). In the case of biofuel imports into the EU, social (work safety) criteria have already been specified that makes it difficult for exporter countries (e.g. Brazil) to export biofuels to the EU (Popp et al, 2010).

Table 1 shows the most important expectations on biofuels concerning the near future.

Table 1: Expectation on biofuels

Expected quantity	2010		2012		2020 (EU)	2022 (US)
	total biofuel	2nd gen. biofuel	total biofuel	2nd gen. biofuel	total biofuel	2nd gen. biofuel
EU (energy%)	5.75	-	-	-	10	-
USA (million l)	-	25	-	1893	107.47*	3785
Expected green-house gas emission	*1BE[2]*	*1BD[3]*	*1BM[4]*	*2CE[5]*	*2FTD[6]*	*2DME[7]*
EU (g CO_2eq/MJ)[1]	24-70	37-68	15-23	13-25	4-6	5-7

Source: IEA, 2010; 2009/28/EC Directive; Coyle, 2010
Symbols: * million tons
[1]: depends on raw material and technology, [2-4]: 1st generation biofuels ([2]: bioethanol, [3]: biodiesel, [4]: bio-methane) [5-7]: 2nd generation biofuels ([7]: cellulose based ethanol, [8]: Fischer-Trops diesel, [9]: dimethyl-ether)

In Brazil, the obligatory incorporation rate of biodiesel was increased from 2% in 2008 to 3% in 2009. Tax allowance on biodiesel production fluctuates between 0–100%, depending on what kind of raw material, what kind of territory and what type of holdings (family or joint) are producing biodiesel. In the USA, there is a 0.12 USD/l tax allowance on corn-based fuel production, while on new generation biofuels, there is a 0.27 USD/l tax allowance (Coyle, 2010); meanwhile, the EU Member States have

different support systems, but as per fuel type the allowance is not differentiated.

Regulation on biofuels has an impact on automobile industry, too. Fulfilment of the specifications of RFS would be possible by raising the current 10% incorporate norm; however, this increases the risk in the motor industry too, which gives warranties on their cars only up to 10%. In the EU, in the case of diesel oil, this figure is 7%, for petrol 10%, biofuel (and 15% ETBE) can be incorporated into the standard fuel. However, this has not been published in national legislation yet; by June 2010, merely four Member States (Austria, France, Germany and The Netherlands) had launched it. Naturally, E-85 and B-100 standards also exist, which can safely be used only with FFV, functioning at an extremely low rate.

2. Materials and methods

2.1. Objectives

Following objectives were set for the examinations:
1. a search for possible correlations between the increase of real GDP and oil utilization
2. an analysis of the relation between fuel prices and consumption on the national level
3. an examination of price elasticity on fuel demand
4. an analysis of the effects of the possible changes brought about by regulation systems on some biofuel markets

2.2. Target areas

We chose three countries, the USA, Germany and Hungary, as target points of the analyses. The reasons for our choices are as follows:
1. The global financial and real economy crisis started in the USA and the most bioethanol is produced here (Popp et al 2010); thus, it has an important role in the global biofuel sector
2. Germany is the EU and European leader in biodiesel production and consumption; its market actions determine the biofuel market of whole Europe, particularly as regards Central and Eastern European biofuel producing countries having commercial relationships with Germany
3. Hungary is the typical example for the indirect effects of the crisis on the biofuel market; moreover, its ethanol market development stands in contrast with American and German tendencies.

2.3. Databases and methodology

We used the databases of EIA (Energy Information Administration), BAFA (Bundesamt für Wirtschafts- und Ausfuhrkontrolle), Energy Centre Ltd, Hungarian Customs

and Finance Guard, EUROSTAT and FAPRI. We prepared analyses using the MS Office 2010 Excel and SPSS Statistics 17 programmes.

In the course of our research, we applied Pearson's correlation analysis and price elasticity calculation of demand; their methods are briefly introduced, as follows:

- Pearson's correlation: Values of r correlation coefficient can fluctuate between -1 and + 1 depending on the strength and direction of the relation. If r=0, linear relation between X and Y can be excluded, though non-linear relation between variables can be existed as r is inadequate to measure that. The definition of Pearson's correlation coefficient (r) in a supervised n sample, takes place as follows (MALHOTRA, 1999):

$$r = \frac{\sum (X_i - \overline{X})(Y_i - \overline{Y})}{\sqrt{\sum (X_i - \overline{X})^2} \sqrt{\sum (Y_i - \overline{Y})^2}}$$

- Price elasticity of demand: we examined the price sensitivity of fuel demand by defining the curve elasticity. Price elasticity gives the percentage change in quantity demanded in response to a one percent change in price. Calculation is by means of the following formula, where Dg is the demand, Pg is the fuel (on the basis BRONS ET AL, 2007):

$$\varepsilon D_g = \frac{\delta D_g}{\delta P_g} * \frac{P_g}{D_g}$$

3. Results and discussion

3.1. Correlation between the change in real GDP and consumption of petroleum products

As we explained in the introduction, some kind of interaction can be observed that is expressed both in prices and consumption. As GDP is the most widely accepted indicators of economic increase, we compared its alterations in the cases of the USA and selected European countries to changes which occurred in petroleum product consumption. *Table 2* contains starting data of the correlation analysis.

The performed correlation analysis has shown significant and relatively strong (r= 0.604 – 0.694) correlation between real GDP and change in petroleum products consumption in 2007 and 2009. It can be stated that strong correlation is not typical of that two indicators, as developed countries are striving for the reduction of CO_2-emissions, consequently for the reduction of petroleum utilization. In this way, less growing or decreasing petroleum utilization can be realised by growing real GDP. However, the world economic crisis diminished the economic operation so much that it resulted in the reduction of petroleum consumption in an expressly verifiable and provable way.

3.2. Analsis of fuel prices and consumption in chosen countries

Since fuels are rather inelastic to price, it is difficult to present any obvious correlation between the prices and

Table 2: Consumption of petroleum products in selected countries (1000 bbl/day)

Country	2007	change% 06/07	real GDP growth rate 06/07 (%)	2008	change% 07/08	real GDP growth rate 07/08 (%)	2009	change% 08/09	real GDP growth rate 08/09 (%)
United States	19964.6	-0.12	*1.90*	18788.2	-5.89	*0.00*	18096.1	-3.68	*-2.60*
Czech Republic	206.6	-0.48	*6.10*	208.6	0.97	*2.50*	203.7	-2.35	*-4.10*
Hungary	159.9	-1.24	*0.80*	160.9	0.63	*0.80*	156.9	-2.49	*-6.70*
Poland	510.4	3.78	*6.80*	533.9	4.60	*5.10*	533.9	0.00	*1.70*
Romania	223.2	4.35	*6.30*	205.1	-8.11	*7.30*	176.9	-13.75	*-7.10*
Slovakia	61.9	5.09	*10.50*	63.4	2.42	*5.80*	59.7	-5.84	*-4.80*
France	1857.3	-0.85	*2.40*	1874.3	0.92	*0.20*	1769.5	-5.59	*-2.60*
Germany	2448.9	-8.21	*2.70*	2546.1	3.97	*1.00*	2415.2	-5.14	*-4.70*
Italy	1650	-3.16	*1.50*	1602.1	-2.90	*-1.30*	1517.1	-5.31	*-5.20*
Nether-lands	671	-1.11	*3.90*	654	-2.53	*1.90*	626.9	-4.14	*-3.90*
Spain	1426.7	1.45	*3.60*	1383.3	-3.04	*0.90*	1312.4	-5.13	*-3.70*
United Kingdom	1555.7	-3.66	*2.70*	1530.6	-1.61	*-0.10*	1493.9	-2.40	*-4.90*

Source: OPEC, 2010; EUROSTAT, 2011, own calculations

consumption within a country; however, in the case of international outlook, it can be proved that in countries (e.g. USA, Canada) applying lower fuel prices, fuel consumption per capita is basically higher than in typically more expensive countries, such as EU Member States (LITMAN, 2011).

It can be stated as a whole that fuel prices in the three examined countries followed the tendency of petroleum prices during the analysed period; primarily, exchange rate fluctuations (USD – EUR; USD – HUF) are responsible for small extent deviation of the shown tendencies. Fuel consumption per capita loosely followed the prices, although the above-mentioned territorial differences (the USA vs. the EU) can be clearly seen in *Figure 3*.

Figure 3: Fuel prices and consumption in the USA, Germany and Hungary
Source: EIA, 2011; BAFA, 2011; VPOP, 2011; Energy Centre Ltd., 2011

Figure 3 demonstrates that, while in the USA, decrease in consumption per capita was primarily significant in 2008, until then, in Germany and Hungary, due to the delayed arrival of the crisis, a significant decline first took place in 2009.

3.3. Evaluation of biofuel consumption

Figure 4: Biofuel consumption of the EU and the USA
Source: FAPRI, 2011

Taken as a whole, biofuel consumption, independent of the crisis, shows a growing tendency both in the USA and in the EU (*Figure 4*); however, significant fluctuation was experienced in consumption on the monthly level during the crisis.

Figure 5: Monthly bioethanol and biodiesel consumption in the examined countries
Source: EIA, 2011; BAFA, 2011; VPOP, 2011

Major fluctuation was experienced on the German market, whereas the Hungarian ethanol market for the major part of the examined period, showed steep growth (the reasons for this are discussed in detail in section 3.5.). Biodiesel and plant oil consumption were the most unstable in the examined period (*Figure 5*). This was due to the extremely high oilseed prices, which had just increased the net cost of biodiesel when petroleum prices hit the historical bottom. Therefore, significant state support was not able to compensate the price difference, either.

3.4. Price elasticity of fuel demand

As fuel prices do not correlate with consumption, price elasticity of demand is the only indicator by which their effects can be quantified. *Tab. 3* contains price elasticities of demand. It is remarkable that values for elasticity are mostly different from bibliographic data (-0.1 – -0.38; GOODWIN ET AL, 2004; DAHL, 2011). The reason for these significant

Table 3: Fuel price elasticities in the USA, Germany and Hungary

Year	gasoline price elasticity			diesel price elasticity		
	US	DE	HU	US	DE	HU
2008	-0.25	0.71	0.22	-0.58	3.05	2.99
2009	0.01	0.84	1.16	0.27	-0.66	-1.04
2010	0.04	-0.10	-0.71	-0.18	0.02	0.81

Source: own calculations

deviations is the chaos caused by the crisis, which disarranged petroleum prices and exchange rates. Furthermore, the crisis has made several enterprises bankrupt and has caused significant increase in unemployment, thus reducing the purchasing power of households. The combined effect of many special factors has disarranged the traditional price-consumption relationship on the fuel market.

3.5. Effects of alteration in regulation systems on the biofuels market

The most important change in the USA was that on 13 October, 2010, when the incorporation rate of bioethanol was increased by 15% for cars and vans manufactured in and after 2007. This change affected approximately 1/3 of the entire fuel consumption (TÓTH, 2010). Change in regulation practically had no impact on the examined period, as it was carried out at the end of that given period. As the regulation system was practically unchanged in the period 2007-2010, fluctuations in the American biofuel market were due to the economic situation.

Development of regulation was completely foreseeable in Germany, too. Bioethanol is tax-free, whereas the tax allowance on biodiesel was lowered from 0.3994 EUR/l to 0.3034 EUR/l in the examined period. It can also be stated that the regulation system did not change in a drastic or unforeseeable way, thus biofuel fluctuation can be traced back to the market conditions. (See chapter 3.3.).

The Hungarian regulation system changed several times during the crisis. Regulation for biofuels was not affected (these were only changed in 2010 (CVII. law of 2010) but due to the crisis, the excise duty rate and VAT-rate were increased. Therefore, the excise duty on fuel has risen from HUF 130.5 to HUF 120, duty on gasoil rose from HUF 88.9 to HUF 97.35 (SZARVAS, 2010). Considering that the excise duty is also the basis of VAT, the effect of this price increase was more significant – in the case of petrol it was HUF 20.6 , regarding

gasoil it was HUF 10.6. This sudden price increase prosperously influenced turnover of E-85 in the country (*Figure 5*) as fuel content of E85 is excise duty free.

Figure 6 illustrates the content of fuel prices in the examined period. It can be clearly seen that lower fuel prices in the USA are primarily due to the lower tax rates. The fact that the tax ratio in Hungarian fuel prices did not grow, in spite of the increasing tax rate, is due to the growth of petroleum prices and the HUF-USD rate.

4. Conclusion

Usually, there is no close correlation between the consumption of petroleum products and the change in real GDP, although the interaction between the economy and the petroleum market is well known. However, the crisis influenced the economic processes in 2009 to such an extent that such a correlation became a reality.

Fuel prices, as usual, obviously followed the evaluation of the world price of oil during the examined period, also affected by = differences caused by the fluctuations in the exchange rate (EUR-USD; HUF-USD). The per capita consumption only loosely followed the evaluation of prices, mainly for two reasons. On the one hand, fuels are traditionally inelastic products: price has little effect on their demand in the short term; on the other hand, fluctuations caused by the crisis suppressed all the other effects.

Demand for biofuels, despite the crisis, has shown more steady growth in the USA than in the EU, but monthly, there were very significant fluctuations. These were mainly due to such increases as those seen in raw material prices, which made the substantial part of renewable fuels non-competitive, even under significant state subsidization.

Hungary is an exception to this tendency, where the increase in excise duty rate and VAT-rate occurred within a short time and led to a record increase in fuel prices, thus causing an explosive growth in demand on the E85 fuel market.

In the analysed period, the price elasticity of fuel demand greatly deviated from the bibliographic data. The reason for this is the chaos caused by the crisis, which disarranged petroleum prices and exchange rates, while rendering several enterprises bankrupt and causing a significant increase in unemployment, thus reducing the purchasing power in household sector. The combined effect of many special factors has brought upheaval to the traditional price-consumption relationship on the fuel market.

The biofuel market was not directly affected by the renewable fuel regulation systems of the examined states, since their changes occurred at the end of the analysed period. However, in the near future, they will become significant direct determinant factors.

Figure 6: Composition of fuel prices
Source: EIA, 2011; own calculations

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be paid in cases of non-observance of quotas. We essentially verify that the regulation increasingly inclines towards the latter system as support for increased biofuels turnover imposes a significant burden on the budget. We introduce the regulation systems of major world market operators, as follows:

The market for traditional biofuels is basically determined in Brazil by the incorporation rate, which must be directly changed by 20-25% annually, in the USA by the RFS (Renewable Fuel Standard, 2007) modified by the EISA (Energy Independence and Security Act, 2010), in the EU by the renewable fuels rate expected for 2020 by the regulation no. 2009/28/EC.

The EU law limits the emission quantity of various biofuels during their life cycle (through that the applicable agricultural/industrial technologies also), in the case of import biodiesel, the sustainable requirements for production, as well. Thus, biofuels are only included in quotas' fulfilment and can only be supported from 2011 (in cases of factories launched before 2008, from 2013) if their production and utilization decrease the emission of GHGs by at least 35%, compared to fossil energy sources. With the currently applied general technologies, emission decreases exceeding 35% can be reached only with the utilization of rapeseed (- 38%) and corn (-47-49%). In the case of biofuel imports into the EU, social (work safety) criteria have already been specified that makes it difficult for exporter countries (e.g. Brazil) to export biofuels to the EU (Popp et al, 2010).

Table 1 shows the most important expectations on biofuels concerning the near future.

Table 1: Expectation on biofuels

Expected quantity	2010		2012		2020 (EU)	2022 (US)
	total biofuel	2nd gen. biofuel	total biofuel	2nd gen. biofuel	total biofuel	2nd gen. biofuel
EU (energy%)	5.75	-	-	-	10	-
USA (million l)	-	25	-	1893	107.47*	3785
Expected green-house gas emission	*1BE[2]*	*1BD[3]*	*1BM[4]*	*2CE[5]*	*2FTD[6]*	*2DME[7]*
EU (g CO_2eq/MJ)[1]	24-70	37-68	15-23	13-25	4-6	5-7

Source: IEA, 2010; 2009/28/EC Directive; Coyle, 2010
Symbols: * million tons
[1]: depends on raw material and technology, [2-4]: 1st generation biofuels
([2]: bioethanol, [3]: biodiesel, [4]: bio-methane) [5-7]: 2nd generation biofuels
([7]: cellulose based ethanol, [8]: Fischer-Trops diesel, [9]: dimethyl-ether)

In Brazil, the obligatory incorporation rate of biodiesel was increased from 2% in 2008 to 3% in 2009. Tax allowance on biodiesel production fluctuates between 0–100%, depending on what kind of raw material, what kind of territory and what type of holdings (family or joint) are producing biodiesel. In the USA, there is a 0.12 USD/l tax allowance on corn-based fuel production, while on new generation biofuels, there is a 0.27 USD/l tax allowance (Coyle, 2010); meanwhile, the EU Member States have

different support systems, but as per fuel type the allowance is not differentiated.

Regulation on biofuels has an impact on automobile industry, too. Fulfilment of the specifications of RFS would be possible by raising the current 10% incorporate norm; however, this increases the risk in the motor industry too, which gives warranties on their cars only up to 10%. In the EU, in the case of diesel oil, this figure is 7%, for petrol 10%, biofuel (and 15% ETBE) can be incorporated into the standard fuel. However, this has not been published in national legislation yet; by June 2010, merely four Member States (Austria, France, Germany and The Netherlands) had launched it. Naturally, E-85 and B-100 standards also exist, which can safely be used only with FFV, functioning at an extremely low rate.

2. Materials and methods

2.1. Objectives

Following objectives were set for the examinations:
1. a search for possible correlations between the increase of real GDP and oil utilization
2. an analysis of the relation between fuel prices and consumption on the national level
3. an examination of price elasticity on fuel demand
4. an analysis of the effects of the possible changes brought about by regulation systems on some biofuel markets

2.2. Target areas

We chose three countries, the USA, Germany and Hungary, as target points of the analyses. The reasons for our choices are as follows:
1. The global financial and real economy crisis started in the USA and the most bioethanol is produced here (Popp et al 2010); thus, it has an important role in the global biofuel sector
2. Germany is the EU and European leader in biodiesel production and consumption; its market actions determine the biofuel market of whole Europe, particularly as regards Central and Eastern European biofuel producing countries having commercial relationships with Germany
3. Hungary is the typical example for the indirect effects of the crisis on the biofuel market; moreover, its ethanol market development stands in contrast with American and German tendencies.

2.3. Databases and methodology

We used the databases of EIA (Energy Information Administration), BAFA (Bundesamt für Wirtschafts- und Ausfuhrkontrolle), Energy Centre Ltd, Hungarian Customs

and Finance Guard, EUROSTAT and FAPRI. We prepared analyses using the MS Office 2010 Excel and SPSS Statistics 17 programmes.

In the course of our research, we applied Pearson's correlation analysis and price elasticity calculation of demand; their methods are briefly introduced, as follows:

- Pearson's correlation: Values of r correlation coefficient can fluctuate between -1 and + 1 depending on the strength and direction of the relation. If r=0, linear relation between X and Y can be excluded, though non-linear relation between variables can be existed as r is inadequate to measure that. The definition of Pearson's correlation coefficient (r) in a supervised n sample, takes place as follows (MALHOTRA, 1999):

$$r = \frac{\sum (X_i - \overline{X})(Y_i - \overline{Y})}{\sqrt{\sum (X_i - \overline{X})^2} \sqrt{\sum (Y_i - \overline{Y})^2}}$$

- Price elasticity of demand: we examined the price sensitivity of fuel demand by defining the curve elasticity. Price elasticity gives the percentage change in quantity demanded in response to a one percent change in price. Calculation is by means of the following formula, where Dg is the demand, Pg is the fuel (on the basis BRONS ET AL, 2007):

$$\varepsilon D_g = \frac{\delta D_g}{\delta P_g} * \frac{P_g}{D_g}$$

3. Results and discussion

3.1. Correlation between the change in real GDP and consumption of petroleum products

As we explained in the introduction, some kind of interaction can be observed that is expressed both in prices and consumption. As GDP is the most widely accepted indicators of economic increase, we compared its alterations in the cases of the USA and selected European countries to changes which occurred in petroleum product consumption. *Table 2* contains starting data of the correlation analysis.

The performed correlation analysis has shown significant and relatively strong (r= 0.604 – 0.694) correlation between real GDP and change in petroleum products consumption in 2007 and 2009. It can be stated that strong correlation is not typical of that two indicators, as developed countries are striving for the reduction of CO_2-emissions, consequently for the reduction of petroleum utilization. In this way, less growing or decreasing petroleum utilization can be realised by growing real GDP. However, the world economic crisis diminished the economic operation so much that it resulted in the reduction of petroleum consumption in an expressly verifiable and provable way.

3.2. Analsis of fuel prices and consumption in chosen countries

Since fuels are rather inelastic to price, it is difficult to present any obvious correlation between the prices and

Table 2: Consumption of petroleum products in selected countries (1000 bbl/day)

Country	2007	change% 06/07	real GDP growth rate 06/07 (%)	2008	change% 07/08	real GDP growth rate 07/08 (%)	2009	change% 08/09	real GDP growth rate 08/09 (%)
United States	19964.6	-0.12	*1.90*	18788.2	-5.89	*0.00*	18096.1	-3.68	*-2.60*
Czech Republic	206.6	-0.48	*6.10*	208.6	0.97	*2.50*	203.7	-2.35	*-4.10*
Hungary	159.9	-1.24	*0.80*	160.9	0.63	*0.80*	156.9	-2.49	*-6.70*
Poland	510.4	3.78	*6.80*	533.9	4.60	*5.10*	533.9	0.00	*1.70*
Romania	223.2	4.35	*6.30*	205.1	-8.11	*7.30*	176.9	-13.75	*-7.10*
Slovakia	61.9	5.09	*10.50*	63.4	2.42	*5.80*	59.7	-5.84	*-4.80*
France	1857.3	-0.85	*2.40*	1874.3	0.92	*0.20*	1769.5	-5.59	*-2.60*
Germany	2448.9	-8.21	*2.70*	2546.1	3.97	*1.00*	2415.2	-5.14	*-4.70*
Italy	1650	-3.16	*1.50*	1602.1	-2.90	*-1.30*	1517.1	-5.31	*-5.20*
Nether-lands	671	-1.11	*3.90*	654	-2.53	*1.90*	626.9	-4.14	*-3.90*
Spain	1426.7	1.45	*3.60*	1383.3	-3.04	*0.90*	1312.4	-5.13	*-3.70*
United Kingdom	1555.7	-3.66	*2.70*	1530.6	-1.61	*-0.10*	1493.9	-2.40	*-4.90*

Source: OPEC, 2010; EUROSTAT, 2011, own calculations

consumption within a country; however, in the case of international outlook, it can be proved that in countries (e.g. USA, Canada) applying lower fuel prices, fuel consumption per capita is basically higher than in typically more expensive countries, such as EU Member States (LITMAN, 2011).

It can be stated as a whole that fuel prices in the three examined countries followed the tendency of petroleum prices during the analysed period; primarily, exchange rate fluctuations (USD – EUR; USD – HUF) are responsible for small extent deviation of the shown tendencies. Fuel consumption per capita loosely followed the prices, although the above-mentioned territorial differences (the USA vs. the EU) can be clearly seen in *Figure 3*.

Figure 3: Fuel prices and consumption in the USA, Germany and Hungary
Source: EIA, 2011; BAFA, 2011; VPOP, 2011; Energy Centre Ltd., 2011

Figure 3 demonstrates that, while in the USA, decrease in consumption per capita was primarily significant in 2008, until then, in Germany and Hungary, due to the delayed arrival of the crisis, a significant decline first took place in 2009.

3.3. Evaluation of biofuel consumption

Figure 4: Biofuel consumption of the EU and the USA
Source: FAPRI, 2011

Taken as a whole, biofuel consumption, independent of the crisis, shows a growing tendency both in the USA and in the EU (*Figure 4*); however, significant fluctuation was experienced in consumption on the monthly level during the crisis.

Figure 5: Monthly bioethanol and biodiesel consumption in the examined countries
Source: EIA, 2011; BAFA, 2011; VPOP, 2011

Major fluctuation was experienced on the German market, whereas the Hungarian ethanol market for the major part of the examined period, showed steep growth (the reasons for this are discussed in detail in section 3.5.). Biodiesel and plant oil consumption were the most unstable in the examined period (*Figure 5*). This was due to the extremely high oilseed prices, which had just increased the net cost of biodiesel when petroleum prices hit the historical bottom. Therefore, significant state support was not able to compensate the price difference, either.

3.4. Price elasticity of fuel demand

As fuel prices do not correlate with consumption, price elasticity of demand is the only indicator by which their effects can be quantified. *Tab. 3* contains price elasticities of demand. It is remarkable that values for elasticity are mostly different from bibliographic data (-0.1 – -0.38; GOODWIN ET AL, 2004; DAHL, 2011). The reason for these significant

Table 3: Fuel price elasticities in the USA, Germany and Hungary

Year	gasoline price elasticity			diesel price elasticity		
	US	DE	HU	US	DE	HU
2008	-0.25	0.71	0.22	-0.58	3.05	2.99
2009	0.01	0.84	1.16	0.27	-0.66	-1.04
2010	0.04	-0.10	-0.71	-0.18	0.02	0.81

Source: own calculations

deviations is the chaos caused by the crisis, which disarranged petroleum prices and exchange rates. Furthermore, the crisis has made several enterprises bankrupt and has caused significant increase in unemployment, thus reducing the purchasing power of households. The combined effect of many special factors has disarranged the traditional price-consumption relationship on the fuel market.

3.5. Effects of alteration in regulation systems on the biofuels market

The most important change in the USA was that on 13 October, 2010, when the incorporation rate of bioethanol was increased by 15% for cars and vans manufactured in and after 2007. This change affected approximately 1/3 of the entire fuel consumption (TÓTH, 2010). Change in regulation practically had no impact on the examined period, as it was carried out at the end of that given period. As the regulation system was practically unchanged in the period 2007-2010, fluctuations in the American biofuel market were due to the economic situation.

Development of regulation was completely foreseeable in Germany, too. Bioethanol is tax-free, whereas the tax allowance on biodiesel was lowered from 0.3994 EUR/l to 0.3034 EUR/l in the examined period. It can also be stated that the regulation system did not change in a drastic or unforeseeable way, thus biofuel fluctuation can be traced back to the market conditions. (See chapter 3.3.).

The Hungarian regulation system changed several times during the crisis. Regulation for biofuels was not affected (these were only changed in 2010 (CVII. law of 2010) but due to the crisis, the excise duty rate and VAT-rate were increased. Therefore, the excise duty on fuel has risen from HUF 130.5 to HUF 120, duty on gasoil rose from HUF 88.9 to HUF 97.35 (SZARVAS, 2010). Considering that the excise duty is also the basis of VAT, the effect of this price increase was more significant – in the case of petrol it was HUF 20.6 , regarding

gasoil it was HUF 10.6. This sudden price increase prosperously influenced turnover of E-85 in the country (*Figure 5*) as fuel content of E85 is excise duty free.

Figure 6 illustrates the content of fuel prices in the examined period. It can be clearly seen that lower fuel prices in the USA are primarily due to the lower tax rates. The fact that the tax ratio in Hungarian fuel prices did not grow, in spite of the increasing tax rate, is due to the growth of petroleum prices and the HUF-USD rate.

4. Conclusion

Usually, there is no close correlation between the consumption of petroleum products and the change in real GDP, although the interaction between the economy and the petroleum market is well known. However, the crisis influenced the economic processes in 2009 to such an extent that such a correlation became a reality.

Fuel prices, as usual, obviously followed the evaluation of the world price of oil during the examined period, also affected by = differences caused by the fluctuations in the exchange rate (EUR-USD; HUF-USD). The per capita consumption only loosely followed the evaluation of prices, mainly for two reasons. On the one hand, fuels are traditionally inelastic products: price has little effect on their demand in the short term; on the other hand, fluctuations caused by the crisis suppressed all the other effects.

Demand for biofuels, despite the crisis, has shown more steady growth in the USA than in the EU, but monthly, there were very significant fluctuations. These were mainly due to such increases as those seen in raw material prices, which made the substantial part of renewable fuels non-competitive, even under significant state subsidization.

Hungary is an exception to this tendency, where the increase in excise duty rate and VAT-rate occurred within a short time and led to a record increase in fuel prices, thus causing an explosive growth in demand on the E85 fuel market.

In the analysed period, the price elasticity of fuel demand greatly deviated from the bibliographic data. The reason for this is the chaos caused by the crisis, which disarranged petroleum prices and exchange rates, while rendering several enterprises bankrupt and causing a significant increase in unemployment, thus reducing the purchasing power in household sector. The combined effect of many special factors has brought upheaval to the traditional price-consumption relationship on the fuel market.

The biofuel market was not directly affected by the renewable fuel regulation systems of the examined states, since their changes occurred at the end of the analysed period. However, in the near future, they will become significant direct determinant factors.

Figure 6: Composition of fuel prices
Source: EIA, 2011; own calculations

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ANALYSIS OF DEMAND FOR WELLNESS AND MEDICAL TOURISM IN HUNGARY

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Abstract: Health tourism in Hungary holds major opportunities. When analysing medical and wellness accommodation data, it can be stated that the Hungarian population is keenly interested in health-related tourism services.

From the aspect of further development, health tourism based on medical services can be a take-off point for Hungarian tourism. In my opinion, the next few years will be crucial for Hungary's ranking among health tourism destinations. The country's initial circumstances are rather favourable, whereas the revaluation of the quality aspects of these services and the fact that the surrounding countries have also recognised the opportunities in health tourism led to an intensified competitive environment. Consequently, if Hungary does not take advantage of its current opportunities, there will be even less chance to develop the country into the primary thermal and medicinal water-based health tourism destination of Europe in ten years. Yet, this is one of the foci of the objectives set out in the New Széchenyi Plan

Introduction

Tourism is the most dynamically developing sector of national economies. According to the most recent report of the United Nations World Tourism Organisation (UNWTO), tourist traffic has begun to significantly increase again. After the global financial crisis and economic recession in 2008 and 2009, the ratio of international tourist traffic increased by nearly 7% in 2010 (Figure 1). In the opinions of tourism experts, a further increase can be expected in 2011, mainly as a result of the fact that the role of tourism is becoming much more important worldwide. (Kincses, 2009)
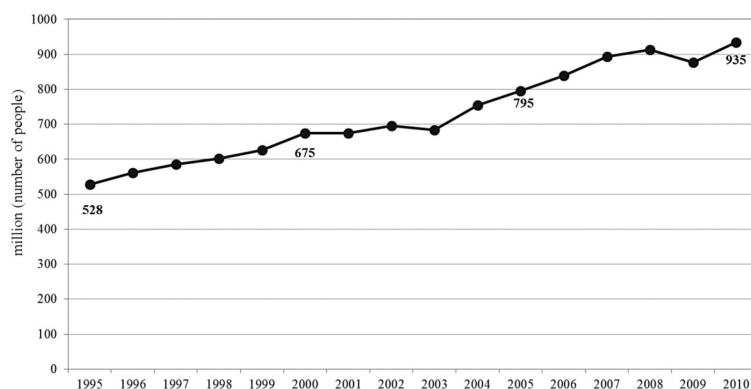
Figure 1. International tourist arrivals, 1995–2010 (UNWTO, 2011)

The importance of tourism

The global crisis made its influence felt not only in tourist traffic. A change can also be seen in the destinations tourists choose, since closer and inland destinations became more preferred. Also, the average duration of stay and the average expenditure per travel both decreased. This decrease can also be "blamed on" the recent crisis, as consumers became even more sensitive to tourism services with preferable price/value ratios. (UNWTO, 2011)

Tourism is one of the main branches of industry in Hungary. Based on its contribution to GDP and its role in employment, its direct economic role is more emphasised than in the world and the European Union. The facts that tourism provided 5.2% (978 billion HUF) of the GDP and that 7.9% (303 thousand people) of all employees worked in tourism in 2005 show the macroeconomic importance of this sector. Considering the multiplication effect of the branches of tourism, it can be observed that this sector represents 8.8% (1654 billion HUF) of the whole national economy, while the ratio of directly and indirectly employed people is 12.6% (nearly 490 thousand people). (Magyar Turizmus Zrt., 2009)

Health tourism in focus

Hungary is a significant target country when it comes to health tourism. The number of foreigners visiting the country for health-related purposes significantly increased in the past few years, as did their expenditures: their number increased by more than 30% between 2007 and 2010 and the amount of money they spent increased by 75% (!) during this otherwise economically critical period (Figure 2). As will be shown below, a

significant increase of domestic tourists can also be observed, mainly due to the attractive force of wellness hotels. (Hungarian Central Statistical Office, 2011)
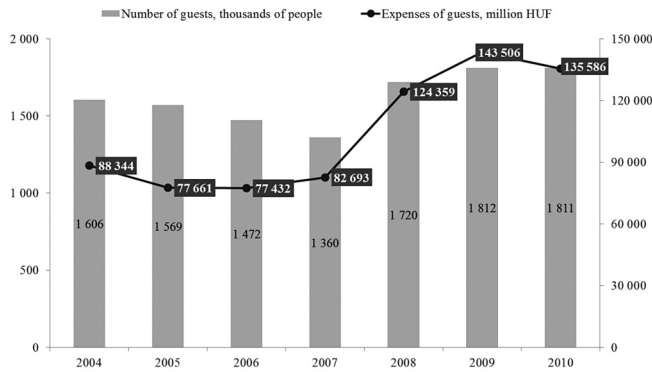
Figure 2. The number and expenditures of foreigners visiting Hungary – Visiting purpose: Medical and health tourism (2004–2010) (Hungarian Central Statistical Office, 2011)

The conceptual system of health tourism is rather comple. Kincses (2009) systematises the related definitions logically and clearly. (Figure 3)

– **Health tourism:** a form of health-related intentional mobility, where the purpose of changing one's location is healing, rehabilitation or health development. It is also coupled with tourism services to various extents.
– **Medical tourism:** health tourism based on medical services used for the specific improvement of one's health.
– **"Medical wellness":** a type of service provided in a wellness centre, where the selection of services and the creation of a program from these services are done with methods verified by medical science and in an individually tailored way.
– **Recreational tourism:** a complex service used with the aim to generally improve and maintain one's health.
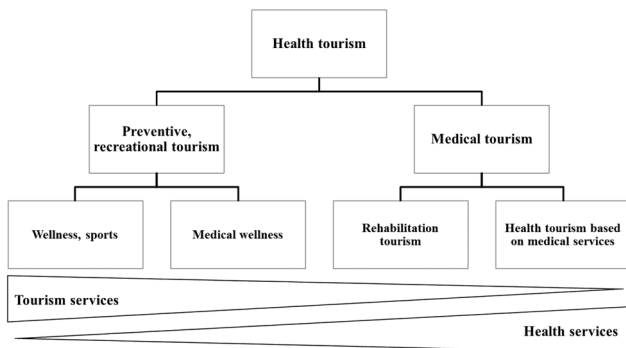
Figure 3: The conceptual system of health tourism (Kincses, 2009)

In Hungary, the need for tourism for both preventional and medical purposes is rather significant, although demand for the former is increasing more rapidly. The growth of demand for tourism services for preventional purposes is clearly illustrated by the change of the number of

accommodation facilities over the past years. Based on the data of the Hungarian Central Statistical Office (HCSO), the number of medical hotels stagnated, while that of wellness hotels significantly increased: in 2004, only 15 such institutions were registered and their number was more than 100 in 2010. (Table 1)

Table 1. The number of medical and wellness hotels between 2003 and 2010 (Hungarian Central Statistical Office, 2011)

	2003	2004	2005	2006	2007	2008	2009	2010
Number of medical hotels	48	56	62	55	55	54	54	58
Number of wellness hotels	n.a.	15	31	45	59	82	90	103

When analysing the number of tourist nights, it can be seen that the tourist traffic of medical hotels decreased in these four years, while that of wellness hotels notably increased during the same period.

As regards the composition of guests, the ratio of Hungarian and foreign guests is nearly similar in the case of medical hotels, while wellness hotels are typically visited by Hungarian guests, as their proportion is three times that of foreign guests. (Figure 4)
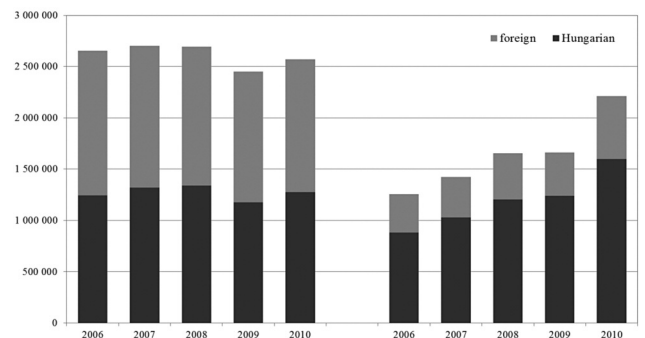
Figure 4: Guest traffic of medical and wellness hotels (number of people) (2007–2010) (Hungarian Central Statistical Office, 2011)

When examining regional differences, it can be stated that the ratio of foreign guests in medical and wellness hotels was higher in the Eastern Hungarian and Western Transdanubian regions in comparison with the rest of the country – especially in the case of the former service. (Figure 5)
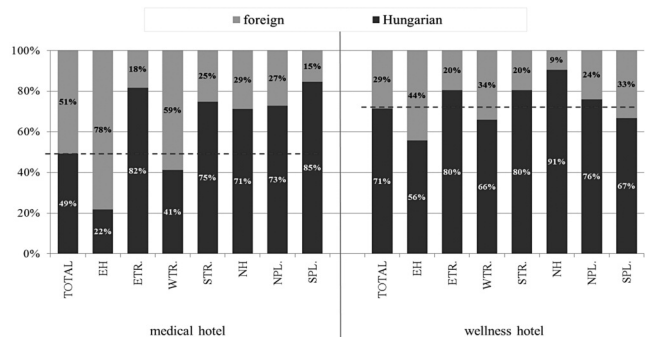
Figure 5: Guest traffic in commercial hotels (number of people) – ratio of foreign and Hungarian guests per region (2010) (Hungarian Central Statistical Office, 2011)

Tourism based on medical services has significant opportunities in Hungary. Foreign patients prefer this country mainly because of the fact that they can use highly professional therapeutic services at relatively low prices. (Kincses, 2009) Furthermore, there is a major potential in Hungarian guests which is mainly stimulated by the problems of the health care system (e.g. waiting list, lack of high quality services). (Szinapszis, 2011) For example, it is worth observing the patient traffic of private hospitals supported by the National Health Insurance Fund, since the patient traffic data of the 12 private institutions increases from year to year (Figure 6). Although these hospitals represent a totally different category than the clearly profit-oriented commercial hotels providing medical services, these data clearly show the increasing need of Hungarian patients for higher quality service. (National Health Insurance Fund, 2011)
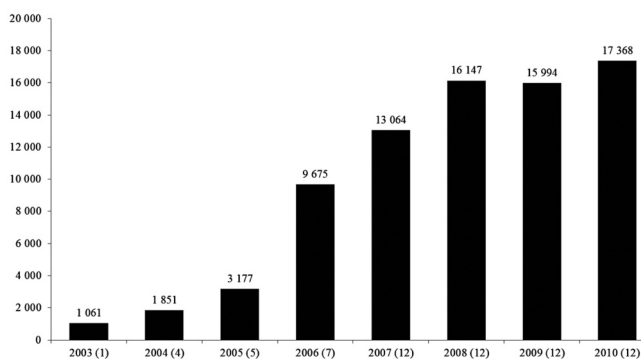
Figure 6: Number of patients discharged from private hospitals funded by the National Health Insurance Fund (2003–2010) (numbers in brackets show the number of institutions) (National Health Insurance Fund, 2011)

Trends supporting the Hungarian health tourism

Health tourism is in a fortunate position among the different branches of tourism, since there are numerous global or regional trends connected to the sector which can contribute to maintaining and improving the competitiveness of those providing health services. (Kocziszky, 2004)

1. The increasing popularity of health awareness

Based on Kocziszky such an aspect is shown in the global megatrend of the increasing popularity of health awareness. (Kocziszky, 2004) Health preservation refers to the activities related to maintaining and restoring healthy conditions, while the prevention of problems also needs to be of primary significance. Healing and the early detection of diseases are equally important. In economically developed countries, people give increasing attention to various forms of prevention. Reference of Kocziszky the literature defines four cluster groups (youth, upper category, mainstream and senior). The typically used health- and lifestyle services can be assigned to these cluster groups (see figure 7). (Kocziszky, 2004)
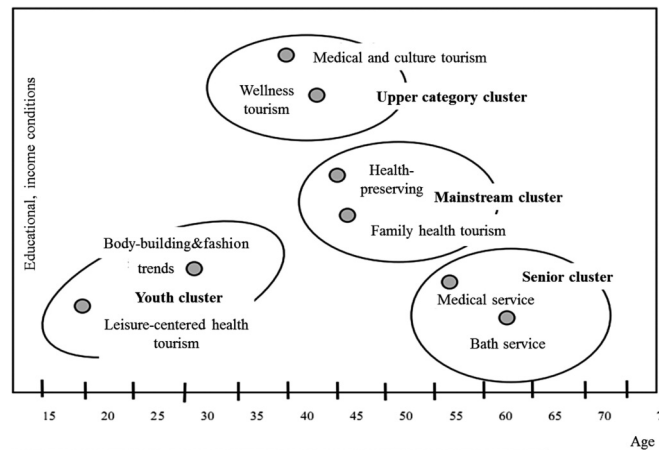
Figure 7: Age group-related needs in health tourism (Kocziszky, 2004)

Motivations support the requisition of health tourism services are different in case of of these four cluster groups. On the one hand, the "aging" welfare societies like Germany, France, etc. are characterised by the increasingly wide and active range of older people who are willing to spend money on travel; therefore, older travellers make up a significant percentage of those demanding health tourism services. . On the other hand, the pension and health care systems of the mentioned welfare countries fight general budgetary and structural difficulties and their capacities are overburdened, which results in long waiting time and all these aspects lead to the increasing importance of the (individual) self-financing of health preservation. (Kocziszky, 2004) (As I have mentioned further this phenomenon subserves for medical tourism as well.) Nevertheless, the young and middle-aged groups prefer active spa or wellness experience which could even be the main goal of their travels. (Kocziszky, 2004)

2. Hungary's natural endowments

Second element which supports the Hungarian health tourism is the natural endowments. The historical bath culture and thermal water resources of Hungary have been known and recognised internationally.

Hungary belongs to the five richest countries terms of the possession of thermal waters; the other four being Japan, Iceland, Italy and France. (Magyar Turizmus Zrt., 2009). As regards the thermal and medicinal water resources and further medicinal aspects, Hungary has the following endowments, based on the registry of the National Directorate of Curative Places and Spas (OGYFI):

- more than 1,200 thermal water wells,
- 219 acknowledged medicinal waters,
- 13 health resorts,
- 72 classified medicinal baths,
- 5 medicinal caves,
- 212 acknowledged mineral waters,
- 5 locally exploitable medicinal mud sites,
- 1 mofetta. (OGYFI, 2011)

The medicinal waters in Hungary can be used for therapeutic purposes in the treatment of locomotor diseases, skin diseases, gynecological complaints, problems with the circulatory and digestive systems. Medicinal caves provide effective treatment for those suffering from respiratory illnesses.

3. Special features of health tourism

In comparison with other branches of tourism, health tourism has more special features that significantly support the competitiveness of the sector:

– Relatively long stays (due to the treatment-based services, the amount of time spent is more than in the case of other tourism products).
– Higher amount of specific expenditure due to the specialised services and tools and the high labour need of health tourism (this is especially true for wellness tourism).
– Lower seasonality; the services of health tourism are usually independent of the weather; therefore, guests usually do not visit health resorts in the summer period (Kocziszky, 2004).
– In tourism, there is an increasing need for individually tailored services and it could even be a major competitive advantage. From this aspect, health tourism can be an especially preferred form of tourism, thereby contributing to the higher level of satisfaction of guests.

4. Transforming Hungarian health care system

The Hungarian health care institutions are majorly restructured. According to the plans of the government (Babos-Gyüre, 2007), the previous system is replaced by regionally organised, holding-like operational and structural models.

The fundamental principles of the reorganization of healthcare and the direction of the steps to be taken are set down in the Semmelweis Plan. One of the most important measures is to make specialized outpatient and inpatient care a state responsibility. This allows for the reorganization of the system following a more reasonable structure that ensures the efficiency of services. The affected healthcare institutions will be transferred to state ownership on 1 January 2012 and 2013. As of 1 January 2013, the only responsibility of local governments in the area of healthcare will be to provide basic healthcare services. (Convergence programme of Hungary 2012–2015, 2012)

These changes affect medical tourism indirectly as well. The institutions in Budapest would work in a separate holding system, and it means they have individual interest in profit, and they have opportunity to complete their profile with e.g. privat healthcare services as well. As Lóránth noticed, in fact it is an expressed aim of the Hungarian government to make Budapest the centre of health tourism based on medical services. These newly developed places will have equal quality levels to those of hotel services and they will focus on hosting mostly foreign tourists (Lóránth, 2010).

5. The medical background in Hungary

Health tourism is a thriving area and it is not the market of services based on natural medicinal aspects which are affected by the market extension of medical tourism in the world, but rather health tourism based on medical services which is growing dynamically. Due to technological development and the change of consumer needs, the advantages resulting from the natural monopoly of thermal and medicinal waters have decreased in value, in addition these opportunities are very general and limited in a country. The future is health tourism based on medical services, Hungary has to focus on it as well.

The professional skills and knowledge of Hungarian physicians are acknowledged worldwide (Kincses, 2010), it means that our professional background for medical services is mostly ensured. At the same time there is no proper quantity service to offer to foreigners in the scope of medical tourism, theres is no business model based on these aspect, and at present it is a huge disadvantage of Hungary (Kincses, 2010).

6. The development of health tourism is a priority in the national economy

The perception of the importance of health tourism in the national economy significantly improved in the last 10 years. This sector was first given real significance in the Széchenyi Plan of the government between 2001 and 2004. (Kincses, 2010)

The National Tourism Development Strategy (2005–2013) also considers health tourism to be a product development priority, similarly to the New Széchenyi Plan, which deals with the opportunities of the sector in a separate section. The central issue of the most recent strategic document entitled "Healing Hungary – Health Industry Program" remains to be the support of the development of the health industry and the thermal health industry, while it also contains novel points which reflect a sustainability-driven approach that is a general direction of the European Union. (Kincses, 2010)

Analysis of Hungarian demand – Materials and Methods

It is an another aspect of the Hungarian-demand's analysis if we measure it directly in the adult population. I had the opportunity to examine this issue by means of an online questionnaire research project in August 2011.[1] The research project was carried out with the support of Szinapszis Market Research and Consulting Ltd.

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[1] The research project was carried out with the support of Szinapszis Market Research

During the survey, 628 questionnaires were filled out and respondents were randomly selected from a panel containing 10 000 people. In this panel, there were previously determined quotas based on age and gender and these quotas had the same distribution as the national distribution based on HCSO data.

It is important to note that the nature of this methodology results in the fact that the proportion of people with elementary educational degrees is minimal. However, if we consider that the target groups of medicinal and wellness services are mostly represented by those who have higher education degrees and people whose income is higher (Kocziszky, 2004), we can state the inquiry was designed to include most affected part of the population.

Table 2. Sample composition (n=628) (Own measuring, 2011)

Gender	Male	46%
	Female	54%
Age	18-35	32%
	36-55	35%
	Above 55	33%
Settlement type	Budapest	22%
	County seat	26%
	City	31%
	Township	21%
Region	Budapest	22%
	Eastern Hungary	46%
	Western Hungary	32%
Income	Below 90 thousand HUF	45%
	Above 90 thousand HUF	54%
Educational level	*Elementary*	*4%*
	Secondary	62%
	Higher	34%

Results

In the examined sample, the estimated ratio of households who participated in some kind of wellness recreation in the preceding month (June 2011) is 11%, while this proportion is 4% in the case of medicinal recreation.

Based on the Chi square test, there is no significant difference between any service from the aspect of various demographic characteristics (age, gender, educational level, income). Due to the low proportion of people with elementary educational degrees, I only examined the differences between those who have secondary and higher educational degrees.

Half of those who used medicinal recreational services (2%) also used some kind of wellness services during their stay, while the ratio of the opposite cases was only 3% among these guests. Therefore, during the operation of

Table 3. The results of Chi square tests (Own measuring, 2011)

	Wellness	Medicinal recreation
Age	p=0,997	p=0,248
Gender	p=0,362	p=0,685
Educational level	p=0,339	p=0,526
Income	p=0,661	p=0,753

medicinal recreation services, it could be worth considering launching other wellness services, as those who have medicinal tourism purposes are increasingly interested in locally available wellness services, too.

On average, the examined households spent 23 000 HUF (standard deviation: 23 025) on medicinal recreation in the tested period, while they spent 45 000 HUF (standard deviation: 41 399) on wellness (the number of people living in one household is unknown; these values refer to the whole family).

Finally, it is important to note that during the examination it was not specified what exactly is meant by the two mentioned health tourism expressions; therefore, the results shown here could be significantly distorted by the subjective nature of respondents from this aspect. Altogether, it can be established that the results detailed above show the demand of the population for services which *they consider to be* wellness recreation and medicinal recreation.

Summary

Health tourism in Hungary holds major opportunities. When analysing the Hungarian medical and wellness accommodation data, it can be stated that the Hungarian population is keenly interested in health-related tourism services. The rapidly growing market is primarily based on wellness services; therefore, the quality control of commercial accommodations that offer health services has to be paid special attention to in the future, in order to protect customers. Nevertheless, a possible threat to dynamic expansion could be the "dilution" of the concept; therefore, lay people have to be clearly explained what the criteria of real health tourism services are.

From the aspect of further development, health tourism based on medical services can be a take-off point for Hungarian tourism. This direction could provide an opportunity to significantly increase Hungary's tourism competitiveness in the region. Currently, the country's main competitive edges are the existing natural endowments and the favourable price-value ratio, which do not represent permanent competitive advantages; therefore, high quality health tourism and medical services have to be further improved in the future. This latter development could also significantly contribute to the sustainability of the health care sector.

Considering future challenges, it will be especially important to emphasise the competitive advantages of Hungary

i.e. to develop a suitable marketing concept that is focused on health tourism. The next few years will be crucial for Hungary's ranking among health tourism destinations. The country's initial circumstances are rather favourable, whereas the revaluation of the quality aspects of these services and the fact that the surrounding countries have also recognised the opportunities in health tourism led to an intensified competitive environment. Consequently, if Hungary does not take advantage of its current opportunities, there will be even less chance to develop the country into the primary thermal and medicinal water-based health tourism destination of Europe in ten years. – in accordance with the objectives set in the New Széchenyi Plan.

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ECONOMIC MODELLING AND ANALYSIS OF HUNGARIAN WHEAT PRODUCTION IN THE MARKETING YEAR 2011

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Abstract: In the framework of the present study I analysed the wheat production sector. In order to evaluate the situation prevailing in the sector I conducted an economic analysis which I based on primary data collection. The year of investigation was the production year of 2011. Long-term implications for different crop sectors can only be based on multi-annual analysis, so in this article I only attempted to analyse the sector with respect to 2011. To evaluate wheat production I compiled its cost structure and assessed it. To evaluate its position in comparison to other crops I also carried out calculations to determine the gross margin (revenue minus variable cost)[1] By gross margin I mean the gross margin (C), which is production value (PV) minus direct cost (DC), by definition (C=P-DC).
 of maize and rape. I observed that the gross margin attainable on one hectare was the lowest in the case of wheat. I applied two types of gross margin, because I consider it important that a given sector should also be profitable without subsidies. In the case of the gross margin including subsidies it is essential to emphasize the role of subsidies, since their ratio varied between 30 and 47% of the total revenue. The importance of subsidies was the most significant in the case of winter wheat.

Keywords: plant production, wheat, cost structure, analyses.

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1. Introduction

"The importance of wheat production in the world economy is proven by its share of 15% of the 1500 million hectares of the world's arable land. This rate is equivalent to an area of 225 million hectares of wheat, based on FAO figures for 2009" (KISS, 2011). Among cereal crops wheat makes up the largest proportion. There are minimal differences in the case of the sowing area in different years. In 2009 wheat was produced on 225 million hectares around the world, of which the proportion provided by the ten countries occupying the largest harvested area is 71.3 %, which is equivalent to 160.6 million hectares.

In the year 2009 681 million tons of wheat was produced, of which the top 10 countries produced 69.6%. 659.8 million tons of wheat was consumed. 69.8% of the total consumption was used for food supply, 18.5% was used for feed, while the remaining 11.5% was used for other purposes. In the ranking of the leading wheat growers in the world the participants have remained the same apart from a minimal deviation in the period between 2000 and 2009. Only two large wheat producing countries (USA and Russia) changed places in the ranking in certain years in the given period. Between 2003 and 2008 the USA was the third largest wheat producing

country in the world, while Russia reached third place in terms of predicted production in 2009. The rankings of the above-mentioned two countries were also noteworthy in 2010, since a significant yield decrease occurred in both countries due to unusual weather conditions (FAO, 2010). There was a slight increase in the annual crop yield between 1990 and 2009, due not to the increasing sowing area, but to the slow and successive increase in the average yield. An annual average of 2.5 tons wheat was produced on one hectare of crop land in the world in the first half of the 1990s; however this reached about 3 tons in 2009.

In 2008 139.1 million tons wheat was traded worldwide, 39.7% of which went to the ten largest wheat importer countries of the world. From Hungary's point of view it is important to highlight that three out of the ten largest wheat importer countries are EU member states, which might be considered market outlets for raw materials. In 2008 81.4% of the total traded wheat came from the ten largest wheat exporter countries of the world. Consequently, it can be stated that the concentration described above in the case of wheat production is even more characteristic when considering the international wheat trade. There are minimal differences in the ranking of the top ten countries in the different years. Between 2000 and 2008 the United States was the world's largest wheat exporter each year.

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[1] By gross margin I mean the gross margin (C), which is production value (PV) minus direct cost (DC), by definition (C=P-DC).

The European Union produced 138.7 million tons of wheat in 2009 and the first ten countries within the EU produced 86% of this amount. France is the biggest wheat-producer in the EU, producing 38 million tons of wheat in 2009. Germany remains in second place with a production of 25 million tons. The UK is the third with 14 million tons. In the rankings of the world's top wheat producing countries France and Germany are in the top 10.

Figure 1 illustrates the structure of agricultural land in Hungary. Hungary has 4.5 million hectares of arable land. The proportion of Hungarian arable land sown with cereals fluctuated between 68.4% and 69.9% in the period between 2004 and 2008. The differences between the different years are negligible. Within the cereal category the importance of wheat and corn is almost the same. Both crops cover approximately 28% of the entire arable land (KSH[2] Hungarian Central Statistical Office (abbreviation: KSH), 2011). In 2009, Hungary, with 1.15 million hectares devoted to wheat production, was 29th in the world ranking. Minimal differences can be observed regarding the area under wheat in Hungary during this period. The area in Hungary sown with wheat decreased both in 2010 and 2011, as compared to 2009, for various reasons related to growers. The profitability of wheat production was low in 2009, and as a consequence a number of growers decided to change the sowing structure to the detriment of the wheat sowing area. During the sowing period in the autumn of 2010 there were negative meteorological conditions together with ground water problems and therefore a number of growers could not sow wheat on the areas previously intended. In summary, it must be stated that both in 2010 and 2011 the area under wheat decreased in Hungary as compared to 2009; however, there were completely different reasons for the decrease in the two years. In 2010 the profitability of wheat could be considered satisfactory.
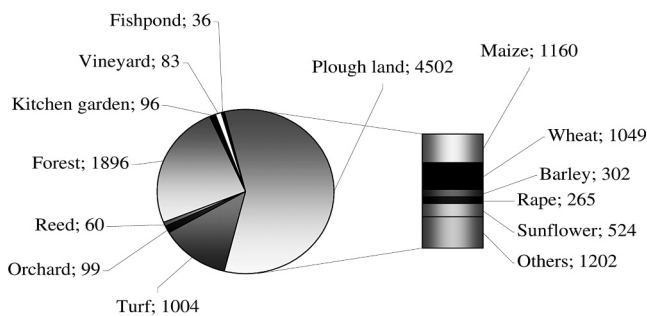
Figure 1: Structure of agricultural land in Hungary and the sowing area structure of crops in 2010 (in thousand hectares)
Source: KSH, 2011

2. Objectives, Materials and Methods

I determined my objectives as follows:
- To construct an integrated system featuring the factors influencing the profitability of winter wheat production, and to illustrate the system graphically.

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[2] Hungarian Central Statistical Office (abbreviation: KSH)

- To briefly present the direct cost structure of wheat production and the possibilities for cost reduction.
- To compare the revenue, production value, direct cost and gross margin of winter wheat with the relevant values for rape and maize.
- To produce a scenario analysis of the profitability of wheat production according to the selling prices and the specific yields ceteris paribus.

I conducted primary data collection on two family farms in Eastern Hungary, one of which is located in Borsod-Abaúj-Zemplén county, the other in Békés county. I consider these two farms to be typical Hungarian family farms. The two farms examined farm an area which is almost the largest legally possible and their workforce is many times more than the family members. I visited the farms to collect the input data and technology information to conduct model calculations. I collected data on subsidies, production technology and for expenditure I collected data on physical inputs and their unit prices. I collected data for the period between September 2010 and September 2011. In the calculations I applied parametric cost estimation. Firstly I calculated the direct cost of wheat production, in which I took into account the machinery operation costs on the basis of the catalogue of the farm machinery services (GOCKLER, 2010 and 2011). I made sure to calculate with appropriate prices, thus obtaining the annual price when the task was completed. In the catalogue of farm machinery services the service providers also include the labour costs related to machine operation. Since we study family farms, ignoring the work carried out by the farm owners would distort the result of the cost calculation. Consequently, in my calculations the machinery operation costs also include labour costs, calculated on the basis of the catalogue prices. Furthermore, machinery operation costs include the material costs related to machinery operation and maintenance and the obligatory insurance fees for the machines. Depreciation costs were collected separately during the farm visits, thus they are not included in the machinery costs. In my opinion this allows us to avoid cost distortions in the calculation. In the case of physical input costs I based my calculations on the unit price information given by the farms. I used the per hectare depreciation rate applied by the farms. I compiled the direct cost structure of the winter wheat production and then evaluated it.

Figure 2 demonstrates the logical framework of the model used for the calculation. The model carries out the calculations necessary for parametric cost estimation and for computing sales revenue, production value and gross margin.

The results of the calculations appear on the output side of the model in a form that allows them to be used to make the analysis.

Figure 2: Logical framework of the model used for the calculation
Source: Author's own editing, 2011

To determine the production value I used the production yields realized in 2011 where they were available; where the harvest was still underway (maize) I used the projections of the MgSzH (Central Agricultural Office). I used the prices reported by the AKI PÁIR (Research Institute of Agricultural Economics, Market Price Information System) at harvest time. Accordingly, for rape and wheat I used the average prices recorded in July, 2011, and for maize the average price in September, 2011. Having obtained the prices I computed the revenue per hectare in the given production year. The subsidies are part of the production value, so the amount of subsidies reported by the farms was included in the calculation. In our case subsidies cover area based payments and gasoline subsidies. Within area based payment I took into account only the sum of the ordinary SAPS received in 2010, and excluded possible involvement in agri-environmental measures. Concerning gasoline subsidies I applied the maximum per hectare payment that is legally possible.

After computing the production values and the direct costs I determined the attainable gross margin per hectare for each plant for the production year of 2011. I calculated two versions of gross margin, because I consider it important that a given sector should be profitable without subsidies. Therefore, I calculated the gross margin with and without subsidies.

Finally I conducted the scenario analysis of the gross margin (ceteris paribus) of the wheat production sector, in which the costs previously calculated and the subsidies were taken in account. Since the national average values are not valid for all the farms, the need for such an analysis is justified. In my view there is no need to explain the possible differences between the average yields realised in the two farms. We can obtain a more realistic picture of the given crop sector through the scenario analysis of the gross margin with altering yields and selling prices. That is, I applied different specific yields and different selling prices when conducting the analysis. The different values of specific yields and selling prices were determined using the many years of professional experience of the members of the given farms and also taking into account the genetic potential of the crop. I conducted the scenario analysis with two types of gross margin: one that involves the subsidies, and one that does not.

3. Results and Discussion

3.1. Demonstration of the factors influencing the profitability of winter wheat production

3.2. Direct cost structure of wheat production in 2011

Figure 4 illustrates the direct cost structure of winter wheat production. The cost structure involves the following cost elements: machinery cost, material costs, depreciation and insurance. As mentioned above, machinery cost also includes labour cost, since I applied the prices given in the catalogue of the farm machinery services, in which the labour cost of the machine operators is included. As a consequence, machinery cost accounts for 48% of the total cost.

The share of the other significant cost group (material cost) is 46%. Pesticides, fertilizers and seeds belong to this group. Since the yields of crop production are mostly defined by the amount of nutritive matter, one should not decrease the amount of nutrients just to decrease the costs. However, artificial fertilizer is not the only solution to ensure nutrient supply to the soil, and it is worth applying other types of fertilization during the production process. In my opinion supplying nutrients through manure might result in a significant reduction of artificial fertilizer. On the other hand, appropriate use of manure might contribute not only to cost efficient and profitable production, but also to maintaining environmental balance. Other possible methods to decrease fertilizer requirements are organic manure, industrial by-products (e.g. sewage-sludge), and using papilionaceae plants as a green crop. Although these methods cannot provide for the total nutritional requirements of the soil, they can significantly decrease the need for artificial fertilizers. Accordingly, where they are applicable one should not avoid using them.

Pesticides constitute the other important subgroup within the category of material costs. From the viewpoint of cost reduction the possibilities are very limited. Evidently, one can avoid using expensive chemicals by applying other substitutive matters.

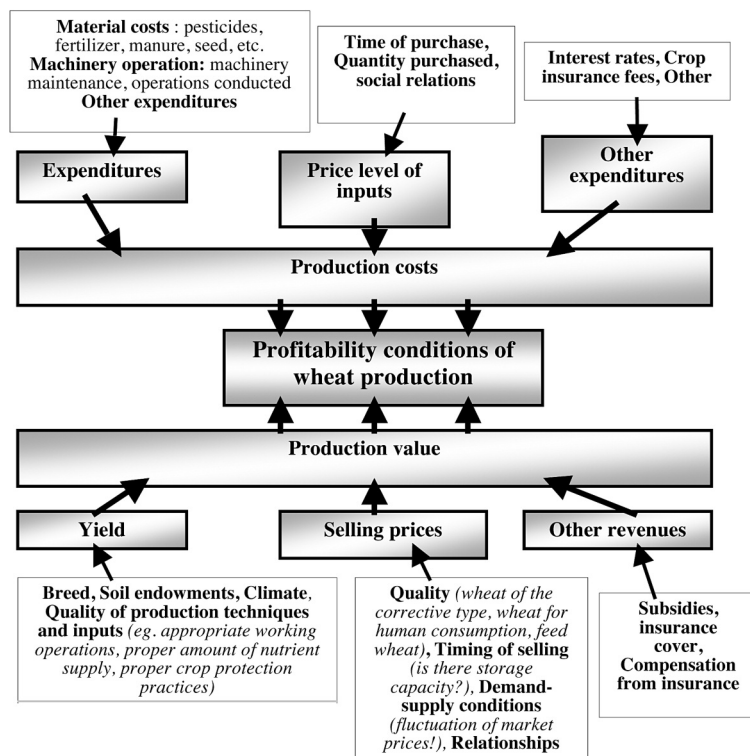*Figure 3:* System of the factors influencing the profitability of wheat production
Source: Author's own editing, 2011

Obtaining pesticides from more suppliers might result in cost reduction, however more suppliers mean greater risk and smaller order size means weaker bargaining power. At the same time when buying from more suppliers (assuming there is no cartel) the competition between the suppliers might push down the prices. Furthermore, the enterprise can have a broader outlook on the market prices. However, this observation is valid for all the input materials.
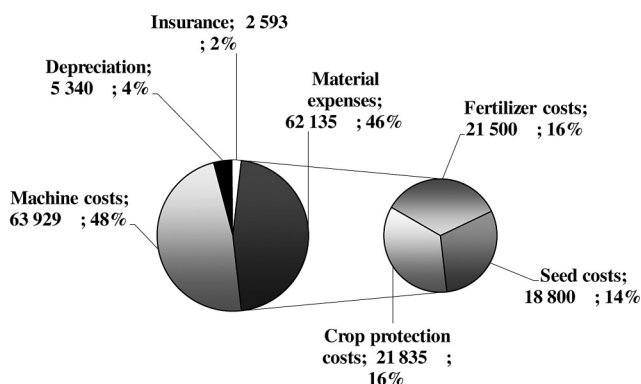

Figure 4: The direct cost structure of winter wheat production (Ft/ha; percentage; total: 133 997 Ft/ha)
Source: Author's own calculation and editing, 2011

The third subgroup consists of the seeds. This subgroup represents the smallest share within the cost structure, but its role should not be underestimated. Inappropriate choice of seed might undermine the production process, thus significant emphasis should be placed on it. The cost reduction methods described in the case of pesticides are relevant here, too. Producers have the real opportunity to sow part of their own seeds harvested in previous years, in this way saving money by avoiding purchasing sealed seed. Nonetheless, this opportunity is applicable and worthwhile primarily in the case of non-hybrid cereals, because with these plants the yield loss resulting from not using sealed seeds is not significant. Even so, as from 2009 producers are obliged to pay a royalty when using self-produced seeds of originally protected varieties. In 2010 the royalty for winter wheat varied between 600 and 900 Ft per hectare depending on the breed (for winter durum wheat 1385 Ft/ha). The two farms I observed use sealed seeds of course, which is why I could use them as research subjects.

Precision farming can reduce the costs of fertilizers, pesticides and seeds. SULYOK and associates demonstrated that applied precision techniques result in cost reduction in the case of fertilizers as compared to traditional crop production methods (SULYOK et al., 2011).

3.3. Revenue, production value and gross margin of winter wheat production

Table 1 demonstrates the **gross margin** calculation of three crops. The revenue, the production value, the direct production cost and also the **gross margin** are the smallest in the case of winter wheat.

Table 1. Comparison of the important economic factors of winter wheat production with two other important crops

Denomination	Measure	Winter wheat	Winter rape	Maize
Yield	t/ha	4.2421[1]	2.247[1]	6.6[2]
Selling price	Ft/t	46 113[3]	124 581[3]	47 307[4]
Revenue	Ft/ha	195 611	279 934	312 226
Area based payment (subsidy)	Ft/ha	46 535	46 535	46 535
Gasoline subsidy	Ft/ha	7 566	7 566	7 566
Subsidies	Ft/ha	54 101	54 101	54 101
Production value	Ft/ha	249 712	334 035	366 327
Direct cost	Ft/ha	133 997	208 934	187 969
Gross margin (**without subsidies**)	Ft/ha	61 614	70 999	124 256
Gross margin (**with subsidies**)	Ft/ha	115 715	125 100	178 357

[1] *LUKÁCS-HORPÁCSINÉ, 2011 (national factual data)*
[2] *KOSZTOLÁNYI, 2011 (MgSzH projection, 27 July 2011)*
[3] *AKI PÁIR average prices in July, 2011*
[4] *AKI PÁIR average prices in September, 2011*
Source: Author's own calculation and editing, 2011

One should differentiate the gross margin involving subsidies from the gross margin without subsidies. Both types of gross margin show prospective and profitable conditions for all three crops in Hungary, although one must note that the weather conditions in the production year of 2011 were really favourable and long-term projections cannot be made on the basis of this year's yields.

In the case of the gross margin involving subsidies the ratio of subsidies is around 30–47%, and it is the highest in the case of winter wheat. In less favourable years the subsidies serve as loss mitigating factors and not as extra profit. Subsequently, the maintenance of the subsidies is vital for the long-term stability of the agricultural sector.

3.4. Ceteris paribus scenario analysis of wheat production

Figure 5 demonstrates the development of the gross margin of winter wheat production according to the different scenarios. I chose the values for specific yield as 2t/ha in the case of the pessimistic, 4t/ha in the case of the realistic and 6t/ha (close to record level) in the case of the optimistic scenario. In the calculation I also used three different values in the case of the selling price: 30 000 HUF/t, 40 000 HUF/t, 50 000 HUF/t accordingly.

When calculating with the pessimistic specific yield (that is with 2t/ha), it can be observed that the gross margin can be positive only when the selling price is the highest and the subsidies are taken into account. Nevertheless, in a severe drought such a rate of yield loss might occur.
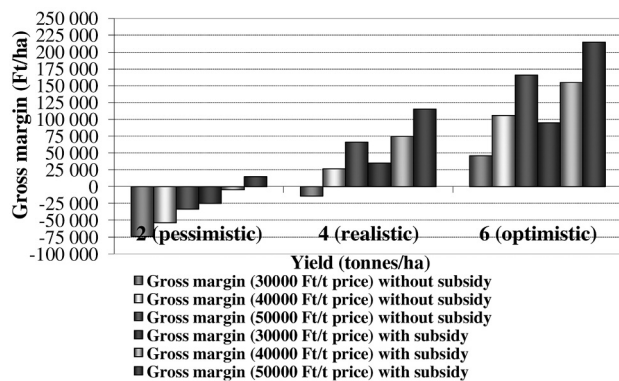
Figure 5: Scenario analysis of the gross margin of wheat production
Source: Author's own calculation and editing, 2011

On the other hand, in the realistic scenario the sector's gross margin would be negative only when the selling price is the lowest and the subsidies are ignored, otherwise it would be positive. In the optimistic scenario the gross margin would be always positive.

However, the gross margin also includes the overhead costs, and as a consequence in the pessimistic scenario the sector's net income would undoubtedly be negative after deducting the overhead costs. It must also be noted that in the pessimistic scenario subsidies play a loss minimizing role.

4. Conclusion

The importance of winter wheat production in Hungary is beyond dispute, which is reflected also in its high representation within the system of crop rotation. However, observing its situation in 2011, its gross margin attainable per hectare is below that of both rape and maize. In the case of winter wheat the share of subsidies is 47% within its gross margin. Nevertheless, in the case of maize – which shows

better profitability indicators – the share of subsidies is also 30% within its gross margin. The maintenance of subsidies is vital in the long run, because the ratio of subsidies was high in favourable production years, too. In less favourable years the subsidies serve as loss minimising possibilities. Nonetheless, the extra profit attainable this year due to the good weather conditions might create an opportunity for the farms to launch long-term investments, which is in the interest of our national economy as well.

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INTEGRATION AT THE WORKPLACE STUDIES WITHIN MULTINATIONAL PHARMACEUTICAL FACTORIES IN HUNGARY

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Abstract: The primary objective of this essay is to assign a gap in Human Recourse Management literature. Many studies and resources are known about hiring and maintaining people and their loyalty to organizations. Work socialization is the first step to keeping people; however, most of the literature on integration at the workplace focuses primarily on organizational commitment and not on the individuals. Various perspectives of work socialization have been discussed including socialization stages, guidance and carrier development. This essay focuses on the approach of Human Resource Management, but the scope is expanded to the individual as well.

In this paper, the reasoning, the methods and the questions of my future doctoral research on integration at the workplace are analysed. First, the issue is discussed from the perspective of social changes in Hungary. The next part of this essay illustrates varying definitions from the literature, providing then my own view of how to explain the integration process in the workplace and through which what I would like to focus my research. This article also aims to show possible methods (in-depth interviews with Human Resource Managers and document analysis) for examining the topic at multinational pharmaceutical factories in Hungary, while highlighting the most important questions for which my research aims to find answers.

Introduction

Growing up in Hungary after the democratic revolution of 1989, I realized that the country had become a part of the global community and how global processes have had enormous impact on the country. These effects may have proved more important than the actions of any of our governments. Due to the sudden unfolding of the world after 1989, and the accompanying exposure of Hungary to global changes, the lives of ordinary people have been greatly influenced. During socialism, the purpose of the government was to provide full employment, so that people could feel security in their jobs. At that time, it was natural for every employee to retire from his/her first workplace. In a market economy, the need for new workplaces is highly influenced by different circumstances, such as well-educated labour, wages, taxes, infrastructure and the market. Additionally, because of the continuous changes of these factors and, of course, the current economic situation, workplaces are quickly established and eliminated. It follows that people change their workplaces more frequently than ever before: 77,8 % of employees between 15 and 19 years old, 55,2 % of employees between 20 and 24 years old and only 38,2 % of employees between 25 and 29 years of age presently work at their first workplace [Internet 1]. This means that organizations have more newcomers who are of different

age, work experience, education background, social background and behaviour [Móré, 2011]. Therefore, new challenges are created in the process of integration, which should not be neglected in 21st century management literature.

Literature Review

This part of the essay illustrates different approaches to the idea of work socialization, providing also my own interpretation of this idea and through which I would like to focus my examinations of this topic.

One of the most well-known approaches [Van Maanen & Schein 1979] defines work socialization as a process by which newly-hired employees learn about, adapt to, and come to identify with an organization. Louis [1980] suggests a process by which an individual comes to appreciate the values, expected behaviours and social knowledge to participate as an organizational member.

Newer definitions also stress the goals of learning. Haueter et al. [2003] and Saks et al. [2007] refine work socialization as a procedure through which employees acquire information and knowledge on how to adapt to new jobs, roles, work groups and organizational culture, in order to be useful members of their organizations. Furnham [2005,

145. p.] defines the term as a procedure through which an organization changes its newcomers. He suggests that its basic objective is to maintain control, by ensuring that newcomers share the same norms and values as those already established, i.e. it involves attempts to teach newcomers new rules, roles, norms, values and concepts used by the organization.

Feldman's [1976a,b] three-stage entry model itemizes the integration process as follows:

1. Anticipatory socialization – "getting in": getting realistic expectations, determining match with the newcomer;
2. Accommodation – "breaking in": initiation into the job, creation of interpersonal relationships, clarification of roles, congruence between self and organizational performance appraisal;
3. Role management – "setting in": degree of fit between life interests outside work and organizational demands, resolution of conflicts at the workplace itself, diversity due to individual experiences.

A recent approach [Brown, 2011, p. 31–32.] also itemizes the process, but it emphasizes the importance of fitting into the existing organizational culture. Brown suggests that for a new employee, the socialization process evolves through four stages:
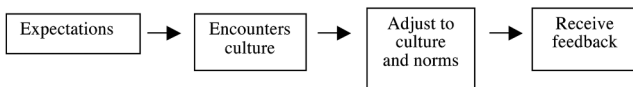
Figure 1: The four stages of work socialization
Source: Brown, D. R. [2011]: An Experiential Approach to organizational Development. 8th ed., Reason Education, Inc., New Jersey, 32 p.

Another definition views work socialization as one entering an organization with initial expectations, encountering an organizational culture, adjusting to that culture and norms and receiving feedback. This definition is in contrast with the others, because it lacks any mention of the learning (and also the work) processes.

No literature has been found that would make distinctions according to the differences among persons in the process of work socialization. Although new studies began to study the interaction between socialization and individualization, no considerable attention has been given to the personal differences among newcomers. However, while Haueter et al. [2003] suggest that the integration process is not the same for everyone, the authors do not mention the personal differences among newcomers as reasons.

Another approach argues that new employees can be differentiated along how much they learn about the following elements of the organizational culture: norms, goals, policies and values. This approach also gives advice on how to differentiate employees on the basis of how well they can develop interpersonal relationships which are necessary for successful functioning within an organization [Mitus, 2006].

The hiring process is a complex procedure which contains three steps: recruiting, selection and integration into the workplace. The literature emphasizes the importance of selection (how to select CV-s effectively, assessment centres, different job interview techniques, type of questions and non verbal communication through the interviews, but selection is just one of the three steps. Certainly, the recruiting process depends on organizational practice and the type of new position; in my opinion, the integration process is not highly emphasized by authors.
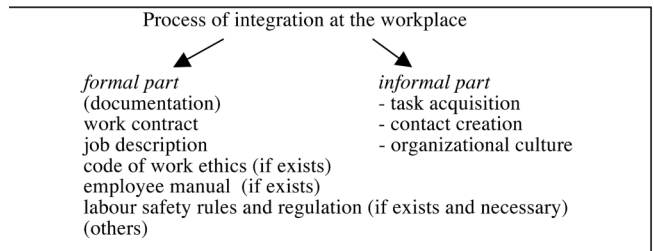
Figure 2: Parts of integration at the workplace
Source: own figure

My explanation for the integration at the workplace includes two parts: a formal and an informal part. The formal part essentially contains the documentation; this process is independent of the personality of the newcomer – the contact and the job description process is the same for a 25 year old employee and a 50 year old employee (if they are hired for the same position). The informal part of the integration process has three important factors:

1. Task acquisition in practice: knowing the tasks on a daily basis and the way these should be accomplished – the ability to work independently and the realization of the added value to the organization;
2. Contact creation: getting to know the direct co-workers and managers, building connection networks at the workplace and fitting in the hierarchical system;
3. Organizational culture: getting to know the organizational habits, values and rules.

In my view, these three parts cannot be independent of the entirely new personality of the newcomer and this element has not been studied in Human Resource Management literature, as yet.

What I miss is that the definitions clearly define the process itself; however, not from the perspective of Human Resource Management, because there is no emphasis on practical realization and there are no practical instructions. Furthermore, definitions from the literature do not distinguish between entrances.

Aims and Methodology

In this part of the paper, the aims and methods of my future doctoral research are analysed. Considering the social changes and the economic situation in Hungary, the literature review and my explanation for integration at the workplace, my research will consist of three questions, with each question including sub-questions. The questions are the following:

1. How does the integration in practice at Hungarian multinational pharmaceutical factories work? What are the steps of integration? What are the differences in the integration process concerning positions? Is there a mentoring system? If there is, what is it like?
2. Multiculturalism: does the subsidiary company use the same process as the parent company? Which are the same factors of integration at the workplace and which factors have been changed because of cultural specificities?
3. Is the 21st century present in the process of work socialization? Do they consider the individual features of their employees, such as age, educational background, work experience, behaviour and social background during the process of work socialization? If yes, how?

In order to answer these questions and those which will arise over the course of my examinations, I have chosen document analysis of organizational documents and in-depth interviews with Human Resource Managers at chosen organizations as my research methods. Document analysis shows how the integration process is regulated and the depth-interviews point out how it works in practice.

Antal [1976, 15 p.] calls document analysis every process during which – on the basis of the regularly recurring features occurring in the notices and messages – we come to conclusions which are not overtly stated, but to conclusions which may be inferred from how the message was formulated (i.e., coding) and which may be verified and continued in a different way through other methods. Klein [2004, 120. p.] defines an in-depth interview as a conversation which aims to get information and collect data. A more detailed approach suggests that in-depth interviewing, known as unstructured interviewing, is a type of interview which researchers use to elicit information, in order to achieve a holistic understanding of the interviewee's point of view or situation; it can also be used to explore interesting areas for further investigation. This type of interview involves asking informants open-ended questions, and probing wherever necessary to obtain data deemed useful by the researcher. As in-depth interviewing often involves qualitative data, it is also called qualitative interviewing [Internet 2].

In the first period of my research, document analysis will be made and, considering its results, the in-depth interview questions will be compiled.

Summary

The goal of this study was to assign a gap in Human Recourse Management literature and illustrate the reasoning, the methods and the questions of my future doctoral research on integration at the workplace. The social changes in Hungary justify an analysis of work socialization and the review of the literature shows that there is a wide-range of studies about work socialization, but less attention has been given to the personal differences among newcomers during the process. This essay analysed the chosen methods (in-depth interview and document analysis) which will be used in my research. The most important questions of the examination were also highlighted.

The analysis of work socialization has its own practical merits and I intend to deliberately and analytically reveal its important factors and steps. Furthermore, I will endeavour to focus on its organizational effects and also try to come up with suggestions that would be taken into account in human resources activities.

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A COMPARISON OF THE HUNGARIAN MANGALITZA AND DUTCH ORGANIC PORK CHAINS

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Abstract: The aim of this paper is to present the Hungarian mangalitza pig and Dutch organic pig supply chains and, in interrogating the differences between the two sectors, to make suggestions for the efficient operation of the Hungarian mangalitza breeding sector. The information about the two was sourced by a depth interview and literature reviews. It is established that there are few similarities between the two segments. In both sectors, the pigs are kept outdoors in large paddocks, there are also National Associations: in Hungary, the Association of Mangalitza Breeders (NAMB), in The Netherlands, the Organic Pork Growers. They hold a general meeting every year, where they discuss issues such as volume, quality, price, marketing and the future challenges and opportunities. There is strong demand both for the mangalitza and also for Dutch organic pork products on foreign markets. The main difference between them is their information systems. In The Netherlands, information flows via FarmingNet, but in the mangalitza sector, no such system exists. Yet, such a system would represent a breaking point for the adequate flow of data and efficient production for the NAMB, because then, Hungarian farmers would be forced to supply data.

1. Introduction

Supply chain management (SCM) not only presents the product flow from the producer to the consumer (Balogh et al., 2009). Coordination and collaboration among chain actors have a significant role over sourcing, production and logistics management (Naspetti, 2009, Szabó et al., 2009). The precise knowledge of traceability is essential to analyse the supply chain and to provide secure and good quality food products for the customer (Pakurár et al., 2010). Because of the changes in consumer demand which have occurred of late, substantial transformations have been seen in organic food chains. Increasing numbers of studies describe comparisons and the performance of organic supply chains, noting that the production, processing and sale of organic products are not the same as in conventional chains. This difference is explained by how, in organic chains, collaboration, information flow and the production of high quality products are of high priority. The main organic pork producers in Europe are Germany, Denmark, France, the United Kingdom and The Netherlands (European Commission, 2010). The market share of the Dutch organic pork sector in 2010 was 1.9 %, and this is expected to increase continuously in the future (Monitor Duurzaam Voedsel, 2010). In the Dutch organic pork sector, a strong increase has been seen over the past few years. While most of the Dutch production is exported, domestic consumption is increasing continuously. The share of organic meat in gross pig meat sales in The Netherlands is higher than anywhere else in Europe. The reason for this strong showing is the strength of the Dutch supply chain, the foundation for which was laid in the past (Vermeer, 2011). In Hungary, demand has been growing for organic products and the mangalitza pig represents the organic line in the Hungarian pork sector. However, this breed is not organic, even though consumers are of the opinion that this breed is organic in and of itself, because its products are viewed as being healthier and tastier than commercial pork. The mangalitza supply chain is unique not only in Europe, but worldwide, because the segments of this chain function in close connection and interdependence, even though the producers and traders of mangalitza products appear on the same market as competitors.

2. Materials and methods

The paper is based on the methodology of supply chain management. Pork supply chains consist of similar stages all over the world, but structural differences between each other can be observed (Trienekens and Wognum, 2009). This paper presents the main structural differences between two similar, but not uniform, segments in two European countries.

The information on the analysed mangalitza sector was derived from a depth interview with the secretary of the National Association of Mangalitza Breeders (NAMB), Dr. Péter Szabó. In the course of the interview, most questions focused on the mangalitza breeders, slaughterhouses, processing companies, export and home retailers. The other area of research was an analysis of the organic pork chain in

The Netherlands. I processed key annual reports and literature involving the Dutch organic pork production and chain. On the basis of this information, I prepared the flow charts for both segments.

The main aims of this research are to compare the mangalitza and the Dutch organic pork chains and to identify their differences, in order to make suggestions for efficient production in the mangalitza pork sector.

3. Results and Discussion

3.1. The mangalitza breeding in Hungary

The Hungarian mangalitza pig sector has experienced numerous structural changes in the past few decades. From a record low of approximately 200 pigs in 1990, when the breed was on the edge of extinction, last minute demand from the Spanish market suddenly appeared and the pig stock has increased dynamically ever since (Magyar, 2005). Since the millennium, the number of pedigree stock has continuously increased until 2007 and reaching a level of 9,200 sows. From 2004, a strong climb ensued in the number of mangalitza. The reason for this was the target programme from the year of 2005 for the keeping of animals representing high genetic value, as the breed is indigenous (MRD, 2004). Subventions were in place until 2009; however, from the third year of the application period continuous decline can be observed. The main reason for the decrease was the drastic growth of feed costs because of the drought damage in 2007 (Kovács and Balogh, 2011). Another reason for the decline was the global economic crisis in 2008, which forced many farmers to stop breeding and to liquidate their livestock. Since 2010, a further period of supports has been in place, which will be maintained until 31th December 2014. The aim of the subvention is to preserve the genetic stock of protected indigenous and endangered agricultural species represented in low numbers in breeding programmes (MRD, 2010). This programme will stop the decline, and even to the end of the supporting period will contract more than half of the farmers 50 % growth in the sow number. Figure 1. illustrates the change of mangalitza sow numbers from 1988 to 2011.
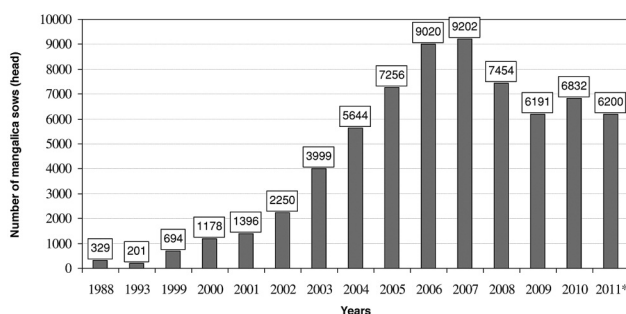
Figure 1.: Mangalitza sow number from 1988 to 2011.
*2011: estimated value
Source: NAMB, 2011

3.2. The Hungarian mangalitza pork chain

In 2011, there were 115 controlled mangalitza breeders in Hungary. Approximately 6,200 sows were kept, i.e. one-third less than the 9,000 sows kept on average in previous years. This sow number resulted in about 46,100 mangalitza slaughter pigs being bred.

The Hungarian mangalitza breeders are supplied with boars by the NAMB co-ordinated nucleus farms. At about half of the total number of farms, boar breeding was initiated to preserve the 27 mangalitza lines. In the mangalitza sector, there are 3 main integrations. Three large-scale producers are in possession of one-third of the total number of sows, with 600–700 sows/farm. Their share in the slaughter pig output is 40 per cent. Slaughtering, processing and the production of several end-products are arranged at Pick Szeged Inc. and Surjány-Meat Ltd., in a ratio of 75–25 %. Approximately 2,000 tons/year of bony thigh (legs), chuck and deboned pork chops are exported to Spain as raw materials, from which the world-famous Serrano ham is made. To Japan are transported about 300 tons/year of pork chop and tenderloin. The domestic processing products (salami, sausage, lard, fat) are produced and sold in Hungary. The 21 medium-sized producers and sellers possess 18 % of the entire number of sows and the total share of slaughter pig sales is 20 %. Slaughter and processing are performed by several larger or smaller factories. Some major slaughterhouses and processing companies are the following: Lac-Meat Ltd., Maros-Meat Ltd., Pásztor-Meat Ltd., Mangary Ltd. Palatin Ltd., PIMI 2000 Ltd., Szilváshús Ltd., Balaton Meat Ltd. represent the processing plants. 91 small-scale producers keep half of the total breeding animals and the share of the slaughter pig sales is similar to that of large producers. Most of the small breeders keep the animals in extensive keeping technology, which is why the breeding period is longer and the production is less efficient. This is the reason why these breeders can only obtain 6 piglets/sow/year, as compared with the number of piglets on large farms (9.25 piglets/ sow/year). Festivals and markets are organised several times each year in some Hungarian cities to target domestic consumers with the products of large and small-scale farms.

The reliability of the mangalitza sector has declined in the past several years. In 2008, the NAMB gave certificates to just more than 26,800 slaughter pigs, but today that number is not much more than 16,100. The NAMB coordinates the breeding and determines the future conceptions. This organisation certifies mangalitza pigs, thereby officially guaranteeing the origin of genuine mangalitza products (Olmos and Tóth Ltd., 2011).

Accordingly, the NAMB associates the chain actors, thus solving the problem of information flow. However, the supplying of data – or rather – complete information flow results in problems. There exists no central system through which the information flow would be suitable to provide key information to the breeders, slaughter-houses and processing companies. Yet, exactly such an interchange of information would make their combined production more efficient. The Hungarian mangalitza pork chain is represented by the following figure (Figure 2).
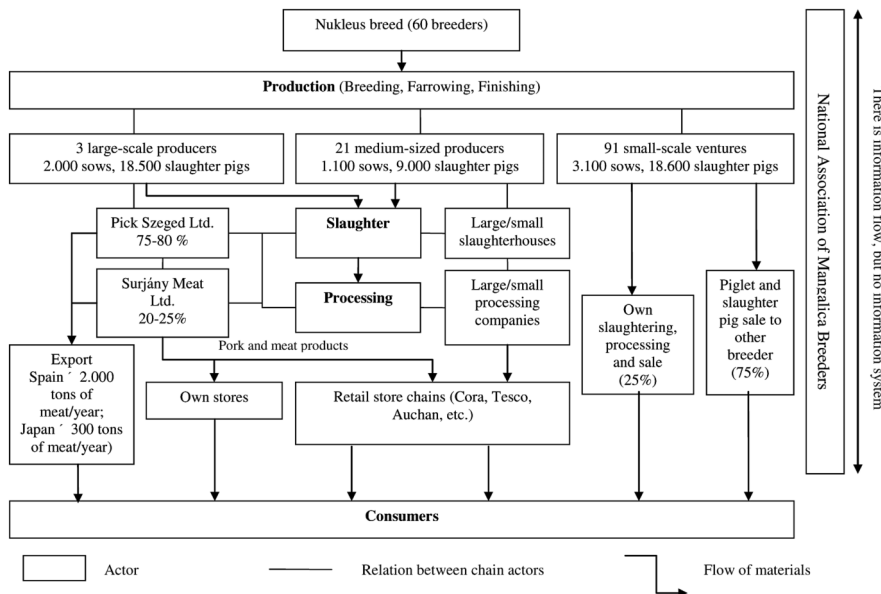
Figure 2: The mangalitza pork supply chain in Hungary
Source: On the basis of NAMB, 2011 own compilation

home sector increased from 0.6 % in 2009 to 2 % by 2010 (Monitor Duurzaam Voedsel, 2010). Figure 3. represents the Dutch organic pork chain.

4. Summary

Mangalitza breeding would be a breaking point for Hungarian agriculture, because of the growing demand in foreign markets and the unique supply chain of the sector. Dutch organic pork production plays a significant role in the EU, because the share of organic pork meat in gross pork meat sales in The Netherlands is the largest in Europe and the Dutch have one of the best performing economies. In the mangalitza supply chain, there are few problems. The main problems are the problems with

3.3. Organic pork chain in The Netherlands

The organic pork sector in The Netherlands is relatively small. In 2009, there were 87 organic pig farms. The gross sales from organic pork grew by 4.4 % in 2009 (Vermeer, 2011). Organic products are 40–50 % more expensive than non-organic pork products, because animals are kept longer, are provided with more living space per animal and also because organic feeding increases production costs, as in the mangalitza breeding. Nevertheless, it is keeping technology problem that more piglets die after birth, as the sows and their piglets are not fenced off from the other animals, meaning that piglets are more easily trampled to death, reducing the efficiency of production (Nijhoff-Savvaki et al., 2008).

The Dutch organic pork chain is streamlined; the products are sold largely by conventional retailers. The major player in the organic pork sector in The Netherlands is The Groene Weg, which is fully owned by the Vion Food Group (Oosterkamp et al., 2009). The long-term planning of The Groene Weg is to elaborate the only franchising formula with considerable growth and a strong position in supplying supermarkets and export. The fresh pork products are sold by The Groene Weg's own stores and other retails/distributors and export outlets. The Groene Weg, as a central meat processor, makes the information flow possible between chain actors via an electronic information system, FarmingNet. This is an intercompany system designed by Vion Foods. Via FarmingNet the farmers obtain information from the slaughter details and it helps the pig farmers to optimize their operations and make modifications to efficient production (Nijhoff-Savvaki et al., 2009).

Organic pork meat became a regular assortment in supermarkets and the largest butchers. Sixty per cent of the products are sold by supermarkets, 36 % by specialists. The sale of out of

Figure 3: The organic pork supply chain in the Netherlands
Source: On the basis of Nijhoff-Savvaki et al., 2009 own compilation

information flow and the lack of data. In Dutch pork production, there is an information system, FarmingNet, which makes the data connection between chain actors possible and helps the pig farmers to make their production efficient. With a system like FarmingNet in Hungary, the problems with information flow could be solved. The system would be operated and financed by the NAMB.

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STRUCTURED COMMODITY FINANCE

Péter Suták

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Abstract: Over the past years, the financial stock market – providing the capital demand that is the result of stockpiling and the characteristic strong seasonality observed in the agricultural sector – has increasingly grown and become more "used" by market participants. Its size had reached an annual value of 200 billion HUF, of which agricultural products had received the largest proportion through the various market participants (producers, integrators, traders, feed producers, mills). In the meantime, this market had become part of the competition between the commercial banks that are the largest financers of the sector, due to which the financing credit institutions had undertaken increasing risk levels, with respect to both degree of financing and the VAT financing related to stockholding.

The practice of commodity financing by banks display a rather varied picture at present. Considering the exceptional degree of fall in prices and the actions of companies totally disregarding business ethics in 2008, it seems necessary to reveal the full scope of risks inherent in commodity financing. The primary aim of such an exercise is to ensure the prudent operation of refinancing activities for commercial banks.

The inherent risks in trade financing – as has been proven by the experiences of previous years – are not found primarily in the goods themselves, but rather at the actual storage facility and also emerge in relation to clients, as well as the inadequate and ineffective risk management of price volatility by the financers. Therefore, the establishment of banking risk management and risk prevention techniques, including the development of new financing procedures become indispensable, minimizing all types of risks that had emerged in previous years.

Keywords: structured finance, commodity finance, trading house, risks

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Introduction

Inadequate capitalization is a common characteristic of the agricultural sector and the companies operating in agriculture, and its related high demand for third party funding primarily in the areas of investment and current asset financing. The financial position of farmers is mostly inadequate security for financers.

The particular aspects of agricultural financing result from the varying, individual nature of agricultural production. It is necessary to examine these varying, individual aspects at two subdivisions (Kostyál et al, 2000):

- High capital demand of investments, coupled with – resulting from the seasonal nature of the sector – exceptionally slow return due to the low capacity utilization.
- The financing demand of current production is determined by e.g., the quality of production, the quantity of current assets, their composition or the material intensiveness of activities.

If one further examines the financing of certain production cycles, one faces further sector specific criteria:

- The vertical nature of production
- Cyclical nature of expenditures and revenues and also their realization during different periods (seasonality)
- Long production cycles, long reaction times

Increased dependency on natural factors increases the risks of return on investment and the repayment of the granted loans. The interests of the agricultural sector clash with the profit-oriented financial system: the banking sector can only provide loans on a strictly commercial basis, by ensuring the appropriate yield of loans that are also applicable in the agricultural sector. The banking sector cannot therefore introduce allowances into the financing system, even if this would be the public interest. Thus, the financing of the agricultural sector needs government subsidization. The government intervention in this area is as more important as larger the differences between the prices of agricultural products and their production costs and between the profitability of agriculture and the banking interest rates (Francsovics, 2005).

Kovács et al. (2007) establishes that the implementation of EU regulations modified the conditions of farm loans. The range of the earlier government subsidies, coupled with financing options (interest rate subsidy, guarantee), decreased. The absence of financial sources had been supplemented in part by newly introduced financing options and, in part, by direct subsidies[1]. He further elaborates that, in relation to newly introduced EU subsidy types, certain

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[1] Recently, direct subsidies had already contributed to nearly 60% of the agricultural budget in the EU. These subsidies are supplied detached from production. Without these, only 40% of Hungarian holdings could realize some profit. The conclusion is that Hungarian agricultural enterprises are subsidy dependent to a significant degree: their profitability and sustainability depends on subsidies (Kovács et al., 2007).

short term financing facilities had been focused on, such as factoring and public warehouse lending, in connection with intervention purchases.

Structured commodity finance

In previous years, it had become clear for financers that the classic, balance sheet based financing does not completely serve the custom made service provision of enterprises, nor the efforts of banks for secure lending.

In many cases, the client's borrowing capacity had prevented the utilization of ordinarily applied financing structures. Thus, in order to increase their competitiveness, it had become appropriate for financers to develop structured financing facilities that are sector specific and target the professional procedure of financing the trading and production of essentially commodity market eligible goods (wheat, fertilizer) and also easily marketable finished products (canning industry products), basic goods and large volume energy carriers (commodity products).

The developed individual facility follows the raw material procurement, production and the finished product, in harmony with the real processes of companies offering the most appropriately structured financial solution at all times.

There are many definitions for structured finance. Perhaps it is the most expedient to consider it as a generic term:
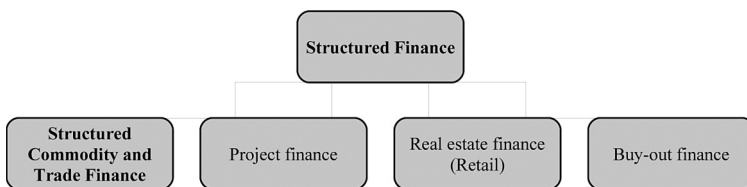
Figure 1: Types of structured finance
Source: Own figure

If I wanted a basic approach to structured finance as a definition, then it would be advisable to consider the following: An enterprise can be financed in two ways. On the one hand, finaincing can be based on the balance sheet of the company, the cash flow produced by the featured assets and business activities. On the other hand, the financing of an individual transaction (e.g., procurement, stockpiling) may be separated from the other business activities, making them individually financeable. In the case of structured finance, the latter approach is followed; one separates the assets or transactions from the other activities of the company and tries to interpret their individual borrowing capacity and financing eligibility.

In the present paper, I only wish to address the structured financing methods most relevant to agriculture, namely commodity or stock financing.

Synthesizing the definitions of "Structured commodity finance[2]" found in international publications, the following primary elements may be given greater importance, which define structured commodity and stock financing:

- Short term current assets, individual or repeated, primarily commodity based, mostly closed (back to back) financing facility, with fixed financing target;
- The structure and collateral ensure the financer control over the goods and also control over the cash flow from the transaction and the right of use;
- The financer tracks the movements of the goods (in part or the whole process from procurement to sales);
- Strict monitoring of the financed transaction that permits immediate reactions;
- The coverage for the source of repayment are the revenues generated by the sale of goods, the debtor typically does not have any other available funds;
- The risk elements characteristic to the structure are clearly identifiable.

As a result of these elements, one can determine that structured commodity and stock financing are applied in cases of non-financeable (primarily balance sheet based) companies or in the case of a company that may not be financeable over a given limit, in which cases the risks inherent in financing are counterbalanced by the adequate structured finance facility and strong collateral system.

The business model applied in structured commodity financing identifies the occurring costs, the necessary funds, the optimal financing facilities, techniques; indicate the relevant financing structure supporting market participants, institutions (e.g., public warehouse, insurance of receivables, factoring house, trading house, etc.). The utilization of a business model is of key importance in the development of the financing structure. With the help of the model – part of which is a dynamic balance of assets-liabilities related to the financed business period – one can determine the size of cash flow of the transaction, their timing and also the distribution of these between the financer and client, in suitable harmony with the collateral structure.

The financial model also plays a key role in the case of the financers, since the financial model becomes the primary tool in monitoring, settlement and accountability following the disbursements. By utilizing the model, sensitivity tests can be carried out, simulating and evaluating the scenarios deviating from the norm (worth, basic, best) and also their effects on the adapted financing structure.

Collateral in structured commodity financing

Of all the risk mitigating economic instruments available to the creditor, the most important is the collateral system. In most cases, the financial institutions require legal collateral, i.e. adequate securities for lending. This need is expressed by

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[2] According to a simplified definition, this is the supply of clients with individual requirements by a complex financing source.

both the financial and credit institution acts (Balázs et. al, 1997).

In practice, it is worth distinguishing between the words collateral and security as definitions. Legal regulation only accepts collateral as a legal institution while, from the viewpoint of banks, collateral must be marketable[3] and immediately liquidated, preferably into cash, (e.g., marketable goods, securities). A portion of collateral (guarantee, joint and several guarantees) is not marketable and related to a specific transaction and are non-transferable.

In general, good collateral is one that can be easily, inexpensively, quickly:

- assessable,
- verifiable,
- enforceable – even in the event of enforcement, bankruptcy or winding-up proceedings,
- "clean" from a legal viewpoint,
- That which has a stable value.

Structured transactions are always collateralized loans. When devising a transaction, along with the planning of cash flows and their financial modelling, the most difficult task is to devise the financial and legal collateral system.

The collateral system backing the transactions may not only include traditionally accepted collaterals, according to Hungarian provisions: the lenders' security may be increased by other collateral not specifically defined as collateral by other legal institutions, also such facilities that may only be viewed as "collateral" due to their effects. (Nádasdy et al., 2011)

The diversity of economic life and of economic interests and their varying intensity resulted in the parties seeking collaterals that are outside the Civil Code chapter 23, one direction among others was the application of so-called fiduciary legal solutions[4].

Trading house

The optimal combination of applicable banking collateral in the area of structured commodity finance and commercial transactions allow the client to receive funding even if the client's financial situation and capitalization would otherwise not allow the establishing of a financing limit or if the client is loss-making; however, the stocks are available in large, homogenous volume, immediately marketable at a traceable price.

Trading house financing also represents a huge competitive advantage for banks, considering that the ownership of the goods acting as collateral provide greater loan security over most banking type (e.g., mortgage right) collateral, and also the option of disposal over the goods are immediate. It is a further positive point that the clients may be financed over the financing limit and – when necessary – for transactions that are at the stage of their being devised and the prior, intensive (restructuring) management can be dealt with rapidly and flexibly (collateral transfer).

The trading house financing permits banks to enter into the financing of such companies where the company – due to existing banking relations – cannot offer classic types of collateral (e.g. real estate). With the buy-out of certain assets and stocks additional financing may be provided, with lending of considerably higher yield than applicable to other business sectors, that further expands the market options of banks.

The Trading House is a typically project type company that can perform invoiced commercial activities[5], acting as an instrument in such financing transactions where the acquisition of the ownership right of goods is preferred or is the only lending method *(Figure 2)*.
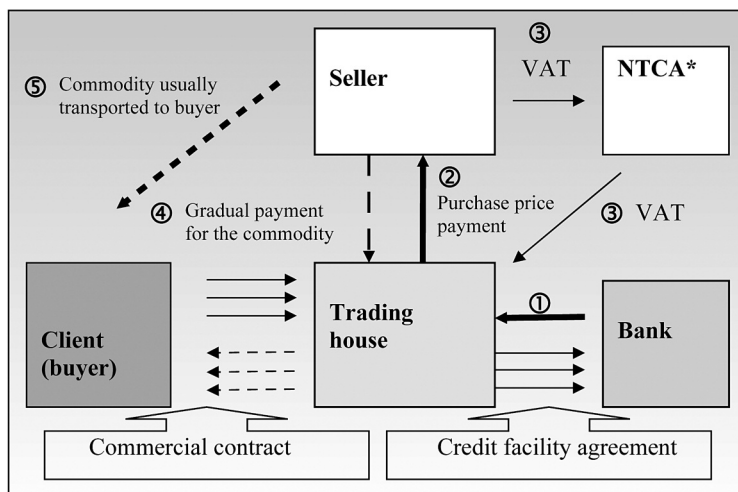
Figure 2: Methods of trading house financing model
Source: Own figure   *National Tax and Customs Administration

Also important from the prudential supervisory viewpoint is that those commodity financing activities that are carried out through trading companies are performed with the involvement of such companies where the controlling, refinancing credit institution can exert an exclusive competence regarding the management of risks.

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[3] The determination of the value of collateral means the establishment of the realistic market price. The financer is bound by neither the book value nor acquisition price. Of course during the valuation these factors could play a part; however, the aim of valuation is to establish an actual price that can be reached and realized on the market. It assists the financers in valuing individual collaterals if one knows the individual values that one can take into consideration. In determining this, one has to keep in mind how could the value of the collateral change in time (time of realization), what type of factors and events could influence the value of the collateral, due to which the expert opinion does not only have to involve the valuation of collateral at present time value but it has to cover the collateral value at the time of realization.

[4] By fiduciary collateral, such legal operations are meant where the legal position of the entitled acts as collateral through ownership right, the option to ownership right, receivables or rights (Gárdos – Gárdos, 2004).

[5] The 1996. (23th) Act on Credit Institutions and Financial Enterprises rules out the acquisition or sale of goods by a credit institution that is aimed at profit generation.

Financing model

The applied work-flow during the activities is in every case dependent on the composition of the structure, and also the type of goods. However, the source of repayment is in all cases the future cash flow from the sale of the goods.

The financing of the client is carried out against a revolving credit facility provided to the trading house by the refinancing bank. Its degree is determined on the basis of the client's previous financial year's procurement – stock levels – and sales data that are provided by the client. The trading company has disposal over the credit facility following the presentation of conditions and documentation proving the closed nature of the construction. In the case of this type of credit facility, the repayment schedule is fixed and the repaid amounts may be used again according to the conditions set out in the financing structure.

During the transaction process, the Trading company acquires (acquires ownership rights) the goods/stocks from the Client and each time obtains loans from the refinancing bank for the financial settlement of the gross purchase price. The determination of the purchase price plays a key role in every financing facility.

The trading house structured business model is basically based on the price difference of purchased goods and their resale price. Based on the model, the trading house receives the stocks at a specified – compared to the value of goods at a pre-fixed rate, reduced price. The seller (client) intends to repurchase these goods during the provided option period, but at the latest on the last day of the option period or a maximum of 1 year. The implementation of the option ensures the contractual collateral that may prevent the loss generating devaluation of stocks (Figure 3.). Thus, both the refinancing and the trading house capital are protected from possible price depression.

At the time of goods purchase simultaneously with the purchase-sale contract the trading house also concludes two option[6] contracts. On the one hand, the trading house provides a short call option[7] right to the seller of the goods for the repurchase during the term; on the other hand establish a long put option[8] right to reduce its risks. The latter means a purchase obligation to the seller.

In the case that the trading house experiences the unplanned increase in risks regarding a given transaction, acting within the options allowed by the contractual framework and utilizing its option right may call upon the client for the repurchase of the goods. In the event of non-compliance by the seller, the trading house possess the option to sell the stocks on the open market without any sanctions.
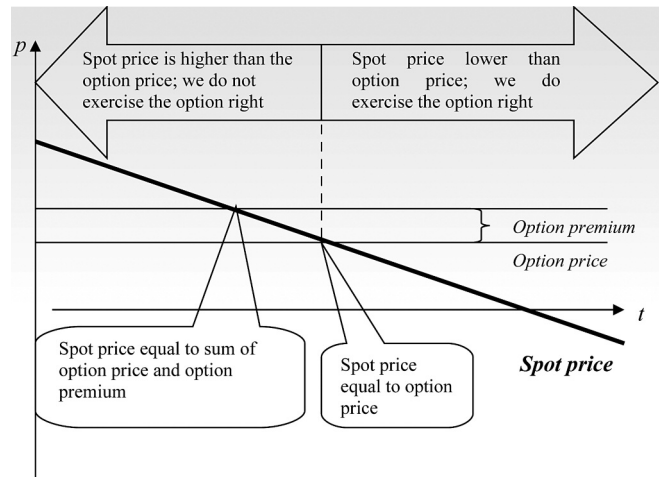
Figure 3: Methods of exercise long put option right
Source: Own figure

With the establishment of the call option, it remains the trading house's discretional right that in the case of default or fraud event steer the transaction towards commodities risk (possession, sale), or in the case of better borrowing capacity clients placing emphasis on company risk utilizing the put option forcing the client to repurchase the goods.

With the establishment of a put option, the trading house is entitled – on the put option – to involve further additional, classic banking collaterals such as blank bills, prompt collection order, offsetting and security deposit. The structures of this collateral in every case are subject to the transaction, client and market options.

When pricing, by using a security deposit, a volume of price puffer is formed that allows adequate room to manoeuvre for the trading house to securely manage stop-loss[9] events, to eliminate losses resulting from market processes. The value of the security deposit and the stop-loss level are the risks of the commodities, subject to the previously observed stocks volatility; client rating and the rating of the storage area are utilized in warehousing stocks.

With the application of this model, the trading house primarily serves the interests of the refinancing background, secondarily the operating prudence and the maximization of realizable profit only occurs as a tertiary aim.

As a result of individually designed financing structures the trading house has a number of differing (legally, accounting) options to sell the goods:
- The goods acquired by the trading company are sold to buyers denoted by the client and previously rated by the bank.

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[6] Option means a right to the realization of a benefit. The concept of option had first emerged on the financial instruments market, during stock price valuation. These rights may be interpreted on the market of fixed assets, distinguished from the options related to money market; the latter is termed real option. In certain cases, the option may only be exercised on a given day. These options are traditionally termed European type options. In other cases, the option may be exercised on a given day and also any time prior to this date, these options are known as American type options.

[7] Act (1959) on Civil Code. 4. 375. §. If an owner grants a right of purchase (option) to another person, the beneficiary shall be entitled to buy the thing with a unilateral statement. Agreements on options to purchase shall be put in writing with the thing and the purchase price specifically indicated. An option to purchase stipulated for an indefinite period of time shall expire after six months; any agreement to the contrary shall be null and void. An option to purchase stipulated for a definite period of time can be stipulated for a maximum of five years.

[8] The other basic type of option is the put option that ensures the right of disposal at a pre-determined rate.

[9] The stop loss level equals to the refinancing costs and amount of variable operating costs per product unit value.

- The client repurchases the goods from the trading company, i.e. exercises the long call option right.
- The trading company sells the owned goods to buyers on commission from the client

Trading houses are primarily linked with business partners operating in capital intensive industry sectors, that are professionally well known exporters, wholesalers, energy suppliers, agricultural integrators and producers and also food industry participating companies and additionally with such companies that have suitable commodity products available and are intending to avail with the possibilities offered by the business sector (e.g. improvement of management ratios).

The range of financed products may only be products with transparently measurable market prices, available pricing and those that are controllable, homogenous and in demand. The range of products and the volume involved in financing are determined based on the sales records of the company. During the fixing of prices, the starting price in the case of trading companies are the acquisition, sales or other price that can be tracked on the market. For producing companies, the cost price is primarily used to make such calculations.

Commodity products may be classified into three primary groups:

- Agricultural products (soft commodities)
- Metal and mining products
- Energy industry products

Goods with reference prices:

- grains (wheat, corn, rye, barley)
- oil seeds (sunflower seed, rape seed)
- protein sources (soy)
- artificial fertilizer
- copper, zinc
- steel products
- coke

The transparent reference prices and adequate historical data quantity of goods allow the determination of internal price, prices, that speed up the reactions given to market trend changes. Since only certain products (bread making wheat, corn, sunflower seed, rape seed, fodder wheat) are featured on the BSE[10] commodity section and these do not always possess adequate liquidity so that the quotations can be considered as a sufficient guide price, it is appropriate for financers to monitor quotations on other markets. The typically monitored price indicators are MATIF[11], CBOT[12], LCE[13] and LME[14], etc.[15] commodity market prices, and also the non-commodity market harbour quotations at Hamburg. Of course, in the cases of price indication calculated from foreign market prices, the cost of transportation has to be

included in determining the collateral value of stocks. Only the inclusions of excise goods are justifiably introduced into collateral system of goods with no reference. In this case the approval of National Tax and Customs Authorities is necessary for storage, greatly reducing the storage risks and also excluding the effects of price volatility due to the fixed nature of these prices.

The introduction of occuring risks

Risk analysis is of paramount importance in the case of every institution involved in financing, since the results of these have a determining influence to both the design of the structure and the fulfilment of financing. With respect to risk mitigation, the primary task is the essential transfer of risks related to goods (exchange rate, quality) and warehousing to the buyer:

- In certain transactions, the transfer of the quantitative, qualitative and buyer risk demands an inspection by third parties (public warehouse, independent warehouse, accredited quality control institution, buyer insurance)
- The risk of goods marketability can be reduced significantly by an appropriate financing rate, meaning a purchase price calculated with a price reserve. These are typically:
  - grains: 90–95%
  - other commodity market products: 60–80%
  - goods that are difficult to sell on secondary market: 50–60%

Trading House solution mitigates counterparty risk and liquidation risk, but causes additional market risk (Figure 4).

	Working capital loan	Inventory financing with public warehouse receipt	Inventory financing with trading house involvement
Counterparty risk (potential default of borrower)	⭕	⭕	○
Liquidation risk (difficulty in exercising right over collateral given default)	⭕	○	○
Market risk (decrease in market value of collateral)	○	⭕	⭕

Figure 4.: Relevant risks in commodity finance
Source: Own source

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[10] Budapest Stock Exchange
[11] Marché A Terme d'Instruments Sinanciers, France stock exchange for rape and grain
[12] Chicago Board of Trade
[13] London Commodity Exchange
[14] London Metal Exchange
[15] LIFFE (London International Financial Futures and Options Exchange), WTB Hannover (Wareterminbörse Hannover), IPE (International Petroleum Exchange), AEX (Agricultural Exchange – Amsterdam)

Market risks

The support of the ownership right of goods with factual, credible documents are the basis of trading house financing. For this purpose, as background documentation, the following are the most commonly used:

- supplier invoice on the procured goods
- declaration regarding the goods' exemption from legal proceedings, attachment, garnishment and execution
- market information regarding the ownership relationships, public warehouse closing of goods (to excluded double financing)
- quality certificate issued by accredited organizations
- records relating to the stocks management (quantitative, qualitative)
- commodity insurance policy issued by certified insurers

Along with the applied moderate price level established within the financing structure, the continuous monitoring of acquired stock quality, price movements, market and marketability options is essential.

The digressive price movements experienced in 2008, involving all industrial and agricultural products, pointed out to financers, and primarily commercial banks, that it is not enough to utilize/apply the various exchange rate and market monitoring techniques in the areas of classic treasury products. Rather, the movements on the commodity market also have to be followed, to prevent the sometimes drastic decrease in collateral levels.

While volatility[16], as a measure of risk had been in use for a long time, for a long period it had been considered as a type of constant value in time and as such a factor that can be eliminated by diversification. The fact that volatility can change in time basically only involved option traders and the people appointed to monitoring their risks. However, with the globalization of trading, the diversification options are becoming increasingly constricted; the increasingly significant speculative capital upset the markets from time to time, causing sudden significant changes in volatility.

It is a common observation on the market that volatility and exchange rates correlate negatively, namely at the depreciation of exchange rates volatility typically increases. Earlier, this could have been prevented by diversification between markets, since the fall on one market does not necessarily accompany a fall on other markets. Today, however, the markets are intertwined to such a level that a fall in one market is often followed by downward movement on other markets (Zsembery, 2003).

The considerable financing risk inherent in price volatility may be kept within predetermined limits and can be secured by hedging (Kozár, 2011) with the application of an adequate contractual structure.

In determining the volatility in the case of financial models, the examined period in part fit in with the term of the option (mostly 1 year). Furthermore, during empirical application, it is appropriate to use the same period historical data set as for volatility value calculation during testing. Namely, if the volatility is to be used for the pricing of a 1 year term financing facility, appropriately a minimum of 1 year historical data set must be used in determining the volatility.

Counterparty risk

Despite the commodity based financing, to both the trading house and the refinancing bank, the counterparty risks appear as a significant importance factor.

The banking risk management techniques primarily concentrate on identifying, preventing and managing the risks inherent in the client's course of trade. Along with factors that are examined based on objective ratios (capital structure, liquidity, debt service, trade receivables, free cash flow), an increasing emphasis is placed on subjective factors, such as management behaviour, ownership structure, professional competencies, sector specific information and track record.

As a result, it is necessary to take into consideration a client rating as a risk premium factor in determining the value of deposit (price reserve) in the business model of the structure – even if it is applied to a smaller extent.

In order to mitigate client risk, it is advisable to strengthen the financing facility structure by involving the client as a surety, that secures the refinancing facility of the Trading company undertaken from the Bank. This legal obligation is established between the Bank and the client.

Considering that the ownership rights of goods forming the basis of financing are transferred to the trading company and are under their disposal, possible wind up or bankruptcy proceedings initiated against the client do not represent significant risks regarding the return on the transaction.

Storage risks

If the trading house does not possess its own storage capacity, the trading house has the option to – similar to public warehousing structure (artificial public warehousing) – warehouse the stocks at the client's own premises, or perhaps with the involvement of a third party under lease, ensuring the storage of the goods. In special cases public warehousing may be employed as a further security element. In this case the already public warehoused goods' ownership rights are transferred to the trading house by the transfer of warrants/bonds, or the trading house under the goods protection title enters as depositor on the public warehouse market In the latter case, the additionally occurring public

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[16] To forecast the future trends of volatility the simplest and most common method is known as historical volatility calculation. During the analysis, one assumes that the historical volatility calculated from prior data will follow the characteristics of the former trend in the future; therefore, the volatility does not change in time (Zsembery, 2003).

warehousing costs have to appear in the costs of the financing facility.

The storage capacity, similar to the infrastructure provided by public warehouses, along with mechanical protection cannot dispense with the use of the latest electronic security systems[17] coupled with appropriately designed security protocols, ensuring the physical existence of the goods, to prevent unwanted goods movements.

It is necessary to examine the availability of necessary commodity specific infrastructure of storage capacity, its legal background (e.g. property protection).

The financial model applied to the transaction and financing structure calculates with a risk premium assigned to the warehouse as location where the goods are safe-kept similar to exchange rate risks, applying on relevant objective and subjective factors and weights.

Quality risk

The majority of the goods stocks undergo such a lifecycle that in time not at all, or minimally – to a manageable level – influence the quality parameters. To mitigate the risks inherent in quality degradation occurring primarily in agricultural products (e.g. bug infestation, overheating) continuous, regular interval quality monitoring of goods is necessary. This allows for the minimization of amortization, quality degradation, and stock damage. In extreme cases, as coercive measures, the transportation of goods may take place or even the immediate sale of the stocks.

Summary

The primary aim of the described structured financing is lending under non-standard conditions within a closed construction, the development of a financing solution and its implementation:
- indirect lending by way of goods acquisition from clients,
- the banking clients stocks and balance sheet optimalization at end of year,
- resale stocks that obtained by credit-related call option right (work out activity);
- the purchase and sale of goods acting as collateral, exclusively through closed (back to back) commercial transaction.

The financing facility displays considerable differences to general business lending, since there is an extra party – the trading company – between the capital provider and capital receiver in this type of financing, which could mean a solution to those companies that have limited borrowing capacity however has adequate volume and quality of goods. Thus, with the aid of the sector, the client can receive appropriate funds over a short period of time, while the trading house and/or through which the refinancing bank can realize profits with manageable risks.

The transaction is closed, the price and buyer risks are verified and secured with the appropriate business and legal instruments, and/or the given goods are of commodity type, accompanied by an adequate quality certificate, its trading is carried on organized markets. Furthermore, the trading companies have adequate price reserves in all cases or its equivalent in collateral, contractual background with respect to the acquired goods.

Acknowledgements

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[17] Web based, industrial camera system, security service with 24 hour dispatcher center

THE RESPONSIBILITY OF MARKETING AND LEGISLATION IN CHILDHOOD OBESITY

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Abstract: The purchasing power of youth is considerable; they are the market of the future. , the young generation is the most influenced and vulnerable segment of the economy. The greatest problem of the influencing of our children is the rising cost of childhood obesity. The health care system cannot keep up with the pressure of obesity. Today, the risk of obesity is a bigger problem than smoking or alcoholism. The greatest problem is that youth underestimates the cost and risk of consumption of foods with high levels of fats, sugar and/or salt.

Keywords: foods with high level of fats, sugar and/or salt, fat tax, marketing, youth

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1. Target group - youth

"Kidfluence" is the direct or indirect influence kids have over family household purchases. Indirect influence means that children's preferences are given consideration when parents make a purchase decision. The major driving force behind this sweeping change is advertising. Advertising has changed the way kids learn, react and behave to a large extent. On television, too, only 18 percent of the total viewing is of children's channels, while 80 percent still continues to be general viewing (Swati Soni, Makarand Upadhyaya, 2007). The greater influence of children on family decision making is caused by two main factors: The first is the growing importance of families with one parent and the lower average number of children. The second is that the independence of children in the family is growing and their consumer socialization starts earlier. (Lehota, 2001) In the cases of several products, they are more informed and have wider knowledge than their parents, which is how their importance grows in the case of competency decisions. (Törőcsik, 2003). In spite of these factors, we should not forget that parents are the main influencers of children in how they will become potential consumers and decision makers, because they finance all their children's purchases. (McNeal, 2007) Eight to twelve year-old children definitely know what they need, even though purchasing for them is much more a hobby than an aim: it is a method of how they acquire conquering the world, making decisions, demonstrating their power and authorize their own status. (Müller, 2001) It is therefore essential for marketing experts to deal with them. Moreover, children represent an extraordinary market, as they make purchases on their own, furthermore they influence their parents' decisions, (Foxall et al., 2006) and they will create future markets. (Diekhof, 1999) Depending on product category, children can influence purchase decisions in several ways: influencing level is

higher in the case of toys and lower in the case of victuals. (Olson et al., 1999; Pólya, Szűcs 2010).

The young generation is one of the most preferred target groups of marketing. Companies are looking for the young generation's flavours and taking aim at an age group that does not have individual incomes or a formed system of preferences. Children understand the essence of advertisements less and they are more credulous from the average one. The absence of scepticism about the contents of advertisements is significant (Boush et al., 1994). Predominately older children (10–12 years of age) recognize that an advertisement does not communicate the full truth all of the time. Children express their apprehensions, but their levels of knowledge and scepticism are not enough. A serious problem is that an average American child (but the statement is also true of Hungarian children) spends roughly 4 hours in front of the television screen every day (Federal Communications Commission 2003, Kunkel, D. 2001). They watch more than 40,000 television advertisements per year (Kunkel 2001, Strasburger 2001). This means about 5 hours of only advertisement viewing weekly (Lindstrom, Seybold 2003). It is a fact that children above the age of three recognize trademarks, but the beginning of the formation of brand loyalty may start even from the age of two (Fischer et al. 1991, McNeal, J. 1992). Secondary surveys confirm that a large percentage (20%) of children less than 3 years of age already insists on brands and influences their parents' purchasing. Children aged between 4-5 years already insist on 20–30. A considerable portion of advertisements features foods containing high levels of fats, sugar and/or salt, rich in energy, but with low nutritional values and ingredients (Linn 2008). More than 75% of advertisements for games, flakes, candies and snacks is scheduled on Saturday morning, primarily on the channels for children (Macklin, 2003). The advertised foods are sweets, sweetened corn flakes, snacks, soft drinks. 95% of food advertisements show foods with

high levels of fats, sugar and/or salt. In a report made by the International Obesity Task Force, the level of children overweight and obese is accelerating rapidly in some countries (International Obesity Task Force 2005). Over the past three decades, the share of children who are considered overweight or obese has doubled, from 15 per cent in the 1970s to nearly 30 per cent today, while the share of children who are considered obese has tripled (Paxson, Donahue 2007, Koplean et al. 2005).

2. Risk of obesity

It is a fact that the average health care cost of overweight persons is higher by 42% than for those persons with normal bodyweights (Finkelstein, 2004). In particular, the average annual medical bill for an overweight person is estimated to be $732 higher than for a person of normal weight (Loureiro, Nayga 2005). Nearly 7 people die of obesity or from complications of obesity in Hungary each hour - one every 9 minutes. The unnecessary kilos play an important role in their deaths (Halmi, 2010). Secondary surveys confirm that children will follow their family's consumption patterns. We have to recognize that obese children become obese adults. The incomplete knowledge contributes to serious problems especially in the case of increasing consumption of food with high level of fat, sugar and/or salt. In this case, the increasing consumption of these products can contribute to the drastic rise in the number of overweight persons, as well as those with Type 2 diabetes. The high intensity of consumption affects the family budget and the budget of the country. The importance of the problem can be measured. The health care costs caused by obesity are rising dramatically. WHO projects that approximately 2.3 billion adults will be overweight and more than 700 million will be obese by 2015. The number of overweight persons today is 700 million more and, in the case of the obese, is 300 million more persons than seen in 2005 (WHO, 2008). The obesity rate around the world reached 60% of the entire population. The obesity rate among adults has risen 30% in the USA. 60 million

Americans over the age of 20 are obese (Costley, Leggett 2010). Childhood obesity is a problem around the world. 15.2% of 2 to 5 year-old children are overweight, whereas 6.3% are obese in Canada. (Olstand, McCarger 2009) Canada has one of the highest overall childhood obesity rates among nations in the Organization of Economic Cooperation and Development (UNICEF Innocenti Research Centre 2007). The magnitude of overweight ranges from 9% to 27.5%, and obesity ranges from 1% to 12.9% among Indian children (Rajaat et al, 2011). Detailed data for Hungary can be found in Table 1.

3. Materials and Methods

This paper focuses on consumer behaviour of youth and cost of eating unhealthy foods, regarding food with high levels of fat, sugar and/or salt. In addition, the efficiency of unhealthy food advertisements is also evaluated. I assumed that by virtue of field research, well delineated consumer groups can be formed within the segment of young people in cases of foods containing high levels of salt, sugar and fat. An aim of this paper is to explore and identify these segments and to describe consumer behaviour.

Altogether 1297 questionnaires were filled out in high schools in four cities (Mezőtúr, Szolnok, Debrecen, Nyíregyháza) of North-Great Plain Region, Hungary.

The questionnaire examined the consumption of young persons in cases of food with high levels of fat, sugar and/or salt. Features of the sample: Participants 1297 young persons (mean ± SD age, 16.13 ± 1.37 years, range 13 – 19 years, mode 15 years); 55.4% female, 44.6% male. Table 2 shows the representativeness of the sample according to gender. The representativeness of the sample is good.

This paper presents the results of 1297 questionnaire. Questionnaires were evaluated by SPSS, using the following statistical methods (e.g., average, mode, median, standard deviation, Cramer's V coefficient of concordance).

In addition, I examined the consumer behaviour of young people with an online survey especially in connection with the so-called fat tax. In this survey, 504 questionnaires were filled in Hungary. The online questionnaire was promoted in different forums: social media, e.g. Facebook, iwiw and Neptun. Taking part in the research for respondents was voluntary and anonymous, without any previous selection. Inquiry of the online survey took place between 27th April 2011 and 1st June 2011. Anyone could participate in the survey that filled in the questionnaire. The online survey was country-wide. Distribution of the sample by gender: 60 % women, 40 % men. Average age in the sample () 27.29 ± 10.099 year, range (R) 14–65 year, modus 20–24 year.

Table 1.: Distribution of population according Body Mass Index (BMI), gender and age in Hungary

BMI category	Men			Total	Women			Total
	Age 18-34	Age 35-65	Age 65-		Age 18-34	Age 35-65	Age 65-	
Underweight	3.0	0.6	1.4	1.5	11.3	3.0	1.9	4.9
Normal	55.9	29.6	28.9	37.7	67.4	39.8	32.1	45.2
Overweight	29.8	45.0	39.8	39.4	14.9	34.2	42.1	31.1
Obese	11.3	24.8	30.0	21.5	6.4	23.1	23.8	18.9

Source: Hungarian Central Statistical Office, 2009

4. Results – Cost of fast foods

During my research, I made several analyses to realize at what intensity children and young people take part in the market of foods containing high level, of salt, sugar and fat. Following the position of the European Heart Network, I limited my research to 3 product categories (fast food products, carbonated soft drink beverages, especially colas and chips). We can see as a result of my field research that 38.0% of young men and 29.7% of young women consume health-damaging chips at least once a week. 70.5% of young men and 57.8% of young women consume a carbonated soft drink at least once a week. The proportion of weekly fast food restaurant visitors is 17.1% among young men and 11.1% among young women. As to the classification of McDonald's, we can refer to them as heavy users. The data is shockingly high. I proved with my field research that young people of different genders have different consumption intensities; in the market of foods with high levels of salt, sugar and fat, young men consume more than young women.

Analyzing foods containing high levels of salt, sugar and fat with a distribution ratio, it can be stated that women have a lower consumption intensity; but by using higher statistical methods (ex.: Cramer V statistics), this unambiguous trend cannot be validated. The indicator showed only low correlation between the gender of the interviewed and consumption intensity. These results confirmed the high consumption intensity level for both genders. I made a similar statement for the age of the interviewed persons: at a young age, consumption intensity showed a minimal decrease with age, and this degree is negligible, as Cramer V statistics support. It can be stated that consumption intensity does not depend on age. It can be stated that consumption of foods containing high levels of salt, sugar and fat does not show close correlation with the age and gender of the interviewed. The consumption of foods containing high levels of salt, sugar and fat represent a generally high intensity among young people. It can be stated that young people of different genders and ages have different consumption intensities, but the age and gender of the interviewed is not a determining factor; rather, it is much more determining to which segment the person belongs by his consumption intensity in the case of foods containing high levels of salt, sugar and fat.

Using cluster analysis, I segmented the age groups of young people according to their consumption inten-

sity in the case of foods containing high levels of salt, sugar and fat. Groups can be unambiguously identified and have variant natures. Segmentation was done by the age and gender of the interviewed people. By the gender of the interviewed I identified the following segments:

– Health-conscious people,
– Uninterested unhealthy,
– Healthy self-conscious,
– Fast food chain obsesses,
– Coke-dependents (see on Figure 1.).
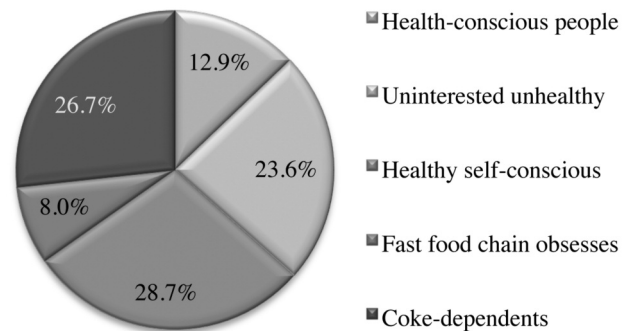
Figure 1: Distribution (%) of revealing segments on the market of foods containing high levels of salt, sugar and fat
Source: Own research, 2010

Table 2.: Frequency of fast-food products, cola and chips consumption according to identified segments (%)

Frequency of sugar-sweetened carbonated soft drinks consumption (%)							
	Daily	Several times on a week	Weekly	Twice in a month	Monthly	Rarely	Total
Health-conscious people	0.0	0.0	3.6	42.8	24.7	28.9	100.0
Uninterested unhealthy	44.9	35.1	19.7	0.3	0.0	0.0	100.0
Healthy self-conscious	0.0	0.0	0.0	14.8	34.5	50.7	100.0
Fast food chain obsesses	26.2	33.0	34.0	2.9	1.9	1.9	100.0
Coke-dependents	22.7	32.8	44.5	0.0	0.0	0.0	100.0
Average	21.2	21.5	20.8	9.3	11.4	15.8	100.0

Frequency of fast-food products consumption (%)							
	Daily	Several times on a week	Weekly	Twice in a month	Monthly	Rarely	Total
Health-conscious people	1.2	1.2	4.2	11.4	60.2	21.7	100.0
Uninterested unhealthy	2.4	6.5	15.9	16.8	46.8	11.6	100.0
Healthy self-conscious	0.0	0.0	0.7	3.3	47.4	48.7	100.0
Fast food chain obsesses	4.9	14.6	29.1	51.5	0.0	0.0	100.0
Coke-dependents	0.0	0.0	0.0	0.0	67.4	32.6	100.0
Average	1.2	3.2	7.6	11.2	50.5	26.3	100.0

Source: own research, 2010

The segmentation proves that there are two segments in which those questioned are consciously healthy or striving to maintain a healthy diet, avoiding the consumption of foods containing high levels of salt, sugar and fat. The total proportion is 36.5% of the youth who responded. With age segmentation, I proved that reformulation of segmentation by the gender of the interviewed does not reveal any substantive difference compared to the previous segment. F –rates calculated during the segmentation process

Figure 2: Word cloud of obesity' consequences
Source: own research, 2011

proved that the gender and age of the interviewed does not have a substantive effect on the consumption of foods containing high levels of salt, sugar and fat, segmentation can be carried out by consumption intensity of products. Detailed data of the frequency of sugar-sweetened carbonated soft drinks and fast food product consumption according to identified segments can be found in Table 2.

The developed segments exist and show practically useable segmentation.

In my online survey in 2011, I asked the respondents to give their opinions about the obesity rate in Hungary. I can state that the respondents underestimate the proportion of obesity. 24% of the respondents think that the obesity rate can be found between 30% and 40%. 71% of respondents believed that the obesity rate is less than 60%. Their opinion is not correct. Only 20% of the respondents think correctly, i.e. that the obesity rate in Hungary is between 60% and 70%. This risk will multiply in the near future. 46.1% of the respondents do not do any sport. The inactivity of the population is a negative trend. 33.1% of respondents think children are affected by obesity principally. Only 5% of respondents report eating healthily, but most of respondents (93%) know the effects of obesity. The word cloud of obesity, according to respondents, can be found in Figure 2.

The idea of the introduction of a so-called fat tax may be an obvious proposal. 16.5% of respondent do not have any information about the new tax and 61.2% reject the introduction of a fat tax. We can suppose that consumers who drink coke often, eat more hamburgers or chips often would say no to fat tax. Our assumption does not justify this. The value of Cramer's V is 0.219 in the case of coke, 0.149 in the case of fast foods and 0.115 in the case of chips. The rate of rejection does not depend on the consumption intensity of foods with high level of fat, sugar and/or salt. The rate of rejection would be 14.2% if the tax on

healthy foods would decrease parallel. In this case, a fat tax would be accepted by 85.8% of the respondents. The size of the fat tax rate is a very important question, because the consumption of foods with high levels of fat, sugar and/or salt is inelastic. If the fat tax rate is too low, then consumption would not decrease. 92% of respondents think so that the fat tax will not achieve its goal (Kendall's W=0.92). Respondents propose to levy a tax on fast foods, too.

5. Conclusion

The idea of the introduction of a so-called fat tax may be an obvious proposal. Its theoretical basis is indisputable. The introduction of a fat tax is an opportunity, but it would not solve the problem of obesity. The introduction of a fat tax is not a panacea, but an opportunity. The tax can contribute to the maintenance of health care expenses on an adequate level. Our elemental interest is the drastic reduction of obesity. The responsibility of marketing could be questionable from this point of view. Melissa Müller's study
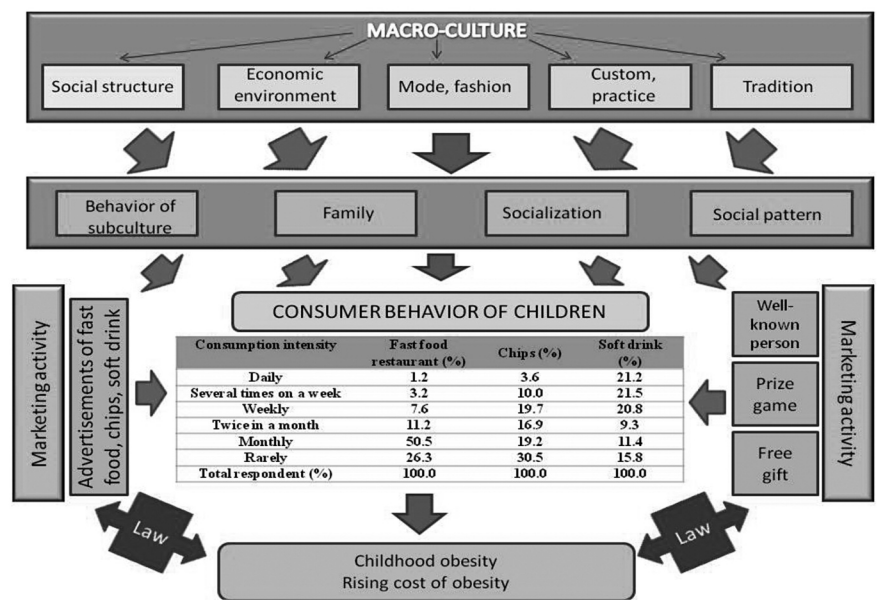

Figure 3: Influencing effect of marketing in case of foods with high level of fats, sugar and/or salt
Source: own research, 2010

(2001) responds to the question unambiguously: commercials make cartoon figures and well-known persons attractive in the minds of children. Their influencing effect is undisputed. In the mind of children, the advertised product is very nice, better or faster. than the non-advertised product. Children like to buy products which can be found in television advertisements. They refer to the television. 20% of respondents recognize that they buy more unhealthy products if the prices of these products are discounted. In our research, we measured the influencing effect of different marketing activities: the influencing effect of fast food and chips advertisements, influencing the effect of cola advertisements, prize games, free gifts, well-known persons. The above-mentioned factors are illustrated in our model, which can be found in the Figure 3.

There are several factors which influence the consumer behaviour of youth. Some factors cannot be measured, e.g. tradition or social structure. Some factors can be measured, e.g. the efficiency of marketing activity, the influencing effect of advertisements is about 30%, the influencing effect of a well-known person is 20.8%, the influencing effect of prize games is 50.3% and the influencing effect of free gifts is 55.5%. It can be stated that marketing activity has a considerable effect in the increase in childhood obesity rates and its resultant increase in the costs to sociaty. The advertisements of foods with high levels of fat, sugar and/or salt should not be banned, but restriction is necessary, according to the opinion of 51% of respondents. This rate is 36% in the case of free gifts. I can state that the "invisible hand" does not work in the case of foods with high levels of fat, sugar and/or salt, and so restrictions are necessary. Still, we have to acknowledge that the method of intervention is questionable. There are some initiations, e.g. New Jersey has passed a bill that went into effect at the beginning of the 2007 school year. This bill includes the banning of all soft drinks, candy and any other item with sugar listed as the first ingredient from schools altogether (Krisberg, 2005). Another initiation is the removal of any vending machines in Arkansas elementary schools (Costley, Leggett 2010). So, we can state that there are some possibilities to fight against obesity.

On the basis of my research results, I can state that consuming foods with high levels of fat, salt and sugar is increasingly popular in Hungary. The consumption intensity of these products is high among youth. The results of the segmentation show that the majority of young Hungarians are intensive consumers of foods with high levels of fat, salt and sugar, that they do not understand the contents of food labels and that they are unaware of the meanings of symbols on product packages. There are several ways to decrease uncertainty: rethinking legislation and the regulation of communication in cases of foods with high levels of fat, salt and sugar, increasing the prices of products through taxation and examining the role of parents.

As to my opinion, the efficient solution is rooted in the combination of all of these. It is a fact that foods with high levels of fat, salt and sugar are popular among young people. By promoting these products, we contribute to childhood obesity. Lack of legislation on the market of foods with high levels of fat, salt and sugar might lead to success in a short run, but only for the producing companies. Profit is realized at the producing companies, but costs are borne nationally as an increased health cost for obese children, young people and adults. Regardless of the interests at stake, intervention against obesity is required.

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ASPECTS OF THE SUSTAINABLE UTILIZATION OF RENEWABLE ENERGY SOURCES

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Abstract: The aim of this paper is to analyze the main approaches to sustainability and to present an alternative interpretation for the issues involved in the utilization of RES. The utilization technologies can be described by the average values of several technological parameters. Some significant parameters were chosen which are the most relevant for the issue of sustainability. The group of attributes was composed of these parameters in the analysis, which was conducted by the choice experiment (CE) methodology. The examination of each attributes' influence on the individual's preferences and choices was made possible by this method and the preferences of the relevant experts were determined. The weight of the attributes was defined by experts according to the importance of each attribute regarding RES-based technologies. The importance of sustainability attributes implies the significance of sustainability in the case of RES technologies, which thus highlights the characteristics of the more prosperous technological parameters regarding sustainable development.

1. Introduction

The long-term existence of human civilization is only possible with the harmonization of the environmental, social and economic impacts created by humanity and the opportunities provided by the bio-geosphere; in other words sustainable development. In this process the remodeling of the current energy system is an absolute necessity. The system is not sustainable because of irrational and economic growth based energy demand, the population growth and also the short- and long-run insecurity of the resources. An increase in efficiency, the reform of consumption patterns and the restructuring of the energy system must be targeted simultaneously.

Sustainability requirements at the present level of knowledge can only be met by the renewable energy sources (RES); therefore the role of these resources in the energy system must be increased significantly. The efficiency of energy and environmental policy is a key aspect in this process.

Future development is determined by the prevailing ecological conditions and possibilities. Theoretically, all RES based technologies are sustainable. However, the role of RES technologies in sustainability differs in certain characteristics – these are the sustainability attributes. Identifying this structure of sustainability contributes to the necessary remodeling of the energy system with the support of decision-making, strategic planning and a different administrative approach in the field of energy policy.

Assessing the sustainability of RES has been attempted from many perspectives. Descriptions were used in some studies (Rio – Burguillo, 2008; Rio – Burguillo, 2009; Varga – Homonnai, 2009). Scoring (Lukács, 2009) and ranking (Evans et al., 2009) methods are also possible ways of assessment as well as monetarization (Gács, 2010; Ulbert – Takács, 2007) which is a less subjective methodology than the others. The most complex assessment method so far attempted is the "Multi Criteria Decision Making" used by Rideg et al. (2009a; 2009b). The weighting of environmental, social and economic aspects was not defined in this complex valuation although it is a key element of the comparison. The exploration of these weightings is attempted in this study – it is an interpretation of sustainability in the utilization of renewable energy sources.

2. Materials and methods

The main goal of the research is to help define energy policy priorities by the exploring the weighting of the different aspects. An economic valuation method, the choice experiment method (CE) was used because of its suitability for evaluating the changes in welfare in comparison to other stated preference methods. This methodology is based on Lancaster's characteristics theory of value and the McFadden's random utility theory.

In order to link actual choices with the theoretical construct utility, the random utility framework is used.

According to random utility theory the *i*th respondent is assumed to obtain utility U_{ij} from the *j*th alternative in choice set **C**. U_{ij} is supposed to comprise a systematic component (V_{ij}) and a random error component (ε_{ij}):

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{1}$$

The selection of alternative *h* by individual *i* over other alternatives implies that the utility (U_{ih}) of that alternative is greater than the utility of the other alternatives *j*:

$$P_{ih} = \text{Prob}\,(V_{ih} + \varepsilon_{ih} > V_{ij} + \varepsilon_{ij}) \tag{2}$$

Assuming that the error components are distributed independently and identically (IID) and follow the Gumbel distribution, the probability that alternative *h* would be chosen is calculated in the conditional logit model (CL) as

$$P_{ih} = \exp\,[\mu V_{ih}] \,/\, \textstyle\sum \exp[\mu V_{ij}] \tag{3}$$

where μ is a scale parameter which is commonly normalized to 1 for any one dataset. The systematic part of utility of the *j*th alternative is assumed to be a linear function of the attributes (Mayerhoff et al., 2009). The scope of the CE method is the estimation of utility (V_j) connected with the attributes (A) of each alternative chosen by the individual.

$$V_j = ASC_V + \beta_1 A_1 + \beta_2 A_2 + \dots + \beta_n A_n \tag{4}$$

ASC is an 'alternative specific constant'. The β values are the coefficients associated with each of the attributes (Bennett – Blamey, 2001). The attribute coefficients (β) and the trade-off ratio between the attributes are produced by this methodology. They are presenting the preferences of the respondent and thus of the whole population. The common attributes of the alternatives and their levels are defined prior to the examination.

Parameter estimates from the conditional logit model identify the utility parameters (Louviere et al., 2000), and in the case of a linear utility function, marginal utilities. In particular, the parameter on the Local income level identifies the positive of marginal utility of income. The ratios of the attribute parameters to the parameter on the Local income level give part-worths: the marginal "*m HUF/TJ*" value associated with a change in the attribute (Burton – Pearse, 2002).

The first applications of CE were published in the early 80's in the field of marketing and transport researches (Krajnyik, 2008). As the method developed the range of adaptations was explained. There are many publications in tourism, landscape and ecological economic sciences supported by CE. The energetic sector was analyzed also from ecological point of view firstly by Roe et al. (2001). An application of conjoint analysis was used, the respondents chose between two alternatives. The price, the contact terms, the fuel mix and the air pollu-

tion were the attributes. The highest willingness to pay (WTP) (implicit price or trade-off ratio between the price and one of the other attributes) was observable by 'the increase in renewable fuel'. The possible power production investments in Scotland were assessed by Bergmann et al. (2006). Preferences were estimated by the CE method through 219 returned questionnaires relating to attributes of landscape, wildlife, air pollution, employment and the price of electricity. The WTP of 'decrease in air pollution' was the highest. The WTP of employment was surprisingly not significant even at a 10% level. We expect the labour attribute to be one of the highest level preferences in Hungary. The WTP of the residents of Bath, England was examined by Longo et al. (2008) for promotion of renewable energy sources. The attributes of the CE analyzed were GHG emissions, black-outs, employment and increases in electricity bills. According to these results the β coefficients of the price and the black-outs were negative which is natural with harmful impacts. The WTP for the 'decrease in GHG emissions' was the highest. Korean energy investment alternatives were analyzed by Ku and Yoo (2010). The attributes used were the same as in (Bergmann et al. 2006) but the results shows slightly higher preferences in the employment attribute. Preferences of constituents regarding different energy policies of Michigan State University were examined by Komarek et al. (2011) during a web-based survey. Attributes of fuel mix, energy conservation effort, carbon emission reduction, year reduction achieved and increase in fees were used. The highest attribute coefficient was observable in the case of emission reduction as well as in the increased proportion of wind and solar energy.

2.1. Study design

In any survey completed by CE the respondents are asked to choose between some (2–4) hypothetic alternatives regarding investments, goods or policies. The attributes and the attribute levels first have to be described. These attributes,

Table 1: Attributes and attribute levels

ATTRIBUTE	DESCRIPTION	LEVELS
GHG emission (relative to fossil fuels)	Decrease in GHG emission due to the use of each technology (LCA approach) in comparison to conventional technology – relative to fossil fuels (%).	5; 50; 80
Land demand	Amount of technological demand on land used for agriculture, forestry or nature conservation, ha/TJ.	2; 20
Energy efficiency	Ratio of used and produced energy (LCA approach, O/I) (%)	10, 30; 60
Other harmful ecological impacts (relative to fossil fuels)	Direct and indirect impacts of the utilization (e. g. landscape, noise pollution), relative to fossil fuels, %	20; 60
Increase in costs	Investment and operation costs in comparison to conventional technology (%)	5; 30; 60
New jobs	New jobs resulting from utilization of resources by each technology (persons/100 TJ)	2; 10; 20
Local income	Income realized by local citizens, enterprises or local government due to utilization (m HUF/TJ)	2; 5; 15

which were defined on the basis of the relevant literature are shown on *Table 1*. The most important environmental, social and economic impacts were collected. They are relevant, easy to understand and useful for policy making.

After the definition of attributes the choice sets were constructed. Every alternative is built up from several combinations of attribute level values. The sum of the possible combinations is the full factorial; in this case it amounts to 972 alternatives. It is impossible to complete this number of choice tasks for the respondents, so the fractional factorial was set in order to significantly decrease significantly the number of alternatives. Following this step 18 alternatives remained and 9 choice sets were based on them. The sets contain two alternatives ('A' and 'B') as well as an alternative 'neither' which represents the continued existence of the current energy system. *Figure 1* shows an example of a choice set.

Figure 1: Example choice set

The questionnaire was constructed in three parts. At the beginning there are some easy warm-up questions regarding the knowledge and opinion of the respondent. The second part is the nine choice tasks. After the tasks there are questions in which respondents are asked to state their attitude to the three dimensions of sustainable development.

In the current phase of the research the survey is completed by experts. 172 Hungarian professionals were chosen according to the following criteria. Experts must have a publication on the subject of RES, ecological economics or environmental policy. Professionals who hold a position in governmental bodies, universities or serious NGOs were also considered as experts – even without any publication activity. In this way a database was built up which represents the whole community of the relevant Hungarian experts on the topic. Thus all of the professionals involved were invited to state their opinion. An on-line survey service was used which was available for completion between 11th October and 18th November 2011. 52 surveys were received in this time.

3. Results and discussion

The survey results regarding the warm-up questions and the experts' attitude are obvious. Every respondent has already

heard about sustainability and 98% of them pointed out that it would be important to have a higher portion of RES in the energy system. The solution of environmental and social problems is more serious and pressing (4.63 and 4.65 on scale of 1-5) than economic problems (4.19) according to respondents' answers. Socio-economic data regarding the experts because was not considered relevant because they were examined by right of their knowledge, and in theory their answers do not vary according to living circumstances and personal conditions.

The estimation results of our model are presented in *Table 2*. It shows that except for 'energy efficiency' all coefficients are significant at a 95% level. The signs of every β coefficient are consistent with our expectation. The positive signs imply that the experts are more likely to choose a technology which is more efficient, creates new jobs and realizes local incomes. The attributes with a negative sign are connected with harmful impacts. The signs imply the changes in the utility of respondents. For instance when costs increase the utility decreases. On the contrary, the greater the decrease in local incomes the higher the probability of choosing that alternative, hence the utility connected with this attribute.

Table 2: Estimation results of the CL model

ATTRIBUTE	β COEFFICIENT	EXP. β COEF.	STD. ERROR	p
ASC	1.66407	5.281	0.29079	1.00E-08*
GHG emission	-0.01156	0.989	0.00226	3.00E-07*
Land demand	-0.03243	0.968	0.00865	1.80E-04*
Energy efficiency	0.00444	1.004	0.00434	3.10E-01
Other harmful ecological impacts	-0.01178	0.988	0.00368	1.40E-03*
Increase in costs	-0.01656	0.984	0.00374	9.70E-06*
New jobs	0.02246	1.023	0.00959	1.90E-02*
Local income	0.02835	1.029	0.01325	3.20E-02*

* significant at 95% level
Likelihood ratio test=126 on 8 df, p=0 n= 1404, number of events= 468
Exp. β coefficient = e^{β}

Figure 2: Weighting of sustainability attributes

The exponential coefficients report the changes in utility value of respondents. The exp. coef. implies how much of the change in utility is derived from the variation in levels; for instance, a 1.6% (1-0.984) decrease is derived from a 1%

increase in costs. The β coefficient indicates the role of each attribute in the choice made by the population as well as in the utility (see equation (4)). The highest β 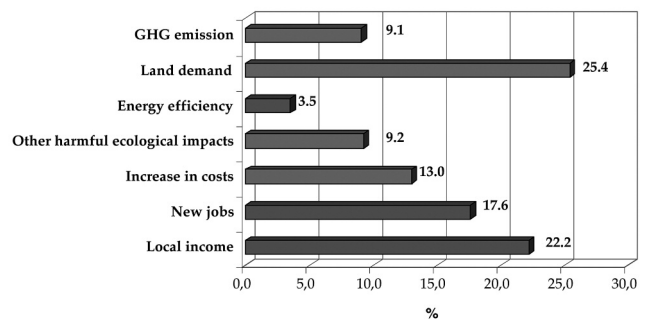values in absolute terms are observable with land demand (-0.03243) and local income (0.02835). Surprisingly the β coefficients in GHG emissions (-0.01156) as well as in other harmful impacts (-0.01178) are low.

Figure 2 reports on the importance of each attribute in decisions. While the experts' task was to choose between alternatives regarding sustainability, we conclude that the role of the attributes in their choices implies the structure of sustainability in the case of RES.

25.4% of utility (β_i / $\sum |\beta|$) is derived by the lower land demand of RES based technology and 22.2% by retaining income for the local community. The local income and the 'new jobs' (17.6%) attributes are more important in terms of sustainability than the increase in costs, which constitutes only 13% of utility. The role of decreasing GHG emissions (9.1%) and other harmful ecological impacts (9.2%) is low. The very low importance of energy efficiency (3.5%) in the structure of sustainability is interesting regarding energy and other development policies.

The attributes used in this study are different from previously used attributes. However, the impact on employment, air pollution and price are common issues. The results of previousr studies are fairly varied. According to Ku and Yoo (2010) the employment attribute is the most important (35% of utility value). Longo et al. (2008) reports that the most important factor in the choices was GHG reduction and that other impacts were negligible. The air pollution attribute was found to be the most important by Bergmann et al. (2006).

More attributes were used in this study, and some new impacts were also analyzed. This method did not examine some important issues regarding their role in sustainability – for instance the land demand of technologies. Naturally, a new attribute increases the possibilities of choice; a more accurate estimation of utility function is allowed. This is confirmed by the more balanced utility structure of the attributes.

The structure of sustainability in the case of RES based technologies was calculated according to Hungarian experts. The elimination of harmful ecological impacts – emissions and others, as well as the land requirement – would be the most relevant, the 'weight' of these attributes taken together is more than 40%. The energy efficiency is the least significant (3.5%). The β values for local income and new jobs are much higher than that for the cost attributes. We conclude that the significance of local recourse utilization and welfare is implied, even at the expense of increasing investment and operation costs. The weight of the utilization technologies of RES is already known. Based on the experts' opinion it can be concluded that the elimination of harmful environmental impacts, the increase of local incomes and job creation possibilities are the key aspects on the path to sustainable energy management.

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METHODOLOGICAL QUESTIONS OF A SURVEY OF CIVIL ORGANIZATIONS

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Abstract: Today, the non-profit sector, and especially the role of civil organizations, has become significant in society. In Hungary there has been a large development in the past 20 years, in the non-profit sector, as the number of such organizations has quadrupled.

The number of classic civil organizations (foundations and associations) makes up more than 80% of the non-profit sector. The social attendance, economic significance and affect often raise the issue of the true intensity of the sphere and also the question of why there are such vast differences between the conditions of function, human resources and how successful they are.

For years now, with management related examination, we have been searching for the answers to the above questions, within the confines of the functional aspect research program of the Institute of Management and Organization in University of Debrecen, Centre for Agricultural and Applied Economic Sciences, Faculty of Applied Economics and Rural Development.

Above all, we made an attempt to find general, management- related results and answers, with the use of probability sampling, a low number of samples and surveying.

In the selection process of organizations to include in our research, we relied on the data base of the Court of Hajdú-Bihar County and with K-aspect systematic sampling, and we also questioned more than 140 managers from different organizations.

With this research, we acquired a diverse collection of information, which now we intend to summarize within this article.

With this article, we aim to find out how realistic a picture the database of the Court gives regarding the civil activity of the county.

Even the sampling was not trouble free, since the entire database is not accessible.

The survey also revealed some problems that confirmed the statement of the Central Statistic Office (KSH), i.e. that some organizations either do not function at all or function in name only.

Keywords: non-profit, civil, Hajdú-Bihar county, method

Introduction

In Hungary, the role of the non-profit sector, and more specifically, the civil sector, is becoming more significant. As proof of this statement, their numbers, social and economic roles evolved rapidly after 1989. This development is expressed in their numbers and their position in the sphere of the economy. While at the end of the 1980s, only 8,500 civil organizations were functioning in Hungary, by the second half of 2000, this number rose to close to 60,000 in the sector. This rapid increase in numbers and the change in structures may be explained with more factors, each partially related to each other. In Hungary, since 1990, the number of civil and non-profit organizations quadrupled and the profit of the sphere between 1996 and 2006 rose from 240 to 896 billion Hungarian forints (Bocz, 2009).

Figure 1 clearly describes the increase in the number of these organizations country-wide. Simultaneously, court records indicate, that in the past few years, these numbers have been stalling. From our point of view, the expectations drafted by the new civil law will decrease (especially from May 2013) the number of these organizations in the sector. New obligations related to reports will definitely play a role in this decline, just as the alteration of the program based support fund. (National Civil Fund – National Cooperation Fund)
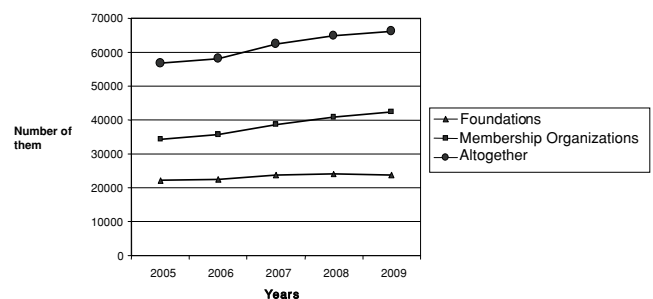
Figure1: Conformation of the number of civil organizations between 2005–2009
Source: Own compilation, based on KSH data, 2011

In 2010, approximately 65,000 non-profit organizations were functioning in Hungary. A little more than one-third (23,500) were foundations, and 41,500 were membership organizations. 62% of the foundations are related to 3 fields of activity: education (32%), social procurement (16%) and culture (14%). Regarding non-profit membership organizations, the ratio of leisure activity (25%), sports association and cultural organizations are still the most significant. Our reasearch is focused primarily on classic civil organizations, which may be explained by their superiority in numbers. These two legal forms make up 87% of the non-profit sphere

(Baranyai et.al. 2003), which number remained the same according to statistics from 2010. At that time, half of the organizations held the title of public-benefit, while only 6% were elevated to the status of prominently public-benefit organization (Internet1).

Regarding these organizations, new changes came with the new legislation. The prominently public-benefit status ceased to exist. The demands and obligations to keep the title public-benefit may further burden this sphere in the future.

Non-profit organizations in 2009 gave almost three times more jobs to employees than in 1993, further increasing the economic importance of the sector (Internet2). Between 2009 and 2010, the employees in the sector rose by 9.2%, thus the total number exceeded the value of 143,000 (Internet1). Peculiarly this field may be connected with significant voluntary activity, which multiplies the work capacity of full time employees.

Wenn we examen the sector, we normally due so from two sides. We examen its economic capacity and its human resorces. Also, the method of categorization has changed, since the associations, the foundations and the civil associations are now all considered to be civil organizations.

A further problem is, whether the significance of the civil sphere will be depleted in only considering their economic capacity and human resources, leaving out other dimensions which approach the significance of the sphere from a completely other perspective.

The current research is meant to substantiate the answers for the questions determined above.

Materials and Methods

Data from 2010 show that the number of registered non profit organizations is a little less than 65,000. Every year, using sheet no. 1156, the Hungarian Central Statistical Office (KSH) collects information about this sector. KSH is involved with with sample taking, but in reality it does not give a clear view about the number of active organizations (respectively examining few dimensions to judge the measure of real organization activity), nor about wheter they are contactable.

This can be explained by- although receiving the sheet- most do not take the time to send it back to KSH. Also, the default of sending back the sheet does not have any kind of legal consequence. In this way, since the data are not confirmed by authentic means, our point of view is that most data are based merely on estimation.

In answer to this problem, the new Civil law is expected to bring more strict rules on many points for civil organizations. In the future, due to obligatory court publication, more authentic data are expected.

Since, based on KSH registry, it is harder to start a county-wide survey, we used the data supported by the County Courthouse (former Court), as it is liable for registering all functioning and semi- functioning organi- zations.

Our examination is also capable of revealing Courthouse data validity and true content while considering possible evaluation mistakes. On the basis of Courthouse data, out of 82 settlements, 72 have registered civil organizations in Hajdú-Bihar County. On the Courthouse's homepage, these organizations are registered in the following categories (which include the currently valid details, according to the President): registered; modified, based on notification; repealed (by civil review procedure); repealed (in new trial); modified (by final and binding decision); and terminated (by final and binding decision). Of the above categories, the third means that the organisations apparates in accordance with the date avaliable in the courthouse: registered; modified based on notification and the modified (by final and binding decision). Although by choosing one of these three categories, the number of organizations may be quantified, unfortunately, an accurate list of them has not, a problem for which the courthouse was unable to give any solution. Thus, because of this method, we were forced to narrow the number of categories and to examine only registered organizations. From this determined base population, using K-aspect systematic sampling we tried to contact these organizations, collect their details, and keep several research aspects in view.

On the basis of literature recommendations, this K-aspect systematic sampling is completely appropriate in this case. During this sampling, we choose every „k"th member into the sample pool.

This method- with few exceptions- is functionally equal with simple random-pick sample taking, while being more practical (Babbie, 1998). Thius, every 10th organization got into the the sample pool. Collaterally with this we determined the selection method of subsidiary addresses, if the chosen address is unreachable for some reason, it can be added in later. These subsidiary addresses were defined to be continued by the next address. This type of survey was started experimantationally. And in the following days we are strating a new survey that relies on a larger sample pool. As far as we know, no such examination was started recently in the circle of civil associations, at least, in Hajdú- Bihar, we are not aware of any.

The survey relies on the examination program of the Applied Economics and Rural Development Faculty's Institute of Management and Organization, both in the selection of the desired method, in the determination of management tasks and in registration surveying. The basis of this method was elaborated Berde (2000). Within the confines of this program, primarily questionnaire surveys, deep interviews, and the composing of case studies are accepted. From among these methods, at this point of the project, the questionnaire surveys are making progress.

First of all, for the examination, a questionnaire and the means of its analysis had to be made which consists of three parts: general data collector; interview identification data and the interview itself.

Onto the general data collector, we particularly collected the most important details about the given organization in 13 questions (such as legal form of operation, function, public-

benefit level etc.). The interview indentificator aims the measurement of personal, professional and experience details of the questionned person, such as the gender, age, or highest qulification of the subject.

In the professional questionnaire interview we measured the aspects in focus (such as leading function, organization activity and organization development) where the questionned leading manager had to qualify the important of these aspects by their impact. We applied different questions, and as possible answer we designed for these question's a 5 stage rating scale (1: not sufficient/insignificant rate or amount; 3: medium/average rate or amount; 5: excellent/ significant rate or amount). This total of 8 leading functions, 5 categories of activities and 10 questions, drafted issues regarding the attitude of organization development or asked about passed off developments. The questionnaire survey was performed in the sphere of the lead managers of civil organizations.

In the case of a civil organization, those are considered to be lead manager, who are entitled to decide. In the case of an association the representative, recorded, but not nominated by its constitution; in the case of a foundation, the person/representative, nominated by the deed of foundation. The surveying had been executed by trained commissioners whose jobs were to conduct subsidiary addressing as above, whether for any reason they, have not been able to complete the questionnaire at the first given address.

Summarized, we reached the sample limit of 100.

We completed the evaluation of the questionnaires with the help of the program package SPSS 14.

Results and Discussion

We started this monitoring in July 2011.For the sampling process, we used the database of the Court of Hajdú- Bihar County. On the 7th of July, 2011, according to courthouse data, in Hajdú Bihar county, the number of civil organizations in 3 categories, reached the number of 3,475. As the President of the courthouse confirmed, these details are relevant and up to date. Since this base population –because of its large number- is not published on the homepage of the Courthouse, we narrowed our search and focused only on registered organizations. There were 1,462 organizations in this category. Of a total 1,462 organizations, 667 are located in Debrecen, and the remaining can be found in other cities in the county. To acquire a more accurate sample pool, we created a stratified sampling method according to the distribution of the base population.

Based on our experiences so far, more consequences may be concluded about the methodology issues of civil organizations. The first –and maybe the most important result in many aspects – is that there are several problems related to the true activity and the existence of civil organizations.

Many of the organizations we searched were found amongst the registered organizations although they already ceased to operate. Beyond this fact our project approached the following obstructions:

- the organization can not be found at given address
- the organization is not known
- noone knows about their existence (relevant connection to a business association)
- moved, can not provide a new address, or may not give information to reach them (availability)
- does not respond.

These problems arise not only regarding the first addresses, but at the point of the subsidiary addressing procedure also.

The database on the courthouse internet homepage – contrary to the statment of the courthouse President- not only does not cover the relevant population but only shows the registration data of an organization. Additionally, our point of view is that the registration database is not up to date in all cases. The reason for this may be explained by the civil organization' s not taking the courtal registration process serious enough, in their not fulfilling their announcement obligation or not providing accurate information in time.

Our previous results suggested that there are many problems with the legal conformance of civil organizations. In most cases, only a prosecution inspection reveals these legal problems. There were many lead managers who refused to answer, others alluded to the shortage of time. In the case of an unknown primary address, the commissioners continued with the subsidiary addresses.

Figure 2. shows how many questionnaires had been made at the address of a given serial number. Zero address shows the chosen organization, and implicitly 1-10 are the numbers of subsidiary addresses. According to these data, only 31 per cent of organizations were found at their original addresses, thus on 0-3 addresses, only 73% of the questionnaires were made. According to these details and our results, the number of truly functioning registered civil organizations are way less than what the data of the courthouse suggests.

Beyond these, the answers given for professional questions also give a really diverse picture. Apart from direct evaluation, many surveys were made where the respondent left spaces empty, either because they were unable to interpret the question or the question did not apply to his organization. It is still a question whether this sphere can be examined by following the methodology of related professional literature.
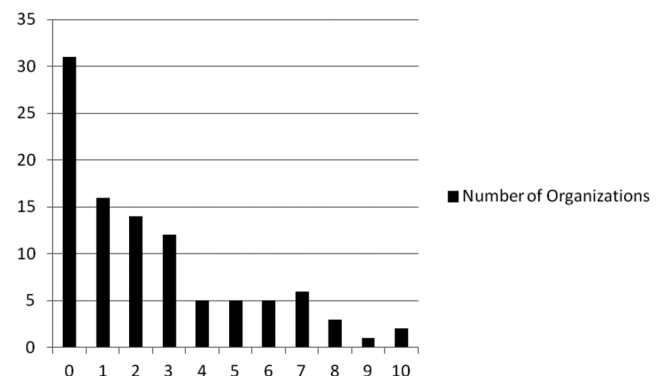
Figure 2.: Distribution of civil organizations regarding subsidiary addresses
Sources: Own inspections, 2011

The answering willingness of civil organizations, as social self organizing units, deserves a different thought, since the level of such willingness is quite low. The inclination in giving these answers, or the lack of this willingness may be traced back to many reasons. Regardless of giving a full list, we just mention some, such as: distrust towards others, distance of manner, or autocratism.

The problems coming up under research brought up several questions, regarding organizations as primary subjects of this examination process. Obviously the problems connected to the registration of civils organizations, may not be blamed on the Court, although it is still questionnable why those civil organizations are still in the registry if they have already ceased to operate. According to KSH registry, the number of organizations that operate without money country-wide is about 3–4 thousand.

Literature also writes about so-called sleeping organizations who only funcion nominally, without performing any real activity. We may even find estimations that evaluate the number of these organizations at about 10%. The new legislation and regulation will modify this substantially. The consequence of the absence of handing in reports (which allows a 1 year lapse in time) by May of next year is the prosecution procedure, based on Courthouse initiation.

Much more had to be done to gain the rank of public-benefit. We think that these new expectations will provide a means of acquiring a clearer picture about the sector. For us, at the same time, this means that only those organizations which reall intend to accomplish something may remain registered as functioning civil organizations.

Summary

Our results uncovered several contrasts regarding the activity of civil organizations in the county. Primarily, the problem may be traced back to the lack of any penalty in cases of negligence, even though providing data is obligatory for civil organizations.

Legislators, data collectors and researchers expect some changes in this field with the enforcement of the new Civil law. In this manner, beyond lots of alteration, the obligation to file an annual report means the greatest change. Whit the completion and submission of such a report, the circle of active organizations will become obvious, since the negligence in completing this report will mean legal consequences.

Presumably, the changes brought by the codification will alter and affect the operation and management circumstances of such organizations.

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2011. évi CLXXV. törvény az egyesülési jogról, a közhasznú jog-állásról, valamint a civil szervezetek működéséről és támogatásáról (Új civil törvény)

Internet1: KSH Statisztikai tükör V. évfolyam, 90. szám 1-3. p.: http://www.ksh.hu/docs/hun/xftp/stattukor/nonprofit/nonprofit10.pdf

Internet2: KSH Statisztikai tükör IV. évfolyam, 193. szám 1-3 p.: http://portal.ksh.hu/pls/ksh/docs/hun/xftp/stattukor/nonprofit/nonprofit09.pdf

INVESTIGATION OF THE EFFECT OF FLOORING ON THE LIVING PERFORMANCE OF SOWS USING SURVIVAL ANALYSIS

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Abstract: Pig-farming has a long tradition in Hungary, most significantly within the Alföld region. In my analysis I studied the lifespan of sows in two nucleus pig herds on the Great Plain, also examining the probability of the occurrence of different reasons for culling. During my research I collected data (from 2001 to 2010) relating to more than 10,000 sows from the farms conducting a breeding programme and I searched for the answer to the question of whether can I find a significant difference in the lifespan of sows with the same feeding and the same genotype if the floor type of farms is different (Herd A has a solid floor with straw and Herd B has a slatted floor). Regarding the reasons for culling ANOVA was used to investigate mean differences in logarithms of the lifespan of sows in each herd. Between the herds the seven most common culling reasons were estimated with the Kaplan-Meier method and the significant difference was demonstrated with the log-rank test. The results of the log-rank test showed that there was a significant difference in leg problems as a cause of culling and deaths ($p < 0.05$) between the two farms, which is the consequence of different floor types.

Keywords: lifespan of sows, floor type, culling reasons, survival analysis

Introduction

The sow replacement problem is today one of the most important challenges in sow herd management. In recent decades, the rate of sow culling has increased to levels close to 50% per year (*Dijkhuizen et al.*, 1989; *Rodriguez-Zas et al.*, 2003; *Patterson*, 2010). The removal of nonproductive sows along with the introduction of replacement gilts is an essential part of maintaining herd productivity at a constantly high level. The reasons for culling sows and the rate of removal may be influenced by many factors (*Sasaki and Koketsu*, 2010) including genotype, nutrition, environment, health, behaviour, management policies and diseases (*Balogh et al.*, 2009).

Over recent decades, genetic improvements in pigs have focused on productive traits (growth, leanness and meat quality) (*Van Wijk et al.*, 2005; *Fernández de Sevilla et al.*, 2008; *Szabó et al.,* 2009). According to the herd type a 35–36% herd replacement is usually recommended. Higher replacement is necessary in nucleus herds in order to achieve a faster transfer of genetic gain (*Houška*, 2009).

The aim of this research was to study the lifespan of sows in two different floor type systems in the Alföld region in Hungary, also examining the probability of the occurrence of different culling reasons.

Materials and methods

This study was based on data from two commercial piglet producing herds in the Alföld region of Hungary. The genetics of the sows were Dutch Large White and Dutch Landrace crossbred. In the herds there were similar feeding but different breeding technologies. Sows were kept on solid floors in Herd A and on slatted floors in Herd B. The feed was liquid feed that was produced by the pig herds.

The source data of the sows was collected electronically with the assistance of the herd manager. The database used was from the farm-led monitoring programme KW-Röfi (an AGROCOM product). The analyses included more than 10,000 sows (3312 animals from Herd A and 6916 animals from Herd B).

The time period examined was between 2001 and 2010. Records were treated as censored if the sow was still alive at the end of the studied period on December 31, 2010.

From the data collected we analysed the lifespan of sows according to the different culling reasons.

In the calculations, the MS Excel spreadsheet and the SPSS 17.0 statistical package were applied. In the first stage during the statistical analysis differences between culling reasons were estimated by one-way ANOVA using Tamhane's test. In the second stage Kaplan-Meier Survival Analysis (KM) was applied to calculate the significance of differences using the log-rank test.

Results

Table 1 contains the reproductive data for sows in each herd. It can be noted that Herd A had better production data. The T test resulted in significant differences between the two herds in all examined parameters.

Table 1: Production parameters per sow and herd

	Herd A		Herd B		Sig.
	$\overline{X}$	SD	$\overline{X}$	SD	
Number of matings	**4.31**	**2.46**	**4.14**	**2.95**	**
Number of weanings	**4.06**	**2.33**	**3.72**	**2.61**	***
Number of piglets born alive	**45.38**	**28.42**	**39.42**	**29.72**	***
Number of piglets born dead	**4.10**	**3.53**	**4.64**	**4.84**	***
Number of piglets weaned	**41.49**	**24.60**	**37.04**	**27.35**	***

** denotes statistically significant differences at the level of P≤0.01;
*** at the level of P≤0.001
Source:Author's own calculation

In the period examined 68.5 % of the sows were culled. Most frequently sows were culled due to leg problems (17.56%), deaths (14.05%), euthanasia (11.01%), anestrus of sows (9.14%), negative pregnancy diagnosis (8.06%), old age (7.00%) and return to estrus (6.89%). Overall 30% of the culled sows were removed due to reproductive failures. For the other causes of removal the culling rate was somewhere under 5.00%.

Following this I analysed the seven most frequent reasons for sow removal from the pig herds. The homogeneity test between the two herds resulted in a significant difference (2=113,141; df=6 and P≤0.001) in terms of the reasons for the culling. Table 2 contains results of the analysis of variance (ANOVA) concerning the lifespan of sows eliminated from the herds for the most frequent reasons. In order to contrast the lifespan data with the criteria of normality the logarithm of the original data was used in the ANOVA, so the interpretability of the original data could be shown in the table.

In both herds leg problems and death on the farm are the most significant culling reasons (together the two values were about 38% in Herd A and 30% in Herd B). Analysis showed that the cause of culling had a significant effect on the sows' lifespan. Of course the lifespan of sows was the highest if the culling occured due to old age. In Herd A apart from sows dying, those sows culled due to leg problems lived longest (the mean was 917 days) and the lifespan for sows culled due to this problem differed significantly – at the level of P≤0.01 – from all other culling reasons. But there were no significant differences between the various reproductive system-related reasons for culling.

Herd B was different from Herd A. The average lifespan of sows was the highest – except for those culled due to 'old age' – when sows were culled due to a negative pregnancy diagnosis (the mean was 773 days). The sows culled due to leg problems lived as long on average as sows culled due to death, euthanasia, anestrus or return to estrus.

Table 2: Lifespan depending on the most frequent causes of culling

Cause of culling	Herd A			
	N	% of culled sows	$\overline{X}$	SD
Leg problems	381	21.3	917 A	346
Death	292	16.3	742 B	344
Anestrus of sows	179	10.0	582 C	312
Euthanasia	173	9.7	703 B	299
Return to estrus	129	7.2	590 C	270
Old age	120	6.7	1390 D	189
Negative pregnancy diagnosis	52	2.9	678 BC	268
∑Other causes	463	25.9	-	-

Cause of culling	Herd B			
	N	% of culled sows	$\overline{X}$	SD
Leg problems	850	16.3	677 A	398
Death	693	13.3	658 A	356
Euthanasia	599	11.5	671 A	349
Negative pregnancy diagnosis	513	9.8	773 B	370
Anestrus of sows	462	8.8	688 A	302
Old age	371	7.1	1653 C	173
Return to estrus	354	6.8	701 AB	367
∑Other causes	1381	26.4	-	-

Source: Author's own calculation

Table 3 shows a comparison between the herds using survival analysis according to the seven most frequent culling risks. For all causes – with the exception of euthanasia – there were significant differences (P≤0.05) between the lifespan of the two herds. Sows culled due to leg problems in Herd A had the second

Table 3: Results of survival analysis

Cause of culling	**Median of lifespan in Herd A**	**Median of lifespan in Herd B**	**χ2**	**Sig.**
Leg problems	**910**	**552**	**42.965**	***
Death	**687**	**515**	**4.778**	*
Euthanasia	**641**	**561**	**0.135**	**ns**
Old age	**1443**	**1640**	**224.281**	***
Anestrus of sows	**430**	**545**	**16.678**	***
Return to estrus	**493**	**580**	**13.481**	***
Negative pregnancy diagnosis	**639**	**674**	**4.790**	*

* denotes statistically significant differences at the level of P≤0.05; *** at the level of P≤0.001; ns = not significant difference
Source: Author's own calculation

longest lifespan (the median was 910 days) which differed significantly (P≤0.001) from the other herd. In Herd B sows culled due to reproductive causes showed greater survival rates.

Discussion

The study analysed the significant difference in the expected life-capacity of sows with similar feeding regimes and genotypes of two nucleus herds in large commercial farms in Hungary. The difference between the herds was the floor type, because Herd A had a solid floor and Herd B a slatted floor. The comparative examination is based on the causes of culling. In spite of the fact that the genetics of sows and feed technology were the same on the two examined farms there were significant differences between the lifespan of sows culled for different reasons.

Several culling factors were found to influence sow longevity, and the poor sow longevity in commercial pork production systems can lead to economic inefficiency and animal welfare concerns. In the present study reproductive problems (overall 30%) and locomotor problems (17.5%) were the most important reasons for sow removals. Similar values were observed in studies from other authors. The most commonly reported reason for removals (*Boyle et al*., 1998; *Lucia et al*., 2000; *Engblom et al*., 2007; *Szőke et al.,* 2009) was reproductive failure, accounting for about 30% of all removals, followed by lameness and locomotory problems (11–14%). In several studies a higher proportion of removed sows were reported to have lameness and other locomotor problems during the periparturient period (*Jørgensen*, 2000; *Pluym et al*., 2011). Lameness is known to be a painful condition and pain may reduce feed intake.

Leg and locomotor problems in both herds examined were the most frequent reasons for culling (21.32% on the solid floor and 16.27% on the slatted floor). There was also a significant difference between the lifespan of the culled sows. The sows kept on the solid floor stayed in production longer than those on the slatted floor. Studies which examined the prevalence of leg weakness and claw disorders on various floor types have shown that for standing slatted flooring is significantly worse than solid floors with or without straw. *Jørgensen* (2003) reported that the floor types do not have the same effect on the different aspects of leg weaknesses and claw disorders. Clinical leg problems were worst on slatted floors and best in pens with straw, followed by solid floors without straw, but claw disorders are worst on solid floors without straw. *KilBride et al*. (2008) and *Volsárová et al*. (2010) also described the negative effect of slatted floors on the welfare of pigs, particularly concerning their effect on locomotive apparatus. In their study this was demonstrated by the higher mortality of pigs transported after fattening to the slaughter house from slatted floor housing compared to pigs transported from solid floor housing.

In conclusion, it can be said that the different quality of flooring (solid floors and slatted floors) had a statistically significant effect on the lifespan of sows. Sows culled due to leg problems remained in production longer in herds with solid floors than in herds with slatted floors. The productive time of sows that were removed due to death was also better on the solid floor. Based on my results, it can be stated that satisfying animal welfare conditions may contribute to sows' long term high-quality production.

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THE ROLE OF TRUST IN COOPERATION BETWEEN FARMERS – THE OUTCOMES OF A SURVEY IN BÉKÉS COUNTY

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Abstract: Local socio-economic cooperation arrangements can contribute to the development of adequate solutions which can compensate the negative impacts of globalization. One of the specific areas is agriculture. Capital-intensive technology is the key element in the competitiveness and viability of firms. The present paper reviews the factors affecting the joint machine use arrangements of agricultural producers, with special regard to the role of trust. The questions of trust are examined in two dimensions: contractual and competence trust. On the basis of the survey carried out among farmers a positive connection was detected between the level of trust and the farmers' activity in cooperation arrangements. Our results also pointed out that the trust needed in different areas of cooperation is very different. The experiences indicate a tendency, according to which contractual trust is more important in intensive cooperation arrangements which result in higher dependence, while competency trust is more emphasized in more extensive solutions.

Journal of Economic Literature (JEL) code: Q13

Keywords: cooperative behaviour, loyalty, competence, data survey, empirical model

1. Introduction, raising questions

David Korten triggered a debate in the early 1990s with his famous book "When corporations rule the world" in which he considered the appreciation of local communities, the growing weight of the local economy and the stimulation of cooperation between those involved in the economy as an adequate response to the negative phenomena of a globalizing world. [*Korten* 2002] Without reviving that debate, it can be stated that the role of local business cooperation has once again become important in Hungary, as well as in other countries of the Central Eastern European region.

Several forms of business cooperation have been introduced in recent decades which can be classified, for example, by the closeness of the relationship between cooperating partners and the degree of institutionalization regarding the form of arrangement (the degree of mutual dependence between partners).

The organizational approach to cooperation in the literature references typically appears as the review and evaluation of cooperatives, as the typical (most widely known and implemented) form. In many volumes of the Economic Review (Közgazdasági Szemle), the articles on this subject confirm this observation. It should be added,

however, that the findings regarding cooperatives, as models of cooperation, can also be explained to a great extent as attributes of other forms of cooperation. In this respect, the examination of the theoretical relations of the cooperative model and the analysis of responses given to the impact of the changing socio-economic environment can help to highlight the internal coherencies of other forms of cooperation.

The cooperative form itself is a classic organizational model, the roots of which go back more than a hundred years, and the changes it has undergone in Hungary (primarily in agriculture) have occurred in the framework of very particular and contradictory processes before, as well as after, the post-socialist transition. [*Kispál-Vitai* 2006]

The development of cooperation arrangements indicate that, while keeping the principles of classic models, the interests of owners – which are better expressed as market relations and interests – have become prioritized to the product line. It also suggests that, for example, the much modelized Dutch cooperatives do not have any direct social objectives. [*Szabó* 2005] At the same time, the machine and farm assistance ring, as a model of cooperation – which has a shorter history, but has already become a world-wide movement, too – also has social functions in local communities. [*Takács* 2000]

According to one classification, cooperation can be horizontal and/or vertical, where horizontal cooperation can strengthen the bargaining position of those (horizontally coordinated) in the vertical line. [*Fertő* 1996] This synergy can be observed in some product chains in Hungary (fruit and vegetables, the broiler chain) [*Felföldi* 2009; *Szőllősi* 2009; *Dudás – Takács-György* 2099]

There is a relationship between the size of business actors on the market and the bargaining position; therefore joint work and cooperation which increases market presence has an important role (the cooperative and producer organization is highlighted primarily as an organizational solution). [*Szabó – Bárdos* 2007] By not differentiating among the organizational solutions in regards to cooperation, and using the concept of the virtual firm, it can be proved by the examination of (a virtually created) size unit and firm efficiency that coordination can help to increase the individual and joint efficiency of participating firms and thus an improvement in an important factor of their efficiency can be achieved. [*Takács* 2004]

Cooperation becomes inevitable among agricultural producers because there are several economic actors (a vast number and with different weights) parallelly in competitive positions and they face other monopolistic or oligopolistic economic actors who can use their dominance against divided partners who are unable to cooperate and can only enforce their interests weakly. Competitive and cooperative behaviour can be simultaneously present among the players of the market economy and cooperation ability is as important for them as the competitive spirit. These players will be strong, however, only if the ties to state are broken and those involved bear the consequences of their decisions. Cooperative behaviour requires trust, but the permanent presence of a "protecting net" weakens the urge and willingness to cooperate. [*Hámori et al.* 2007] The role of cooperatives is increasing in countries which are also simultaneously developing agriculture. [*Ševarlić et al.* 2011]

Cooperation plays an important role not only in the improvement of a bargaining position but also in the increase of efficiency of the means of production and the capital employed in them. [*Takács* 2008] A distinction should be made between technical and economic efficiency: what is technically efficient is not necessarily efficient in economic terms. [*Zalai* 2008] The cooperation arrangements reviewed in the present paper help to increase not only the technical efficiency of technical equipment, but also the economic efficiency of capital realized in it.

2. Theoretical principles

2.1. Theoretical foundation of cooperation in economics

Kispál-Vitai [2006] introduces the theoretical aspects of the subject in detail in the above cited article; therefore the present paper highlights those aspects of the subject which are not dealt with in the article.

In agriculture farmers (also) cooperate with different groups during their business activities; they conclude oral or written agreements or contracts. The contractual agreements and organizational structures set up in this form are one of the most analysed areas of new institutional economics.

In some theoretical approaches of new institutional economics[1], the different aspects of cooperation agreements are the focus of attention: the issue of asymmetric information is typically discussed by the agency theory, the areas connected with the costs of contracting are targeted by the theory of transaction costs, while the question of so-called remaining controlling rights is covered by the theory of property rights. The individual theories, of course, overlap each other in many respects but the different theoretical approaches are extremely useful in the differentiated examination of arrangements. From the perspective of current research the theory of transaction costs and the principal-agent theory are relevant.

Transaction cost theory/economics (TCE) can basically be regarded as an explanatory model which offers a theoretical basis for understanding the different organizational structures. The first milestone in the theory was the work of *Coase* [1937] (*The Nature of the Firm*). Other outstanding works in the development of the theory are *Coase* [1960], and *Williamson* [1979], [1985].

Summing up the conclusions of the works published on the subject, the theory holds that in business life the cost structure determines the organizational framework of transactions and the transaction costs significantly affect it. Those costs can be regarded as transaction costs which emerge in connection with market processes, market transactions or exchanges. According to *Williamson* [1979] three groups of transaction costs can be distinguished, namely: costs connected with collecting information, with concluding a contract and with controlling. The level of these costs depends on three factors of the contract: transaction specific investment, uncertainty and frequency of transactions [*Williamson* 1985].

The theory of transaction costs discusses three possible institutional solutions on the basis of the three cost determinants above. These are as follows:

- classic, short-term contracts, actually market exchange relations;
- neoclassic, long-term contracts, the so-called hybrid solution;
- relation contracts, which eventually mean the realization of transactions within organizational frameworks.

In the following, machinery sharing relations are reviewed. The technical equipment used in agricultural production is, on the one hand, typically regarded as a specific investment, because it can be used and converted to tasks different from the ones originally intended relatively

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[1] *Kieser* [1995] divides the theories of new institutional economics as follows: *agency theory*, *property rights theory* and *transaction cost economics*.

inflexibly. On the other hand, it cannot be regarded as a specific investment because there are many partners in the narrow environment of the investor with whom the transaction can be made and vice versa; so there can be several alternatives for the firm to purchase the required machine capacities. Consequently the evaluation of asset specificity issues is not clear at all; it can be strongly differentiated both in space and time.

There are two qualified cases of uncertainties during transactions. One is the so-called parametric uncertainty, that is the uncertainty connected with the outcome of the transaction; the other is behaviour uncertainty (moral hazard, problems with keeping contacts, etc.) which can be traced back to opportunistic behaviour [*Kieser* 1995]. Since the agricultural production process is determined in time and the optimal time interval is rather short for carrying out the machine work, the *timeliness cost* can be very high and this results in considerable uncertainty. It is important to note that the assessment of uncertainty (also) includes many subjective elements in machinery sharing arrangements.

The frequency of transactions in regard to agrotechnical work operations is typically low because the working steps necessary to produce a crop should mostly be made once or twice a year.

On the basis of the – highly simplified – theory, the purchase of required machine capacities (transactions) for the agricultural firms can be made in the framework of three institutional solutions. Capacities can be ensured on a market basis by occasional, short-term rented machine services, while the so-called hybrid form is the virtual (large-scale) farm, as an alternative, where capacities are purchased in the framework of long-term agreements. The organized institutional solution in this case is the farm's own, independently realized machine investment.

Summarizing the above: the theory clearly confirms that the purchase of required machine capacities in Hungarian agriculture would be the most efficient in the framework of neoclassic arrangements; i.e. virtual large-scale farms.

According to the classic approach, the agency theory focuses on the contract and its role in the relationship between actors (basically the principal and the agent). When examining the cooperation between farmers, the agency theory – especially its normative direction, the *principal-agent theory* – mainly stresses asymmetric information and related opportunistic behaviour. Asymmetric information – although to different degrees – is always present if two or more parties conclude an agreement. As regards principal-agent theory the literature basically distinguishes two types of problems among cooperating partners due to information asymmetry: *moral hazard* and *adverse selection*. The issue of adverse selection is not discussed in the present paper; in this regard see, for example, the work of *Akerlof* [1970].

Moral hazard appears when at least one input cannot be detected in the cooperation process and its quantity cannot be laid down in the contract [*Royer* 1999]. When the economic problem is raised[2], many authors discuss the possible elaboration of an optimization scheme in this context. Many special models were set up in the relevant literature in connection with principal-agent theory; these are as follows: the multiple tasks model [*Holmstrom – Milgrom* 1991; *Sarker*, 2011]; the double moral-hazard model [*Agrawal* 2002]; the team production model [*Alchian – Demsetz* 1972]. As regards our topic this latter model has relevance. The team production model deals with the situation as a basic case when production is performed by several actors. In general, cooperation between actors can be much better defined as a network of relationships between actors (agents), than as a principal-agent relationship. As regards machinery sharing arrangements, however, it often happens that the farmer temporarily fulfils the role of principal, followed by that of agent; these roles are exchanged from time to time partly due to deterministic, and partly to random, factors.

In the literature of team production, the issues of moral hazard are discussed in detail by *Holmstrom* [1982]. The core of his approach is as follows: if the partners in the group are rewarded on the basis of the joint efforts and at least one input cannot be observed by the others, it will encourage the agents to withdraw from joint work (*free rider behaviour). Eswarten – Kotwal* [1985] introduced managerial skills as an example in agriculture. If the managerial skills are good – i.e. the skills cannot be detected by the other partners in making the right production decisions – this can be a reason to hide them within the partnership. This behaviour is due to the fact that each agent receives only a certain share of the total profit, but the total costs of his efforts should be paid. Agents can increase or maximize their profit only by decreasing their costs and an obvious way to do this is to decrease efforts. This type of moral risk is called "effort moral hazard" in the literature.

Another type of moral hazard is discussed by *Hart* [1995]. If inputs (e.g. machinery, equipment, instruments, etc.) are shared among agents in the production process, this will encourage them to use these assets excessively or to misuse them, because the user of the assets does not consider the full value of the assets because they are not, or are only partly, owned by him. This hazard is the so-called "asset moral hazard". In this case the information asymmetry comes from the imperfect controlling rights over the machines since they are in joint use or rental, or lent to other farmers. The limited observability may cause damage to the assets because the necessary repairs or maintenance work are not carried out.

Many authors have tried to solve the moral hazard problem in the team production model. They mostly agree

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[2] The basic problem is also mentioned by the literature as the landlord-tenant problem in connection with share farming [*Stiglitz* 1974]. The landlord is not fully aware how much the profit can be owed to the efforts of tenant. This limited observability can result in the agent (tenant) not ensuring proper, optimum effort from the viewpoint of the principal (landlord); in other words the agent is stimulated to reduce his performance, to "idle", and thus to use the resources for own purposes.

that the key factors in reducing risk are peer pressure, social norms [*Kandel – Lazear* 1992; *Barron – Gjerde* 1997; *Allen – Lueck* 1998], and dynamics [*Radner* 1986].

The peer pressure or peer influence model is based on the concept that the members of the group are afraid of the consequences of breaking the written and unwritten rules, i.e. the social norms of the group. The partnerships among farms are often interwoven with the personal relationships among farmers, such as friendship, kinship or neighbourhood, therefore the behaviour which results in moral hazard can be very "expensive" in a social sense.

Kandel – Lazear [1992] – as far as we know – was the first to discuss peer pressure in fending off moral hazard and grouped the pressure exerted by the group into external (sin, guilt) and internal (shame, embarrassment) impacts. According to this, it was concluded that peer pressure is the result of social norms, since if one member of the group differs from the standards set by the group, he can face unfavourable impacts. Furthermore, the authors also examined the possibility of mutual observation among the members of the group. This concept was further developed by *Barron – Gjerde* [1997]. The role of peer pressure and monitoring was analysed with a sequential game theory approach and the introduction of a principium. The results confirmed that – in theory – a "leader" appointed within the group can be an appropriate way to decrease moral hazard.

Radner [1986] examined the role of dynamics in his paper by using repeated "games". The point here is that if there are several time periods (*supergame*), the members of the group are able to observe each other's efforts or at least the signs which may refer to the degree of effort exerted by other members of the group in the previous period. This ultimately solves the problem of moral hazard because in this case we cannot speak about information asymmetry.

Empirical testing of theoretical relationships regarding moral hazard has been undertaken by many authors. *Larsen* [2007] examined the question in Swedish agriculture and concluded that moral hazard exists among cooperating farmers. Moreover he confirmed the role of social norms in reducing moral hazard. His results also draw attention to the importance of trust and identified the level of trust as a key factor in treating moral hazard as well as in the development and efficient operation of cooperation itself. In Hungary the relationships of cooperation among farmers and moral hazard were examined by *Baranyai et al.* [2010]. They concluded that the machinery sharing arrangements are full of moral hazard but they also confirmed that the impact of moral hazard in itself is not relevant and does not explain the low cooperation activity which is typical in Hungarian agriculture.

The present study can be regarded as a close continuation of the above research in which the questions of trust – emerging as a supplement to moral hazard – are examined in machinery sharing arrangements. In the following the trust-theories providing the actual theoretical frameworks of the research are reviewed.

2.2. *The role of trust in cooperation among farmers*

Trust has an outstanding role in human relations, and consequently in the field of cooperation among farmers, too. Over the last twenty years the issues of trust – as a research topic – has become the focus of interest in many fields of science.

It is widely accepted among experts in different scientific fields that the concept of trust presumes the presence of uncertainty or risk [*Rousseau et al.* 1998]. In this approach, trust is a possible tool for business actors to cope with the uncertainty or risk in exchange relations, behind which lie information and time problems. This is because in social relations – in addition to differing sources of information – the responses are often delayed in time and the first steps must be made without being (fully) aware of the reaction of the counterpart. A certain degree of trust is needed for this [*Lane – Bachmann* 2000].

Trust, as a subject of research, is a relatively new phenomenon in the economic sciences, but a vast number of publications have appeared on the topic in the last 25 years (e.g. *McAllister* [1995], *Sholtes* [1998], *Borgen* [2001], *Hansen et al.* [2001], *Szabó* [2010], *Bakucs et al.* [2012], *Fertő* [2012], etc.) The present paper does not describe the different trust theories in detail, because many authors have done so recently (see for example the works by *Csabina et al.* [2001], *Tóth* [2004] and *Nagy – Schubert* [2007]. Instead, we concentrate on those aspects which are important for our subject.

The Sholtes trust model was the starting point in our research as we used the outcomes of our previous research projects [*Takács et al.* 2005]. *Sholtes* [1998] placed trust in the matrix of loyalty and capability. We can speak about trust if faith in loyalty as well as in capability has a high value among the partners (Figure 1).

		Degree of competence *"I believe that my partner is well trained and capable*	
		low	high
Degree of loyalty *"I believe that my partner likes me and will support me in the future"*	high	SYMPATHY	**TRUST**
	low	DISTRUST	RESPECT

Figure 1: Trust among business partners on the basis of their loyalty towards each other and presumed capabilities
Source: on the basis of Sholtes [1998]

The basic model was adapted with some modifications. Out of the vast number of trust dimensions in the special literature we selected the approach used by *Sako* [1992]. He says that trust occurs when the business partner expects the other to behave predictably and in a mutually acceptable way. Discussing the types of trust *Sako* distinguished – among others – contractual trust and competence trust. (1) Contractual trust: based on the mutually accepted norm of honesty and keeping promises, one of the contracting parties expects the other to keep his promises. (2) Competence trust: the business partner trusts that the other has the appropriate

technical and managerial competence to fulfil the commitments. These two types of trust were implemented in the Sholtes model.

4. Primary data sources

Our examinations are based on primary databases. In order to explore the relations between trust and cooperation willingness in machinery sharing arrangements we carried out a questionnaire survey in South-Eastern Hungary, in the Southern Great Plain region, in Békés county. The research involved private farmers of three statistical micro regions, namely Orosháza, Békéscsaba and Mezőkovácsháza.

The selection of the sample was made with random sampling and the so-called snowball method. The survey was carried out between November 2008 and October 2009, for the financial year of 2007–2008. The criterion for involvement in the sample was the use of at least 1 hectare of agricultural land as well as the ownership of 1 technical resource (engine or machine) which can be used for agricultural purposes. In terms of status only private farms were included.

In the first run, information was collected with a preliminary questionnaire. The questions – among others – covered the following fields:

- general information about the head of the farm (gender, age, education, income dependence on agricultural activities, etc.);
- general information about the farm (activities, size of rented and owned land, size of livestock, etc.);
- natural indices of farming (production structure, outputs, machine supply, etc.);
- main aspects of cooperation arrangements (form and frequency of cooperation, awareness of institutionalized forms of cooperation and the opinion of the farmer about these solutions, etc.); and
- questions of trust.

The present paper introduces the results, explaining the relations between trust and willingness to cooperate.

In a narrow group of farmers the questionnaire survey was complemented with deep interviews. The respondents were randomly selected from those farmers who were willing to reply. The deep interview questions were connected with the questionnaire topics; they served as a control, or a more detailed description of topics. The data collection in this form concerned three villages.

In the questionnaire survey information was collected from a total of 147 private farms, but 15 farms were excluded from further examination during the data processing owing to deficient completion of questionnaires. Therefore the results published below are all based on the data of 132 farms (N=132). Deep interviews were made on 23 out of the private farms surveyed with questionnaires.

The following presumptions and criteria were used for the development of the model for analysis (on the basis of experiences which were not factually examined during the present research) – on the analogy of the tank model:

- the selected regions – regarding the agricultural services targeted by the examination – form a closed system: the examined services going out from the region and the services coming into the region are much less than the services performed among the farmers within the region;
- the parties should know each other and the relational networks should be mappable in order to examine trust;
- as regards geographical, economic, cultural and social criteria, the examined microregions can be regarded as one system, and concerning the above factors they do not significantly differ from other Hungarian regions (this presumption is based on the relatively homogenous national dispersion of registered cooperation arrangements).

On the basis of the conditions the possible number of elements in the sample is limited. In a statistical sense, the sample is not representative at national or county level, but it is representative at local level. Due to this, if our presumptions regarding the closed system are met – which is confirmed by other research, too – the findings concerning the region examined can be generalized because there are no considerable economic or social differences between the key agricultural areas of the country.

5. Applied empirical models

5.1. Definition of areas of machinery sharing, models for measuring

Cooperation, as an expression, is a broad concept – even considering machine use – and it can be implemented in many forms. During the research – based on former research experiences (*Takács et al.* 2005 and 2006) – we have developed a typology in which the different forms of cooperation form a structure in the context of trust and dependence (Figure 2). We distinguished cooperation dimensions in a "wider" and "narrower" sense in the elaborated hierarchical structure, of which the results connected with the narrow approach are described in the present paper.
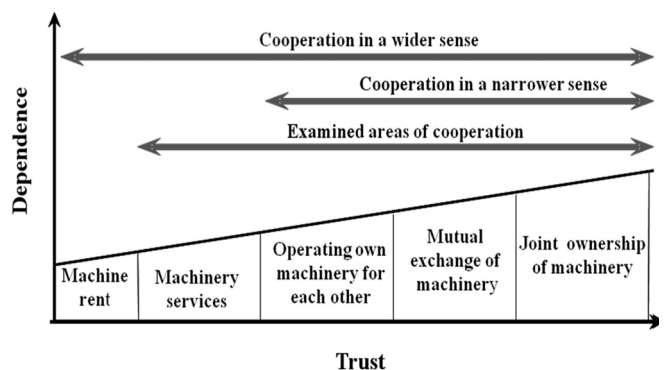

Figure 2: Machinery sharing arrangements in the context of dependence and trust levels
Source: Authors' own editing

In the following we summarize the main points of each field of cooperation and the methodology for quantifying farmers' activity within them.

(1) Machinery services based on mutuality (COOP_1): In our approach this solution is the most extensive form of cooperation. In this case we speak about agreements in which the farmer performs work with his own machinery for fellow farmers on a mutual basis. The respondents quantified the activity in the questionnaire by evaluating each work process on a scale from one to four. Utilizing this information, the following equation was set up to express the value of the activity rate:

$$COOP\_1 = \sum_{i=1}^{n} v_i \qquad i = 1, 2, 3 \dots n \qquad (1.)$$

where: v_i = frequency of cooperation connected with work process No. i [range 0-3: 0- never; 1- rarely: 1-2 times a year; 2- medium: 3-4 times a year; 3- frequent: more than 5 times a year]; n = number of work processes [pcs].

(2) Mutual exchange of machinery (COOP_2): this solution indicates a machinery sharing arrangement where the farmer lends his own asset to his fellow farmer. According to the above concept, the activity can be described as follows:

$$COOP\_2 = \sum_{i=1}^{n} z_i \qquad i = 1, 2, 3 \dots n \qquad (2.)$$

where: z_i = the participation activity of agricultural machinery No. i in cooperation [range 0-3: 0- never; 1- rarely: 1-2 times/year; 2- medium: 3-4 times/year; 3- frequent: more than 5 times/year]; n = number of machines [pcs].

(3) Joint ownership and use of machinery (COOP_3): this is the most intensive form of joint machine use, where the farmers carry out a joint investment and share the acquired technical resource(s). In this case the activity rate was determined as follows:

$$COOP\_3 = \sum_{i=1}^{n} r_i \qquad i = 1, 2, 3 \dots n \qquad (3.)$$

where: r_i = joint ownership of No. i agricultural machinery of the farm [0, 1 dichotomic variables: 0-no, 1-yes]; n = number of machines [pcs].

Considering the three types of cooperation activity in a narrow sense we developed an aggregated willingness-to-cooperate rate (WTC-rate) which describes the total cooperation activity of the observation units. We needed objective weights for correct and precise definition of indices. These weights should be rendered to the different areas of cooperation, thus expressing the different intensity of individual cooperation arrangements. The principal component analysis (PCA) helped us in the solution of the problem. We used the principal component weights in the so-called *A* matrix created by the multivariate statistical method. According to this, the aggregated index was determined as follows:

$$WTC - rate = \frac{COOP\_1 \cdot A_{COOP\_1} + COOP\_2 \cdot A_{COOP\_2} + COOP\_3 \cdot A_{COOP\_3}}{A_{COOP\_1} + A_{COOP\_2} + A_{COOP\_3}} \qquad (4.)$$

where: *WTC-rate* = aggregated index of cooperation activity in the case of the given observation unit [-]; *COOP_x* = the value of activity rates that are typical in the individual areas of machinery sharing arrangements [-]; A_{COOP_x} = the linear correlation coefficient of cooperation arrangements with the principal component (**A** matrix of PC-1) [-].

5.2. Quantification of trust levels

In order to examine the farmers' trust we collected information on the basis of the trust concepts detailed above. Two questions were used to measure the level of contractual trust and three questions for competence trust (see Table 1). The respondents evaluated the replies on a scale from 1 to 7, where 1="I do not agree at all" and 7="I agree totally". The expression of each level of trust was achieved with a simple arithmetical calculation of the average.

Table 1: Questions used for measuring the trust level

Contractual trust
I think my fellow farmers definitely keep their word
I think my fellows would never do any harm to me if the conditions of farming changed
Competence trust I trust that if any of my fellow farmers provides any machine work for me, the quality of his work will be the best possible under the given conditions
I trust that if any of my fellow farmers provides any machine work for me, it will be done at the most appropriate time, under the given conditions
I trust that if I lend a machine or tool to any of my fellow farmers, he will use it with the necessary precautions

Source: Authors' own editing

5.3. Statistical methodology

The general evaluation of information collected in the course of the survey and the detection of relations between data lines required the use of a wide range of statistical methodologies. Besides general descriptive statistics, multivariate statistical methods were used, too, of which the role of so-called "explanatory models" is highlighted in the discovery of relationships between variables.

Several statistical models were applied in the research to identify the factors which explain the cooperation activity of farmers. As is widely known, the selection of a methodologically correct explanatory model is strongly determined by the measuring level of dependent and independent variables. In most cases, the dependent variables were of high measuring level; metric variables (WTC-rate, COOP_1, COOP_2), for the explanation of which we have built different models depending on the measuring level of independent variables. When the independent variables were also of high measuring level, we used linear regression models[3], while hierarchic ANOVA (ANalysis Of VAriance)

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3   Due to methodological considerations, the activity rates of the COOP_3 form of cooperation were transformed into dichotomous variables: 1 – cooperates; 0 – does not cooperate. In this case the binominal logistic regression model was the adequate tool for revealing interrelations.

models helped to find the relationships in the case of (non-metric) independent variables of low measuring levels. In the implementation of ANOVA models, since no standard categorization system was available, the conversion of existing metric explanatory variables into variables of low measuring level was made with the help of the Visual Bander function of the SPSS software package.

6. Empirical results

6.1. Trust profile of farms

The examination of trust was based on Sholtes' model [*Sholtes* 1998], in which trust can be evaluated from two perspectives, namely on the basis of the faith of farmers in loyalty and capabilities. Adapting the original model: loyalty in fact means an approach to trust which focuses on honesty and keeping promises. Faith in capabilities means that the fellow farmer, on the one hand, has the appropriate machinery to fulfil the obligations he undertakes, and, on the other, has those personal qualities with which the transactions can be performed without negative consequences. The questionnaire used two statements to measure the faith of farmers in the loyalty of fellow farmers, while three statements were designed to measure faith in the capabilities of fellow farmers. (Table 4)

On the basis of responses measuring trust in the loyalty of fellow farmers, it can be concluded that farmers have slightly more trust that their fellows would keep their word (average: 3.69), than that their fellows would not be opportunistic in the case of any changes (positive or negative) in the conditions of farming (average 3.47). The paired t-test confirmed that there is a significant difference between the averages of responses given to the two variables. The (contractual) trust in loyalty should have been expressed with an indicator for further examinations; therefore we used the simple arithmetic average of the responses given to the two questions. The average value of the indicator formed is 3.57 in the whole sample.

Trust in the competence of fellow farmers was measured by 3 questions. Two were used to evaluate the level of trust in the field of machinery services and one in the field of machine rental. The paired t-test made for the three questions did not reveal any significant difference between the averages in any of the pair alternatives. Thus it can be concluded that although the average values in the case of machinery services indicate a slightly higher trust level than in the case of machine rental, this difference is not significant in a statistical sense.

As regards trust in competence, the aggregated index was also formed with the simple arithmetical average of the three responses. Comparing the two trust dimensions, it was statistically proven by experience that the average level of trust in the competence of fellow farmers is higher (4.02) than faith in their loyalty (3.57).

Table 2: Typical figures of trust types

Statements connected with measuring trust	Average	Dispersion
a.)I think my fellow farmers definitely keep their word.	3.69	1.96
b.)I think my fellows would never do any harm to me if the conditions of farming changed.	3.47	2.05
Contractual (loyalty) trust	**3.57**	**1.97**
c.)I trust that if any of my fellow farmers provides any machine work for me, the quality of his work will be the best possible under the given conditions.	3.96	1.61
d.) I trust that if any of my fellow farmers provides any machine work for me, it will be done at the most appropriate time, under the given conditions.	4.13	1.65
e.) I trust that if I lend a machine or tool to any of my fellow farmers, he will use it with the necessary precautions.	3.95	1.60
Trust in capabilities (competence)	**4.02**	**1.50**

Source: Authors' own editing

There is another interesting – and important – finding: a statistically proven relationship was revealed between age and trust types. As regards direction, the relationship is negative, so the older the farmer, the lower the level of trust in the loyalty and competence of fellow farmers.

6.2. Effect of trust on cooperation: trust in loyalty vs. competence

Further on in our research we used regression models to examine the role of trust types in the different cooperation agreements. The main results of the examinations are summarized in Table 3[4].

Table 3: Effect of contractual and competence trust on willingness to cooperate (table summarizing results of regression analysis)

Explained variable	Explanatory variable		
	SZERZ_BIZ [-]	*KOMP_BIZ [-]*	R^2
WTC-rate	0.170*	0.304**	*0.14*
COOP_1	0.000	0.327**	*0.09*
COOP_2	0.241*	0.181**	0.10
COOP_3	0.168	0.456*	*0.113*+

+ Nagelkerke R^2
** significant at 0.01 level
* significant at 0.05 level
Source: Authors' own editing

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4   It should be noted that as the control of the statistical analysis, in order to exclude endogeneity and multicollinearity phenomena, the required control examinations were performed and validated the results. A further problem arose from the low R^2 values. In this regard the significant ANOVA result models the idea that the small values are enough to confirm the validity of revealed relations for the base population.

The value of aggregated cooperation activity (WTC-rate) was significantly determined by both the contractual and the competence trust levels in the multivariate linear regression model. As regards the power of explanatory variables, trust in capabilities was much stronger than trust in loyalty. The direction of impact – conforming to the expectations – was positive. The two explanatory variables together can explain the low value (13.5%) of WTC-rate dispersion.

According to the statistics, the value of the activity undertaken in machinery services based on mutuality (COOP_1) is determined only by the trust in the competence of the fellow farmer. Trust in loyalty is highly independent from this. It confirms that this solution is the "most extensive" form of machine use arrangement, where the most important belief is that the fellow farmer can fulfil his commitments.

The multivariate model examining the questions of cooperation based on machine rental (COOP_2) has revealed some interesting results. Both explanatory variables have become significant model elements, but the B value indicated that the level of loyalty trust has stronger impact and can better explain the machine rental activity than trust in competence. Although the difference is slight in terms of explanatory power it is proven. The two variables in the model explain only 10% of the heterogeneity of cooperation activity.

The relationship between joint machine ownership (COOP_3) and the trust dimensions discussed were examined in the framework of binominal logistics regression. Analysing the individual impact of variables it was concluded that only the impact of trust in capabilities could be regarded as significant before setting up the model; the trust in loyalty was not significant. This partly contradicts expectations because it was presumed that the role of contractual trust was more determining at the highest level of cooperation. Following the setting up of the model 11.3% of the total dispersion – significant in total – could be explained, according to Nagelkerke R^2. When the trust variables were entered in the model, the competence trust still maintained its significance so the given variable substantially contributed to the model. On the basis of this it was concluded that joint machine ownership, as a form of cooperation, is based mostly on trust in capabilities, although trust in loyalty has a non-negligible role, too, although this can only partly be proven statistically.

6.3. Testing the Sholtes trust model

The examination of relationships between trust and cooperation activity were complemented with the testing of the Sholtes model. Validation was based on the presumption that cooperation between farmers is the most likely if they trust each other. As was discussed above, Sholtes said that trust develops when the level of trust both in loyalty and competence is sufficiently high. According to this, it is easy to accept that cooperation will mostly be formed at a high level of loyalty and competence trust. This question will be analyzed below.

The trust scales regarding loyalty and competence trust are each divided into 3 parts: degrees 1-2 = low, 3-5 = median, 6-7= high levels[5]. Comparing the two dimensions, the average activity rate values are summarized in Table 4.

Table 4: Average values of cooperation activity rates in the trust dimensions

Dimensions of trust		Degree of competence trust			
		Low	Median	High	Total
Degree of loyalty trust	Low	0.42 *(s=0.51)* (1)	1.17 *(s=0.90)* (2)	1.32 *(s=1.20)* (3)	0.99 *(s=0.91)*
	Median	0.33 *(s=0.51)* (4)	1.28 *(s=0.96)* (5)	1.66 *(s=1.41)* (6)	1.24 *(s=1.06)*
	High	- -	1.56 *(s=1.16)* (7)	1.99 *(s=1.33)* (8)	1.71 *(s=1.22)*
	Total	0.39 *(s=0.50)*	1.31 *(s=0.99)*	1.72 *(s=1.31)*	**1.27** *(**s=1.08**)*

Source: Author's own editing

The methods of descriptive statistics indicated that the presumption based on Sholtes model was correct because low trust levels resulted in lower, and high trust levels resulted in higher, average activity values. In the case of the other trust level combinations, the values were essentially calculated between the two extreme values.

Control examinations were made in order to validate the results. The comparison of cell averages was made with the ANOVA model, complemented with post-hoc tests. Groups were formed for the examinations. On the basis of "trust cells" 8 groups were put together from the farms (no farm could be listed in one cell, which is why the number of groups was not 9). The results confirm that there is a difference between expected values at a 0.004 significance level. However, it indicates only the general difference between cell averages, and does not give detailed information about the cells concerned. The question can be answered with post-hoc tests. The most conservative, and thus most reliable, Scheffe-test on the basis of F sample dispersion proves that there is no group average where the expected values are significantly different from each other. By "softening" the trials with the LSD test, which uses a t-test to control the differences between averages, significant results could be revealed.

The results proved that, among other things, the cooperation activity of groups with perfect distrust (1) and unconditional trust (8) – using the titles in the original model – are significantly different from each other.

As regards group 3, which represents respect towards fellow farmers, the expected value of the activity rate is not

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[5] Note: histogram analysis was made before categorization and proved the levels through the "peaks" of frequencies.

substantially different from the average of any other group. None of the farmers belonged to the category of pure sympathy – no such combination could be identified in the examined sample. The experiences collected in the more reserved group, i.e. with a median trust level, indicate that even the trust-approach based on the Sholtes model cannot give a perfect explanation for the cooperation activity of farms. The validation of the model, however, can be considered successful. Reviewing the results, it can be concluded that the trust in both loyalty and competence has an important role in machine use arrangements, although the model also proves that the weight and importance of trust types is not the same.

7. Conclusions

The paper examines the role of trust in machinery sharing arrangements. The results of empirical research carried out among agricultural enterprises in Békés county confirm that farmers gave wrong responses to the problems occurring in the new situation which emerged following the post-socialist transition. The new situation required strongly adaptive, innovative behaviour from farmers, in which cooperation mechanisms should have played a key role, but – according to experience – this has not happened in the last twenty years. The findings of the survey have led us to the conclusion that the changes in the political-economic environment have given – often contradictory – impulses to farmers and the encouragement of cooperation was not among these impulses. Thus willingness to cooperate nowadays is rather low.

The present paper examines the trust connected with machinery sharing, as one area of cooperation among farmers. The survey – made within a group of farmers in Békés county – confirmed a positive relation between the level of trust and farmers' activity in cooperation arrangements. Our results also point out that the trust demands of different areas of cooperation is differentiated. The experiences indicate a tendency according to which contractual trust is more important in intensive cooperation arrangements which result in higher dependence while competence trust is more emphasised in more extensive solutions.

Our research, of course, has certain limits. The generalization of the results is more difficult due to the low number of elements in the sample and the regional concentration of the sampling.

It also creates, however, the opportunity to carry on the research, specifically in two directions: on the one hand, by the quantitative expansion of the research – i.e. by increasing the number of elements and the area of data collection – and on the other hand, by qualitative expansion, i.e. by the empirical analysis of further trust models.

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EFFICIENCY ANALYSIS OF DAIRY FARMS IN THE NORTHERN GREAT PLAIN REGION USING DETERMINISTIC AND STOCHASTIC DEA MODELS

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Abstract: Running any dairy enterprise is a risky activity: the profitability of the enterprise is affected by the price fluctuation of feed and animal health products from inputs, as well as by the fluctuation of end-product prices. Under these circumstances, it is essential for the cattle breeders, in order to survive, to harness the reserves in management as effectively as possible.

In this research the efficiency and risk of 32 sample dairy farms were analysed in the Northern Great Plain Region from the Farm Accountancy Data Network (FADN) by applying classical Data Envelopment Analysis (DEA) and stochastic DEA models. The choice of this method is justified by the fact that there was not such an available reliable database by which production functions could have been defined, and DEA makes possible to manage simultaneously some inputs and outputs, i.e. complex decision problems. By using DEA, the sources that cause shortfall on inefficient farms can be identified, analysed and quantified, so corporate decision support can be reinforced successfully.

A disadvantage of the classical DEA model is that the stochastic factors of farming cannot be treated either on the side of inputs or outputs; therefore, their results can be adopted with reservations, especially in agricultural models. This may have been because we could not discover that many agricultural applications. Considering the price of inputs and outputs as probability variables, 5000 simulation runs have been done in this research. As a result, it can be stated that at which intervals of the input and output factors can become competitive and the fluctuation of these factors can cause what level of risk at each farm.

Keywords: deterministic DEA, stochastic DEA, efficiency, dairy enterprise, risk.

INTRODUCTION

Material flow processes of animal husbandry constitute a compound system which involves procurement, stocking and marketing tasks. Material flow processes are closely linked with resource management, operation and demand management. An optimal production and logistics strategy can only be determined in the light of these circumstances. These processes are much more complex in animal husbandry than in a conventional enterprise, since biological laws must also be considered in the timing of processes.

The share of agricultural enterprises from GDP is about 4%. Within this share, the bovine sector gives one-fourth of the GDP in animal husbandry, thus it is of the third largest volume animal enterprise. Based on the database of the Central Statistical Office (CSO), domestic bovine herds have decreased by 200 thousand head, cows by 100 thousand in just the last 10 years. These numbers have considerable influence on keepers not being able to recognize the costs of keeping in their selling prices. The number of bovine farms has also decreased to one-third within the last seven years, according to the CSO's Farm Structure Survey of 2007. Since such a drastic decrease was not followed by the bovine herd's decrease, this suggests that a concentration happened among the farms, i.e. there

are fewer farms, but bigger herds are being kept. On the basis of the statements of the Dairy Board and Interbranch Organization, in 2010, Hungary could fulfil only 80% of its milk quota l, which represents a continuous 10% decrease in the last 3–4 years. This statistic also confirms that the bovine sector is in a long-term crisis; its profitability has been falling. Farms must try to make their farming as efficient as possible with every available tool, so as to avoid the disposal of their herds and closure. The system approach application of logistics can be such an instrument in the processes of animal husbandry. However, for the improvement of efficiency, the exact level – and the input and output parameters – must be known that are to be changed to reach a more expeditious farming. A tool for efficiency analysis is the application of DEA models.

LITERATURE REVIEW

Deterministic DEA models

The idea of *Data Envelopment Analysis* (hereinafter DEA) method was originated by FARREL (1951), who wanted to develop a method that is more suitable for

measuring productivity. However, in 1978, CHARNES et al. reformed this as a mathematical programming problem. This technique is a relatively new *"data-oriented" process*, which can be applied for measuring the performances of decision making units (DMU's) producing from several inputs several outputs (COOPER et al. 2004a). In recent years, the method of DEA has been used in many applications for performance measurement. It has been used for measuring the efficiency of a service's internal quality (SOTERIOU and STAVRINIDES, 2000; BECSER, 2008), efficiency measurement of banks (SHERMAN and LADINO, 1995; TÓTH, 1999), of educational (TIBENSZKYNÉ, 2007) and other public bodies, and also for measuring the efficiency of business parks (FÜLÖP and TEMESI, 2000). However, its application in agricultural practice was not significant. The efficiency analysis of animal farms and agricultural production processes can be carried out by *simulation methods* (SZŐKE et al. 2009; KOVÁCS and NAGY, 2009); however, the quality of available database does not always allow the full mapping of technological processes. In these cases, DEA is a more efficient tool.

The DEA process has two known approaches: *input-oriented* (cost-oriented) and *output-oriented* (result-oriented). In the case of the input-oriented approach, we examine how much and at which proportion the inputs should be used to minimize a cost at the same emission level. In the output-oriented approach, we determine the partial increase of outputs without changing the quantity of inputs (FARREL, 1957; CHARNES, et al. 1978).

This is complicated by the fact that we must take into consideration in our efficiency measurement that not every input benefits an enterprise in the same way: if we calculate with the intake on the same level *Constant Return to Scale* (CRS) is counted, if not, then *Variable Return to Scale* (VRS) (COOPER et al. 2004a). KOVÁCS and EMVALOMATIS (2011) applied a VRS output-oriented model to analyse the efficiency of dairy enterprises in Germany, Hungary and The Netherlands.

DEA is a non-parametric multiple statistic method by which we can determine a unit's efficiency of transforming inputs into outputs; therefore, it is suitable to determine the unit (e.g., farm, university or restaurant) with the "best practice" (ALBRIGHT and WINSTON, 2007). Thus, the DEA process gives the marginal efficiency and, knowing this marginal efficiency curve, the parameters of non-efficient units can be detected. By improving these parameters, optimality can be reached (TOFALLIS, 2001; BUNKÓCZI and PITLIK, 1999).

Stochastic DEA models

By applying DEA models, units of 100% efficiency can be chosen; however, the results are valid for past data: decisions are made for the future. Although bottlenecks – i.e. the factors to be changed so that a decision-making unit (DMU) will be efficient – can be identified by the basic

deterministic model, it is not sensitive enough. There are many input and output factors which can be defined as probability variables, so these will be built into the model. Probability variables can be described by different functions: distribution function, density, characteristic and generator function.

Researchers have begun the practical application of stochastic DEA models from the beginning of the 1990s. The comparison of stochastic and deterministic DEA models was published by several researchers (COOPER et al., 2004b; SEIFORD and ZHU, 1998; TSIONAS, 2003; BRUNI et al., 2009). Stochastic DEA models were applied on many fields: to measure the efficiency of libraries (LOTFI et al., 2007), textile factories (KHODABAKHSHI and ASGHARIAN, 2009) and oil companies (SUEYOSHI, 2000).

BARÁTH et al. (2007) applied stochastic DEA model to analyse the total factor productivity change in Hungarian agriculture.

MATERIAL AND METHODS

The database of regional analyses was given by the Farm Accountancy Data Network (FADN) of the Research Institute of Agricultural Economics (Hungarian abbreviation: AKI). FADN is a representative information system in the European Union that measures the financial position and the assets and liabilities of farms. For this research, the data of 32 sample dairy farms was used in the Northern Great Plain Region. For the calculations, the examined year was 2010.

From the examined 32 sample farms, there are 22 individual and 10 corporate farms. Dairy herds of the individual farms number 1,187 cows; the corporate farms' total herds number 3,716 head, the average for one farm is 371 dairy cattle. The herd of the examined 32 farms numbers 4,903 cows, which is 6.22% of the population in the Northern Great Plain Region. The produced milk yield was more than 35.5 thousand tons in 2010.

Description of deterministic DEA model

In the course of the operation of an enterprise, the question of how efficient its units are working often arises. Investment analysts are interested in the efficiency of competing participants within an industrial enterprise. DEA is a linear programming application by which the above-mentioned problems can be solved. In the course of DEA analysis, we get the result of at what efficient level the inputs are transformed into outputs, so it is suitable to find the unit (e.g., a plant, university or restaurant) which has the "best-practice" (ALBRIGHT and WINSTON, 2007). I apply the method of DEA to determine the frontier efficiency by the efficiently operating units (TOFALLIS, 2001; BUNKÓCZI and PITLIK, 1999).

Efficiency can be measured by output/input indices, thus:

$$E_i = \frac{\sum_{j=1}^{n_o} O_{ij} w_j}{\sum_{j=1}^{n_i} I_{ij} v_j} \quad \text{where}$$

E_i : the efficiency of the unit i

O_{ij} : the value of the unit i's output factor j (1.)

n_o : number of outputs

w_j : the evaluation of one unit of output j

I_{ij} : the value of the unit i's input factor j

n_j : number of inputs

v_j : the evaluation of one unit of input j

Objective function of the model:

$$\sum_{j=1}^{n_o} O_{ij} w_j \Rightarrow MAX! \qquad (2.)$$

For every examined unit, we solve a separate LP exercise, by which the economic content of the objective function is the same; namely, my aim is to maximize the value of the units' weighted outputs. After having solved all LP models, we get the best evaluation (input and output weights) as a result (RAGSDALE, 2007).

Constraints:

1. The efficiency of any unit cannot be higher than 100%.

$$\sum_{j=1}^{n_o} O_{kj} w_j \le \sum_{j=1}^{n_i} I_{kj} v_j \qquad (3.)$$

(k=1,2,..., the number of units to be taken under the analysis)
that is

$$\sum_{j=1}^{n_o} O_{kj} w_j - \sum_{j=1}^{n_i} I_{kj} v_j \le 0 \qquad (4.)$$

2. For the sake of the calculations, input prices should be scaled in a way that the input cost of economic unit i shall be 1 (RAGSDALE, 2007).

$$\sum_{j=1}^{n_I} I_{ij} v_j = 1 \qquad (5.)$$

After choosing the non-efficient farms, we can quantify which parameters should be changed on the farms – one by one – to reach the optimal values of the "composite farm" that is 100% efficient. For this, shadow prices can be applied. On those farms that were 100% efficient, the difference of weighted output and input is zero, so it stands on the threshold i.e. it has a shadow price. The given farm's optimal value can be calculated as the scalar product of the vectors for shadow prices and each parameter value.

Description of stochastic DEA model

Basically, the stochastic DEA model is a stochastic linear programming model series. Stochastic LP can be applied if the probability of different events is known or statistically is to be defined.

Obviously, in this DEA model the input and output parameters must be taken into consideration as probability variables. In this research these variables were treated as beta (Milk production for 305 days, milk fat and turnover) or normal distribution (milk protein, on-farm and bought-in feed costs, labour cost, direct costs) based on my previous analyses about the AKI database. The density function of beta-distribution:

$$f(x) = \frac{1}{B(\alpha,\beta)} x^{\alpha-1}(1-x)^{\beta-1} = \frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)} x^{\alpha-1}(1-x)^{\beta-1}, \quad x \in [0,1] \quad (6.)$$

and f(x)=0 otherwise. In this formula, $\Gamma(x)$ is the gamma-function, $B(\alpha, \beta)$ is the beta-function and α and β are positive. Specially, if $\alpha = 1$ and $\beta = 1$, X follows a uniform distribution in the interval [0,1]. The graph of beta-distribution density function can have various shapes. In this case, the values of α and β for the chosen probability variables are listed in Table 1. These values were set according to the practice presented by dairy farmers.

Table 1. Parameters of probability variables with beta distribution

	The likeliest	Minimum	Maximum	Alpha	Beta
Milk production for 305 days (liter)	farm value	2000	10000	1,75	1,9
Milk fat (%)	farm value	2,80%	4,34%	10	6
Turnover (without subsidy) (thousand HUF/cow)	farm value	200	1250	3	5

Source: own calculation

The probability value for beta distribution was determined by random number generator and based on this the inverse of beta distribution function was calculated, which is exactly the value of the probability variable by given α and β parameters that can vary within my own estimated limits (minimum and maximum). These calculated beta distribution variables will be put into this DEA model.

Milk protein, the own and purchased feed costs, labour costs and direct costs were treated as normal distribution probability variables. The density function of normal distribution is:

$$f(x) = \frac{1}{\sqrt{2\Pi \cdot \sigma}} \cdot e^{\frac{-(x-\mu)^2}{2\sigma^2}}. \qquad (7.)$$

The parameters of probability variables with normal distribution are shown in Table 2. In the course of the calculations, the INVERZ.NORM function was used in Excel, which gives the value of the normal distribution function's inverse by given expected value and standard deviation. Values can be calculated according to the

Table 2. Parameters of probability variables with normal distribution

	Average	Coefficient of variance
Milk protein (%)	farm value	4,10%
On-farm grain feed cost (thousand HUF/cow)	farm value	50%
On-farm fodder cost (thousand HUF/cow)	farm value	50%
Bought-in grain feed cost (thousand HUF/cow	farm value	50%
Bought-in fodder cost (thousand HUF/cow)	farm value	50%
Labor cost (thousand HUF/cow)	farm value	80%
Direct cost (thousand HUF/cow)	farm value	40%

Source: own calculation

probability for distribution, the distribution's mean (in this case average) and coefficient of variation. The probability value for distribution was determined by random number generator. These calculated variables will be put into this model.

RESULTS

Efficiency analysis of dairy farms in Northern Great Plain region by deterministic DEA model

I analysed the efficiency of 32 dairy sample farms in the Northern Great Plain Region in the deterministic version of DEA. I classified these farms according to the size categories of the Hungarian Central Statistical Office (Table 3). Sixteen per cent of the examined farms have 3–9 cows, which is only 1% of the total herd. Sample farms with 20–99 cows are 39%, which gives only 11% of the population. Only 6 farms have more than 300 cows, but 61% of the total herd belongs to them.

Table 3. Classification of the examined sample tests based on herd size

Central Statistical Office size category (cow)	Size category code	Number of farms	Distribution of farms by categories (%)	Herd by categories (cow)	Distribution of herd by categories (%)
1-2	1	0	0%	0	0%
3-9	2	5	16%	27	1%
10-19	3	3	9%	41	1%
20-29	4	4	13%	105	2%
30-49	5	4	13%	160	3%
50-99	6	4	13%	308	6%
100-199	7	3	9%	493	10%
200-299	8	3	9%	781	16%
300-499	9	4	13%	1598	33%
500-	10	2	6%	1389	28%
Total		32	100%	4902	100%

Source: own calculation

Herd size has medium concentration (Figure 1). Based on the calculations, the average difference is 490 cows, which was determined by Gini's formula:

$$G = \frac{2 \cdot \sum_{i=1}^{n}(X_i - X_j)}{n^2} = 489{,}94 \text{ .} \qquad (8.)$$

The degree of concentration was calculated by the concentration coefficient which is the quotient of Gini's formula and twice the mean:

$$Ke = \frac{G}{2\overline{X}} = 0{,}504 \text{ .} \qquad (9.)$$

The value of concentration coefficient is 0.504, which means that the concentration is medium. The coefficient value can take a number between 0 and 1, so the nearer to 1, the stronger the concentration is. Concentration examination was made based on the calculations of LORENZ (1905).
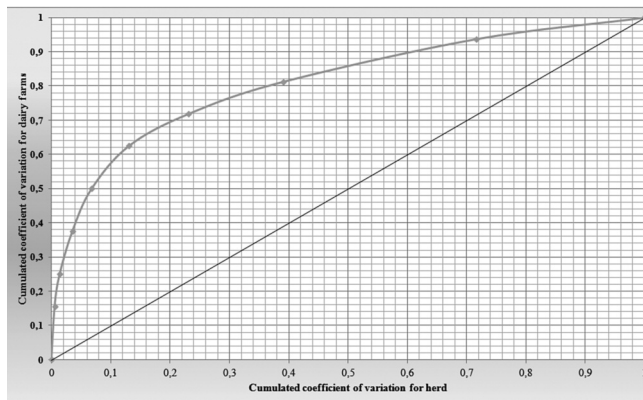

Figure 1. Concentration of herd on the examined dairy farms by Lorenz-curve
Source: own calculation

Classification of farms was executed by cluster analysis. These farms were analysed by two types of cluster analysis: hierarchical and non-hierarchical k-means analysis. The result was the same by both method, 3 groups were established by 11 characteristics: 23 farms are in the first cluster, 4 farms in the second and 5 farms are in the third one. Farms in Cluster 1 constitutes the group of so-called smaller or medium-sized farms, their average herd is 52 cows. Legally 4% of them are corporate farms, the rests are individual farms. The average herd in Cluster 2 is 276 cows, which means that these constitute the group of large sized farms. In Cluster 3, there are 5 corporate farms with an average herd of 521 cows; actually, these are the classical industrial large farms.

In the efficiency model arable land (ha/cow), herd size, on-farm and bought-in grain feed and fodder costs (thousand HUF/cow), labour cost (thousand HUF/cow) and direct costs were taken into account as input factors. Milk production for 305 days, average milk fat and protein from milk quality parameters and turnover with subsidies and without subsidies were set into the model as outputs. The aim of the analysis is to examine the farms' efficiency, to explore the critical factors in cases of non-efficient farms and to determine the direction of further analyses. After solving the model it can be stated that considering the given input and output constraints 20 farms (63%) from 32 operate in an efficient way, the others (12 farms, 37%) does not (i.e. DEA efficiency value is less than 1).

Among the efficient farms, there are 3 corporate and 17 individual farms, while among the non-efficient ones, there are 5 individual and 7 corporate farms. Therefore, according to the examinations, 30% of the corporate farms and 77% of the individual farms work in an efficient way. Consequently, it can be stated that medium and large sized individual dairy farms work more efficiently in the Northern Great Plain Region than the industrial large corporate farms. The classification of efficient farms by legal status, cluster and size category is shown in Table 4. The herd size of corporate efficient farms is 386 cows; cows on the individual farms number 1,239 altogether, which gives 25% of the examined

farms' total herd. 95% of the efficient farms belong to Cluster 1, while only 5% are in Cluster 2. Neither of the farms in Cluster 3 was efficient.

Table 4. Efficient farms by legal status, cluster and size category

Farm code	Legal status 1= individual 2= corporate	Number of cluster	CSO size-category code[1]
1	2	1	2
2	1	1	7
3	1	1	8
5	2	2	9
6	1	1	7
8	1	1	4
9	1	1	6
11	1	1	2
12	1	1	5
13	1	1	2
15	1	1	4
17	2	3	9
18	1	1	3
19	1	1	5
20	1	1	2
25	1	1	3
26	1	1	5
28	1	1	2
31	1	1	3
32	1	1	4

([1] Farm size categories in the CSO databases: 1=1-2 cows, 2=3-9, 3=10-19, 4=20-29, 5=30-49, 6=50-99, 7=100-199, 8=200-299, 9=300-499, 10= more than 500 cows)
Source: own calculation

If the size category for efficient farms is analysed, it can be stated that 8 farms have less than 20 cows, 7 farms have 20-100 cows, 3 farms have 100 and 300 cows and only 2 farms keep more than 300 cows.

The model analysis shows that those farms are efficient, for which direct costs (409 thousand HUF/cow on efficient and 620 thousand HUF/cow on non-efficient farms) are much more lower compared to their turnover (541 thousand HUF/cow without subsidy, 667 thousand HUF/cow with subsidy) and produced less milk per cow (5365 kg/cow) but with better quality parameters. In cases of the efficient farms the feed cost was lower (151 thousand HUF/cow) than on the non-efficient ones (193 thousand HUF/cow).

42 per cent of the non-efficient farms are individual farms (Table 5). It can be stated that in Cluster 1 five farms are efficient from 23 (22%). There is only 1-1 farm in Cluster 2 and also in Cluster 3, which is efficient. On the non-efficient farms, 3,167 cows are kept, which is 65% of the examined total herd.

DEA efficiency of non-efficient farms is shown in Figure 2. The average efficiency is marked with blue colour (73.53%). Based on this, we can see that 58% of these 12 non-efficient farms have efficiency above average. Sorting the efficiency values in descending order, Farms 17 and 21

Table 5. Non-efficient farms by legal status, cluster, size category and DEA efficiency

Farm code	Legal status 1= individual 2= corporate	Number of cluster	CSO size-category code[1]	DEA efficiency
22	1	1	6	92%
21	2	2	8	88%
14	1	1	4	84%
7	1	1	5	81%
24	2	3	9	76%
4	1	1	6	76%
30	2	2	7	75%
10	1	1	6	71%
16	2	3	10	67%
23	2	3	10	62%
27	2	3	9	60%
29	2	3	8	51%
Average				73,53%

([1] Farm size categories in the CSO databases: 1=1-2 cows, 2=3-9, 3=10-19, 4=20-29, 5=30-49, 6=50-99, 7=100-199, 8=200-299, 9=300-499, 10= more than 500 cows)
Source: own calculation

reached almost 90% efficiency. Although Farms 23 and 16 have the largest herds (638 and 751 cows), their efficiency is among the lowest (638 and 751 cows).
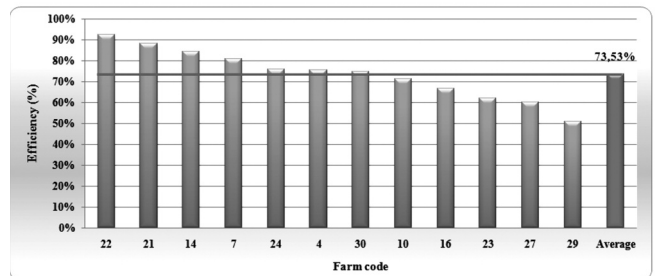

Figure 2. Efficiency of the non-efficient farms
Source: own calculation

In order to make a sounder analysis about the parameters of non-efficient farms, sensitivity analyses and the examination of shadow prices are needed to be made. Using the efficient farms' shadow prices an input and output vector can be created that concern to a complex, hypothetical farm. The input and output parameters of this composite farm can be compared to the present values of the non-efficient farms, thus the defects that decrease efficiency can be explored. In this research, the non-efficient farms' parameters were compared to the hypothetical farms' factors created by the shadow prices, so I could determine which value should be improved to reach a good practice. As an example, the calculation of the composite farm for Farm 4 will be presented. The shadow prices listed in Table 6 were calculated as a solution after solving the LP for Farm 4 in the sensitivity analysis. In the first row of the table (Input Farm 4), DEA efficiency can be found in the column of Shadow price as a dual solution. The weighted input was set with equality in the model, so here the shadow price means that 1% of input change results 0,756% output change. In the other rows, the differences of inputs and outputs are

evaluated. The left and right hand side of the constraint is calculated in every case and, if the left hand side value is equal with the right, the shadow price is to be found. This match means that where the difference is zero, that is an efficient farm and the shadow price shows the weight of considering the given farm in the further efficiency analysis.

Table 6. Shadow prices after solving the LP model of Farm 4

Name	Left hand side of the constraint	Shadow price	Right hand side of the constraint
Input Farm 4	1	0,755635466	1
Farm 1 Difference	-0,789828871	0	0
Farm 2 Difference	-3,9968E-15	0,016921441	0
Farm 3 Difference	-0,626195297	0	0
Farm 4 Difference	-0,244364534	0	0
Farm 5 Difference	-0,409044056	0	0
Farm 6 Difference	-0,122871971	0	0
Farm 7 Difference	-0,499653851	0	0
Farm 8 Difference	-0,154663417	0	0
Farm 9 Difference	-5,88418E-15	0,688754471	0
Farm 10 Difference	-0,654209858	0	0
Farm 11 Difference	-0,227827927	0	0
…	…	…	…
Farm 31 Difference	-1,55431E-15	0,327050034	0
Farm 32 Difference	-0,609197277	0	0

Source: own calculation

If the shadow prices are weighted with the farms' parameters, a composite farm for Farm 4 will be created which were compared to the original values of the given farm (Table 7). In the Difference column, those values are listed by which the parameter value is to be modified for the farm to be efficient. This calculation series was made in every case.

Table 7. Parameters of the composite farm created by shadow prices and Farm 4 and the difference of the values

	Farm		Parameters of the composit farm	Farm 4	Difference
Outputs	Milk for 305 days	kg/cow	4 451,23	4 451,23	0,00
	Milk protein	%	3,10%	3,10%	- 0,00
	Milk fat	%	3,75%	3,38%	0,37%
	Turnover without subsidy	thousand HUF/cow	397,76	372,27	25,49
	Turnover with subsidy	thousand HUF/cow	434,12	404,17	29,95
Inputs	Arable land	ha/cow	0,66	1,18	- 0,52
	Dairy herd	cows	65	87	- 22
	On-farm grain feed cost	thousand HUF/cow	45,80	60,61	- 14,81
	On-farm fodder cost	thousand HUF/cow	42,02	68,63	- 26,61
	Bought-in grain feed cost	thousand HUF/cow	19,78	47,34	- 27,56
	Bought-in fodder cost	thousand HUF/cow	0,10	2,28	- 2,18
	Labor cost	thousand HUF/cow	29,49	50,45	- 20,96
	Direct costs	thousand HUF/cow	434,85	640,99	- 206,14

Source: own calculation

It is understood that on the non-efficient farms, the specific produced milk is not to be changed either. On the farms with good practice, the value of milk protein was higher on average by 0.22%; however, on five farms, this value does not need to be modified. At the largest degree, on

Farm 23, the rate of milk protein should be increased by 0.85%. Considering the milk fat, we can see that an averaged 0.55% should be improved on these 12 farms. The rate of milk fat is only adequate on Farm 30. The highest improvement is needed on Farm 23 again (+1.23%). This led to the conclusion that quality parameters of milk are efficiency increasing factors.

Turnover should be increased by 110 thousand HUF/cow on average on the non-efficient farms. The smallest modification is need on Farm 29 (+17 thousand HUF/cow).
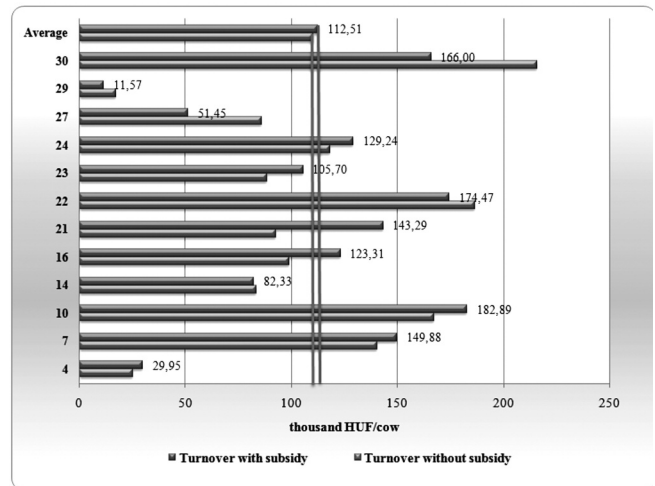

Figure 3. Turnover differences of the non-efficient farms compared to the composite farms
Source: own calculation

Considering the inputs, the size of arable land should be enlarged almost on every farm by an average 2.35 hectares/cow. The largest enlargement should be done on Farm 23 (6.07 ha/cow), the smallest on Farm 7 (0.12 ha/cow).

The size of herd should be decreased by 128 cows, on average. Among the farms of bad practice, on Farm 16, the herd should be reduced by 531 cows, but this farm had the largest livestock (751 cows). The herd of Farm 23 is almost to be halved: the livestock of 638 cows should be reduced by 387 cows.

Considering feed costs, it is to be concluded that both the cost of on-farm and bought-in feeds should be cut by 105 thousand HUF on average in the cases of almost all the farms (Figure 4). Grain feed cost should be reduced by 20 thousand HUF/cow on average, the values fluctuate from 1.3 (Farm 22) to 57 thousand HUF/cow (Farm 7). On-farm fodder cost is to be diminished by 53 thousand HUF on average on all farms. The slightest decrease of this cost is needed on Farm 22 (1.98 thousand HUF/cow), the largest is on Farm 29 (205.6 thousand HUF/cow). Bought-in grain feed cost is not to be modified on only 3 farms (Farm 14, 21, 30), but it should be decreased by 10 thousand HUF/cow on the others. The cost of bought-in fodder is to be moderated by 22 thousand HUF/cow on average. Among feed costs, this cost has the most extreme fluctuation (131%).
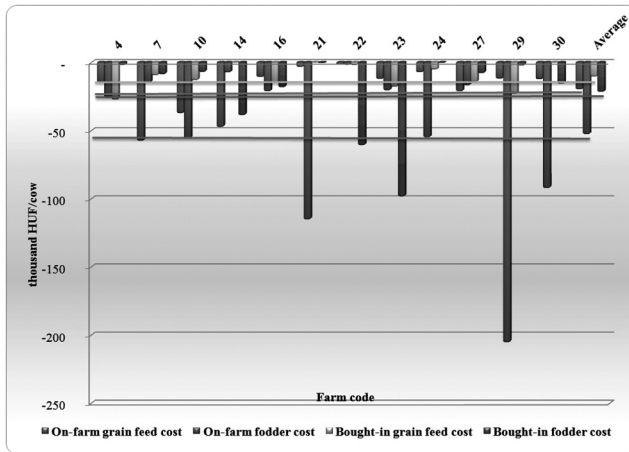
Figure 4. Feed cost differences of the non-efficient farms compared to the composite farms
Source: own calculation

Analysing the differences of labour costs, it can be stated that labour costs should be reduced by 65 thousand HUF/cow on average on all farms. The highest degree of labour cost reduction should be reached on Farm 29 (163 thousand HUF/cow). This cut can be obtained by decreasing the labour hours or the hourly rates.

The level of direct cost is also higher than the level of efficient farms, by 446 thousand HUF/cow on average (Farm 5).
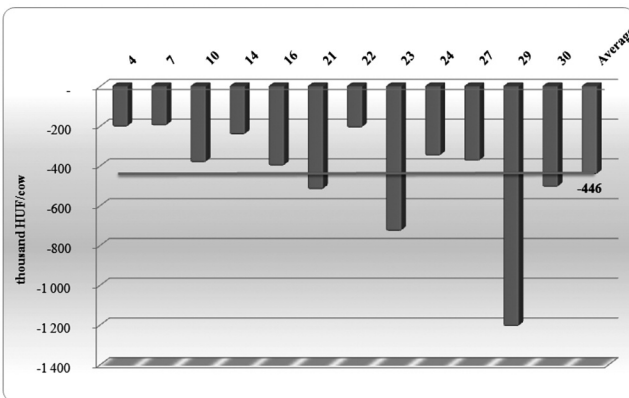

Figure 5. Direct cost differences of the non-efficient farms compared to the composite farms
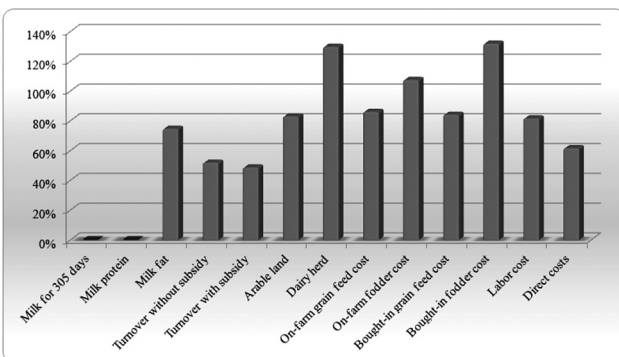*Source: own calculation*

Figure 6. Coefficient of variation values for inputs and outputs
Source: own calculation

Since the values for milk production and milk protein are not needed to be modified, their coefficient of variation is 0% (Figure 6). Coefficient of variation for turnover and direct cost is around 50–60%, which implies an extreme fluctuation. The highest variation of coefficient has the herd size and bought-in fodder costs (around 120%). Coefficient of variation for arable land, on-farm and bought-in grain feed costs fluctuates around 80%.

Efficiency analysis of dairy farms in the Northern Great Plain region by stochastic DEA model

During the evaluation of the results for the stochastic DEA model, I applied the index of the **rate of efficiency (%)**. We can calculate this if the number of simulation runs that were 100% efficient is divided by the total number of simulation runs. The number of simulation tests was 5000. This large number was justified in order that the simulated values for variables shall cover the range of observation in the given parameter intervals based on the distributions, because this way, the results represent better all situations for the future after running the simulation.

After running the stochastic model, it was found that 9 farms are efficient in consideration of the risks, which is half of the result for deterministic DEA. (The considered risk factors are mentioned in the description of the stochastic DEA model of this paper.) The rate of efficiency is better on those 11 farms that were efficient according to the deterministic version, but the rate of efficiency is above 50% in case of only 3 dairy farms (Figure 7). This rate fluctuates around 10–50% on all other farms, which indicates that if the conditions change a bit to a less favourable way, these farms will not meet the criteria of the farms with good practice in the region.
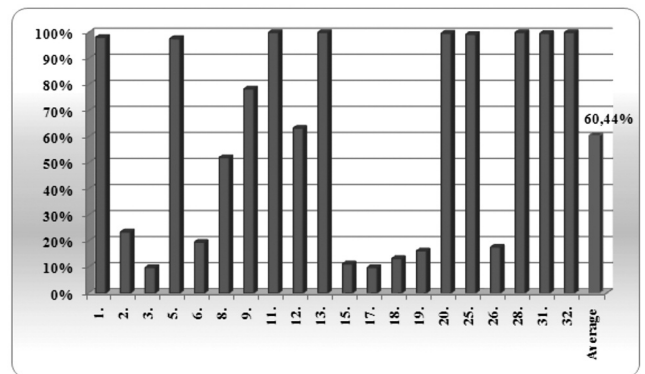

Figure 7. Stochastic DEA efficiency of efficient farms based on the deterministic DEA model
Source: own calculation

The average rate of efficiency in cases of non-efficient farms was 8.31% (Figure 8) compared to the value of 60.44% for efficient ones. This definitely implies that the results of deterministic model are reliable, because the chance of reaching such an input-output combination, in order to be considered 100% efficient, is very small on those farms which were non-efficient.
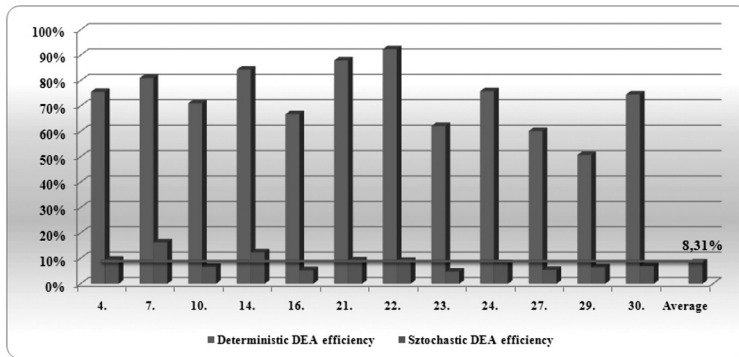
Figure 8. Non-efficient farms' deterministic and stochastic DEA efficiency values
Source: own calculation

According to the deterministic DEA there were 20 efficient farms (Table 8). After 5000 simulation runs, in the most favourable cases, the number of efficient farms was 22 and the minimum value was 7. The distribution is presumed to be close to symmetric, because mean and median are close to each other in every category. Median in the efficient category is 13 farms, which means that in 50% of the cases (in 2500 cases) 13 farms were efficient from 32. This is better than the presented 9 farms at the rate of efficiency, but the constraints are much more solid as well.

In the further columns of Table 8, I decreased the efficiency values by 0.1 and presented the cumulated statistical indices to the given categories. The value of DEA efficiency shows the extent of interventions to be made for the best practice. The lower the efficiency value, the more drastic action is to be made. In the case of deterministic DEA, all 32 farms show values above 0.5; moreover, 24 farms – ¾ of dairy farms – have efficiency above 0.8. If the results of stochastic DEA is analysed, we can see that the median value of category for >0.5 is 24, which means that for these 24 farms the chance of having efficiency above 0.5 is 50%. The median of category above 0.8 is 15, so we can expect efficiency above 0.8 at less than half of the number of farms in 2500 runs.

These results are in fully compatible with the consequences drawn at the rate of efficiency, so it can be stated that at present most of the dairy farms (62.5%) in the Northern Great Plain Region have good practice according to the deterministic version of DEA analysis. However, if the risks of inputs and outputs are also considered, it is found that even most of the farms with 100% efficiency can correct a small split of the present balance with difficulties.

Table 8. Some statistical indices of farms in different DEA categories

Unit: number of farms

		y	>0,9	>0,8	>0,7	>0,6	>0,5
Deterministic		20	21	24	28	31	32
Stochastic	MAX	22	24	25	28	31	31
	MIN	7	7	8	8	9	9
	MED	13	14	15	18	22	24
	Mean	13,1	13,9	15,3	17,4	20,8	23,7
	Standard deviation	2,4	2,7	3,0	3,5	3,9	3,3

Source: own calculation

As the next step, the influence of input and output factors was analysed on the efficiency. In the literature it is meant that we analyse the effect of factors with random variable on the forecasted values. The simplest way to do this is to make a regression analysis.

At multiple linear regression calculations, one of the most frequent problems is the narrow observation range. In this case it was not a problem, because 5000 runs provided data of proper quality and quantity.

The other most frequent problem is multicollinearity. In this case, there is a strong correlation between the two factors, stronger than with the dependent variable. In case of multicollinearity, the definition of partial regression coefficients for the given factors is inexact; therefore, one of the two factors of strong correlation must be left out of the model, so the estimation for the other parameter will be exact.

The partial regression coefficients in the regression analysis show the absolute effect of the influencing factors. The measurement unit and the order of magnitude for input and output factors in this DEA model are significantly differ, so it is practical to apply the standardized regression coefficient, the ß-coefficient (EZÉKIEL–FOX, 1970) in the comparison.

The calculation of ß-coefficient:

$$\beta_i = \frac{b_i \cdot S_i}{S_Y} \tag{10.}$$

where
b_i: the partial regression coefficient,
S_i: standard deviation for independent variable i,
S_Y: standard deviation of the dependent variable.

Variables of the regression analysis:
– DEA efficiency (dependent variable)
– independent variable:
  o milk production,
  o milk protein,
  o milk fat,
  o turnover (without subsidy),
  o on-farm grain feed cost,
  o bought-in grain feed cost,
  o on-farm fodder cost,
  o bought-in fodder cost,
  o labour costs,
  o direct costs.

Milk production, milk fat, turnover and direct costs were involved in the model; the other variables were eliminated because of multicollinearity.

Based on beta-weights, milk fat has the greatest effect on DEA efficiency (Table 9). This factor was the most important at 2/3 of the farms. According to the ranks, milk production is on the second place, direct cost is the third and turnover is the last one. Analysing the average beta values, we can see

that on the second and third place, milk production and direct costs change places, which implies that direct cost has smaller influence, but on those farms where its significance is higher, its effect is stronger on DEA efficiency.

Table 9. Effect of beta weights on DEA efficiency rank

Name	Place in ranking				Average beta	Average place
	1	2	3	4		
Milk production	4	8	13	5	1,32	2,63
Milk fat	20	5	3	2	2,87	1,57
Turnover	3	6	7	14	1,15	3,07
Direct cost	3	11	7	9	1,68	2,73

Source: own calculation

If the rank of influencing factors is analysed by farms, it can be stated that beta values are substantially higher at the farms with lower DEA efficiency, so less efficient farms are more sensitive to changes. In Table 10, farms were sorted by their rates of efficiency and the date show that farms with lower efficiency levels have higher beta values: it is concluded that there are weak-medium correlation among them (the correlation coefficient is between 0.5-0.6)

Table 10. Rank of farms by beta values

Farm	Milk production		Milk fat		Turnover		Direct cost		DEA efficiency
	Beta	Rank	Beta	Rank	Beta	Rank	Beta	Rank	
23.	8,294	10	-13,142	22	-6,159	8	10,569	19	4,74%
16.	2,264	21	-5,383	12	0,671	25	1,906	12	5,28%
27.	-0,314	13	-0,432	10	0,462	9	0,29	17	5,44%
29.	3,509	7	-7,191	8	-0,827	23	3,968	11	6,44%
10.	-1,313	23	0	20	5,908	26	-5,003	27	6,66%
30.	1,971	6	-4,882	4	0,868	13	1,47	3	6,92%
24.	1,115	19	-4,269	21	1,502	27	1,053	22	8,08%
22.	1,126	9	-2,609	19	0,851	16	0,248	15	8,96%
21.	0,438	11	-2,46	29	1,221	2	0,32	2	9,14%
4.	1,711	20	-4,247	23	0,359	12	1,72	18	9,40%
17.	-1,239	14	0	18	3,82	21	-3,095	14	9,78%
3.	1,206	27	-3,473	26	1,083	28	0,994	28	9,82%
15.	-0,125	18	-2,696	9	2,341	24	0,311	9	11,20%
14.	0,855	29	-3,708	13	0,317	4	2,013	24	12,36%
18.	2,676	4	-9,307	5	-0,663	18	0,702	10	13,26%
19.	1,614	12	-3,374	29	-0,726	3	2,122	5	16,18%
7.	1,794	3	-5,725	2	-0,859	19	4,362	20	16,26%
26.	-0,182	8	0,097	11	0,136	17	-0,066	8	17,60%
6.	0,566	22	-1,427	24	0,307	22	0,236	21	19,54%
2.	0,672	25	-2,723	15	0,309	7	1,542	23	23,46%
8.	0,823	16	-1,109	14	-0,303	14	0,402	26	52,00%
12.	1,203	1	-2,062	1	-0,46	1	1,309	1	63,26%
9.	1,44	17	-1,915	7	-0,751	5	1,279	16	78,32%
1.	1,337	24	-0,828	17	-1,167	10	0,781	6	98,14%
25.	0,471	28	-2,081	28	-0,907	29	2,55	29	99,26%
31.	-1,13	26	2,196	25	1,272	20	-2,266	25	99,64%
20.	0,642	30	-0,624	27	-0,409	30	0,426	30	99,72%
11.	-0,705	2	0,741	3	0,866	15	-0,888	4	100%
13.	-0,289	5	0,226	6	0,214	11	-0,17	13	100%
28.	-0,011	15	0,108	16	-0,048	6	-0,049	7	100%

Source: own calculation

CONCLUSIONS, RECOMMENDATIONS

According to the deterministic DEA efficiency analysis, almost 2/3 of the examined dairy farms have "good practice". The model analysis shows that those farms are efficient which direct costs (409 thousand HUF/cow on efficient and 620 thousand HUF/cow on non-efficient farms) are much more lower compared to their turnover (541 thousand HUF/cow without subsidy, 667 thousand HUF/cow with subsidy) and produced less milk per cow (5365 kg/cow), but with better quality parameters (milk fat and protein). In cases of the efficient farms, the feed cost was lower (151 thousand HUF/cow) than on the non-efficient ones (193 thousand HUF/cow). If the input and output parameters are considered to be probability variables, risk is then also considered. After 5000 simulation runs, this rate reduces to 1/3, which implies that even half of the efficient farms is quite sensitive to the unfavourable change of conditions. Based on the ß-weights, milk fat is the most important factor among the risk factors, which is followed by milk production, direct cost and turnover. The other involved input and output factors had to be eliminated from the model because of multicollinearity.

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IMPACT OF ECONOMIC GLOBALIZATION ON THE HUMAN TRAFFICKING IN THE GREATER MEKONG SUB-REGION COUNTRIES

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Abstract: This study examines the impact of economic globalization on the human trafficking inflows into the Greater Mekong Sub-region (GMS) countries. The paper empirically tests for a cross-section of six countries, including Cambodia, the Yunnan Province of the People's Republic of China (PRC), Lao People's Democratic Republic (Lao PRD), Myanmar, Thailand, and Vietnam. Employing the Pooled OLS estimator, as the theory predicts, the economic globalization increases trafficking inflow into the GMS. However, only foreign direct investment (FDI) affects the degree of trafficking of persons, while the effect of trade is insignificant. Moreover, Exchange rate, Migration, Population and Democracy induce higher rates of trafficked persons, whereas Gross Domestic Product (GDP) and other factors, such as education, vocational training and micro-finance through village development funds decrease this problem in the region. Gross National Income per capita (GNI per capita) and rule of law do not have any significant effect on human trafficking.

Introduction

In the Great Mekong Sub-region, trafficking in women and children is an established and complicated issue, often intertwined with illegal migration and transnational organized crime. In spite of various governmental and non-governmental efforts to oppose human trafficking, the problem seems to be increasing at a frightening pace (World vision, 2005). The United Nations Office on Drugs and Crime (2006) provided a definition of trafficking in persons as "the recruitment, transportation, harboring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power, or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation" (UNODC, 2006)

This definition recognizes foremostly that trafficking in persons is a gross violation of human rights. The GMS includes Cambodia, the People's Republic of China (PRC, notably the Yunnan Province and the Guangxi Zhuang Autonomous Region), Lao People's Democratic Republic (Lao PRD), Myanmar, Thailand, and Vietnam (Stone et al., 2010), this region is home to more than 260 million people. Once devastating by conflict, the region has become increasingly wealthy, with travel, tourism and trade all growing, despite the injustice of human trafficking remaining. In fact, the changes in political and economic climates, freedom and relative political stability may have made migrants more vulnerable than ever before to modern day slavery. Fast economic growth has brought greater affluence to the region and this economic expansion has created new opportunities for exploitation. The contradiction in wealth between neighboring countries is attractive to those wanting to escape poverty. The disparities between countries provide traffickers opportunities to exploit the vulnerable, who seek to cross porous and increasingly open borders. Collecting accurate statistics is a challenge because of the criminal and underground nature of trafficking and due to different data collection methodologies used by researchers. However, globally, it is estimated that 800,000-2.5 million people are trafficked each year, including some 1.2 million

children. At least 12.3 million people are engaged in exploitative labor practices, including children. In the GMS alone, it is thought that a quarter of a million people are victimized by trafficking each year (World vision, 2005). The Mekong region, compared to many other parts of the world, include very diverse patterns of human trafficking, such as internal and cross-border; highly organized and also small-scale; sex and labor, throughout both formal and informal recruitment mechanisms and involving the victimization of men, women, boys, girls, and families. Therefore, within the GMS, there is not so much a single pattern of trafficking in persons as a range of different forms, with diverse victim and criminal profiles. For example, trafficking victims and families into Thailand from neighboring Lao PDR, Myanmar and Cambodia is done against a background of widespread irregular migration. Traffickers are forced into prostitution, domestic servitude or labor in sweatshops or on fishing boats, construction sites or farms. In addition, there is the trafficking of children from Cambodian or Myanmar border areas or rural Vietnamese or Chinese areas to beg or sell flowers on the streets of larger cities. Also, there is the form of trafficking from rural China, Myanmar, or Vietnam into the interior of China, in order to be forced into marriages which lead to domestic servitude and/or sexual exploitation.

As commerce becomes globalized and borders open, the transfer of people both willing and forced is becoming more widespread. This is in large part due to the phenomenon that human trafficking has become such a profitable and fast-growing criminal activity. Globalization is the development of a significantly integrated global economy, marked especially by free trade, free flow of capital and the cheaper foreign labor markets that transcend nation-state boundaries.[1] In part, globalization spreads practices, values, technology and other human products throughout the globe (Bales, 2005). It must be acknowledged that forms of slavery and human trafficking are not just outcomes of globalization, but rather part of the globalization process itself, which involves a functional integration of dispersed economic activities. To explain this phenomenon, author Kevin Bales offers the example of the victim recruited in Thailand and forcibly trafficked to other states as a sex-slave, who thereby generates income that is in turn recycled back into the Thailand brothel economy.[2] Moreover, globalization fosters interdependence between states for commerce and facilitates the transfer of goods. Comparative advantage in cheap labor and goods in developing countries has played an important role in objectifying and exploiting humans for economic ends. In developing states, where agriculture lifestyles were once the preponderance of income providing activities, nationals are left without an education or the appropriate skills to compete in a developing workforce. To a large scale, the developed countries of the world have become the factories and workshops. A high demand for cheap labor by multinational corporations in developed countries has resulted in the trafficking and exploitation of desperate workers who, in

turn, are subsequently to a lifetime of slave-like conditions.[3] Trafficking still occurs from the Mekong countries to destinations further abroad. For instance, women and girls from Thailand, Cambodia, Myanmar and Vietnam are significantly found in forced prostitution or domestic servitude in Malaysia. Many using formal labor recruitment agencies were expecting to be able to migrate safely and legally, but were deceived and violated at their destinations.

Trafficked Thai women are also found in the sex trade in such countries as Hong Kong, Chinese, Japan, South Africa, the Middle East, and in Western Europe, as well as in the Americas. Western Europe, specially the UK, is reporting increasing numbers of victim cases involving Chinese, Thai and Vietnamese women (World vision, 2005). Therefore, a research problem can be conceptualized concerning how economic globalization is influencing human trafficking in the Great Mekong Sub-region countries.

Methodology/Experimental design

1. Economic globalization and human trafficking

Economic globalization concerns the founding of a series of worldwide exchanges in labor, trade, technology, and capital between countries (Stubbs & Underhill, 1994). Advantages from this phenomenon comprise world economic development, diminishing trade barriers, higher living standards, rapid innovation, spread of technology and management skills, and also new economic opportunities for nations (Head, 1997; Larkin, 1999; Wallach & Sforza, 1999). In its broadest sense, the term contains all types of economic and cultural transfers between nations which comprising domination of the media and widespread by using the World Wide Web. In a narrower sense, it refers to the economic exchange of goods and services internationally and international financial flows. This study concentrates on the economic aspects of globalization, and especially on trade and FDI.

The countries and areas encompassing the Greater Mekong Sub-region together combine a great variety of landscapes, resource bases, ethnic groups and economic and political systems. For example, Thailand has followed free market principles in its pattern of development. Cambodia, Lao, Vietnam and Yunnan are engaged in a transition from mainly planned economies towards more open, free-market systems. Myanmar remains largely isolated from the international community and pursues its special variant of socialist, mainly planned, economics. With the exception of Yunnan, all are members of the Association of Southeast Asian Nations (ASEAN) and all are experiencing, although to various degrees, flows of regional and global investment, trade and labor that warrant the designation of these countries as a separate sub-region in the Asian and global economy (World vision, 2005).

Of course, it may also be that economic globalization has positive impacts. Organized crime has been taking advantage

of fast-moving technological advances, such as the Internet, overall globalization and the freedom of the flow of goods and services, as well as the founding of global markets. The acceleration of the liberalization process of markets, for example, has been at least partly technology-driven, with the rapid development of travel, global networks, electronic commerce and the information economy. It has therefore been easy for people to trade and communicate. Financial activity, services and investments are expanding rapidly. These developments give opportunities for sustained enhancements in economic performance and also raise important new challenges in the form of globalised crime. Economic globalization has absolutely brought countries closer together via technological innovation and the integration of financial markets. The ability to manage trade has become substantially quicker and cheaper and the global financial system, which now operates on a 24-hour basis. The phenomenon has also extended levels of cross-border investment and the transfer of technology, skills and knowledge across countries. Therefore, economic globalization has contributed advantageously to both the legal economy and the illegal economy (Findlay, 2000).

The rapid extension of free markets, driven by liberal economic globalization, has resulted in enormous progress in living standards and lifted millions out of poverty. From an economic outlook, human trafficking raises some interesting facts. Undocumented migrants (some of whom have been trafficked) are fundamental to the economies of many states. In the United States, for instance, some 10 million undocumented migrants account for nearly 10 percent of the low-wage labor force. International remittances from migrants produce gigantic domestic incomes, while relieving the unemployment rates by decreasing domestic labor supply (Cameron, 2008). Other impacts are that market integration has originated substantial economic growth on a global scale, consequence in more jobs, enhanced livelihoods and an overall alleviation in poverty. Furthermore, by bringing larger advantages to individuals and countries already holding physical and human capital, globalization has stressed disparities within and between countries. Among the impacts are expanded urbanization and cross-border migration. The difference between poverty and disparity is an important one. While there is significant empirical research showing that economic growth causes a general lowering of poverty levels, the impacts of growth on disparity are less clear cut. Growth occurs to have supplemented an increase in disparity as poverty diminishes. Moreover, globalization is differentiated by increased focus on competitive markets. Such competitive markets incline to be characterized by significant inequality in incomes and wealth. It is inequality and disparity, coupled with the rise of consumerism that forces poor people into migration, for if the anticipation of better opportunities was not accessible elsewhere, there would be less cause to migrate (Marshall, 2001). Based on these arguments, the following hypothesis has been made:

Measuring Economic Globalization and hypothesis

This paper examines a hypotheses on the linkage between economic globalization and human trafficking on the basis of the literature of Cho (2012): Integrating Equality Globalization, Women's Rights, SON Preference and Human Trafficking. Based on the aforementioned discussion of economic globalization, in this section, we develop a hypothesis on changes as major influencing factors on human trafficking. A conceptual model of two factors is associated with human trafficking; in particular, openness to free trade and FDI are used to measure economic factors. In the following sections, this study examines the associations between human trafficking and these two factors.

Based on the aforementioned discussion of economic globalization, the study addresses economic globalization as being closely linked to the trafficking problem. Especially trade openness is used to measure economic globalization. Rodrigeuz & Rodrik (2000) stated that such openness is the sum of exports and imports of goods and services measured as a share of the GDP (Dreher et al., 2011). The supporting of trade openness had a positive effect on economic liberalization, which forces economic globalization in a given a (Dreher et al, 2011; Rodrigeuz & Rodrik, 2000). Another factor is FDI, Apodaca (2001), Mitchell & McCormick (1988), Poe & Tate (1994), and Rosenau (2003) claimed that economic integration produces economic wealth, the establishment of the rule of law and a higher respect for human rights and (personal) freedom (Dreher et al., 2011). Additionally, Gelleny & McCoy (2001) stated that due to expanded wealth and modernization, global integration leads toward a higher level of political stability, whereby governments are less tempted to impinge on human rights to maintain control (Dreher et al., 2011). Likewise, Richards et al. (2001) maintained that economic globalization forms a "middle-class," having the power to demand (fundamental) human rights and freedom. If countries become entangled in an unexpected war, the probability of receiving FDI decreases, as does the amplitude of such investments (Dreher et al, 2011; Li 2006). Thus, human rights abuses should diminish with a country's level of economic globalization. Since this brings benefits for governments that take part in economic integration (Dreher 2006; Dreher et al., 2011), regimes have an incentive to respect human rights. There are theoretical arguments, as well as empirical evidence, that trade or economic globalization reduces conflict in a country, since the possible loss of trade decreases the willingness to fight (Dreher et al, 2011; Morrow 1999: 48).

Thus, we test the following hypothesis:

H_0: *Economic globalization does not increase human trafficking in the Greater Mekong Sub-region*

2. *Estimation Strategies*

2.1 Scope of the study

One of the biggest challenges of doing research on human trafficking is the scarcity of reliable and comparable data. (Cho et al., 2011) Contained within the data of human trafficking is a clandestine, criminal activity, with those being trafficked and involved in such activities being part of "hidden populations" (Tyldum & Brunovskis, 2005). Thus, the true number of human trafficking victims is unknown (Belser et al., 2005). Among the currently available informational sources, the Incidence Reporting Index developed by the UNODC (2006) is one of the most reliable indicators. Aggregated numbers of incidence reporting from 113 major institutes during the data collection period of 1996-2003 are used here.

The Index covers 161 countries and has an ordinal scale ranging from 0 to 5, with score 0 indicating no (reported) inflow of human trafficking and 5 a very high inflow (Cho et al., 2011). This data covers six countries in the Greater Mekong Sub-region, which also differentiates between the intensity levels of human trafficking inflows. This empirical analysis is based on the UNODC data given that to test the impact of economic globalization on the degree of human trafficking in the Greater Mekong Sub-region.

Furthermore, this study discuss in gender-neutral, referring to individuals, persons and prostitutes in general, rather than female prostitutes because the theoretical arguments, in principle, equally apply to boys and, possibly, men also trafficked into the sex industry and under no illusion that the overwhelming majority of individuals affected by trafficking are in fact girls and women. (Cho et al., 2011)

2.2 Conceptual framework and model

The study uses pooled cross-section, which examine the effect of the incidence of trafficking with economic globalizations. Pooled data consist of 48 annual observations from the six countries between 1996 and 2003. Data is a balanced panel, as there are no missing values. The dataset has a small sample size from the cross-sectional data, thus the model does not include country fixed or random effect. The reason for this is that we would control for unobserved country heterogeneity and the estimation of the random effect is only required and efficient in the case of larger sample sizes. The equation to test our hypothesis is as follows:

$$Y = \alpha_1 + \alpha_2 EG_i + \alpha_3 Z_i + u_i \qquad (Eq.1)$$

From Eq.1:
Y   defines as the incidence of trafficking inflows
EG_i denotes as Economic globalization (main variables)
Z_i is a vector including control variables
u_i is the idiosyncratic error term
From the cross-sectional data, the model does not include country fixed effect and period fixed effect since this cannot handle unobserved country heterogeneity. The dependent variable (Y) has an ordinal structure ranging from 0 to 5 (0

being no reported trafficking flows, 5 being very high), taken from UNODC Incidence Reporting Index, 2006. The main independent variables (EG_i) are Trade openness (the ratio of imports and exports to GDP) and foreign direct investment (FDI, net inflows) due to increasing of FDI, which can indicate of a growing economic globalization. Both factors are the most commonly used indicators (Cho, 2012; de Soysa & Vadlamannati, 2010; WIKI, 2011). The control variables (Z_i) are the proposal measures for the most significant determinants of trafficking flow according to the literature (Akee et al., 2010; Cho et al., 2011). The variables include the (log) GDP and (log) population size from WDI 2011, as richer and more populous countries should experience higher flows. National income per person (GNI per capita) from WDI 2011 reflects the average income of a country's citizens (WIKI, 2011). Rule of law is taken from the World Bank Governance Indicators (WGI) (Kaufmann et al., 2009). It ranges between -2.5 and 2.5. Higher values mean better outcomes or reduced number of victims because the trafficker has a higher risk of prosecution. Index indicating democracy is taken from Cheibub et al. (2010). The dummy is coded as 1 if the country is democratic and 0 otherwise, because countries with more open borders increase the risk for trafficking. The (log) international migration is also a factor since potential victims might be attracted by the existence of pre-existing migrant networks in a country (Mahmoud & Trebesch 2010). Data are taken from WDI (2011) and are only available from 1990 to 2005. Exchange rate is also included in the model, as it coincides with the success in the sex trade (Ouyenoru).

Results and Discussion

Table 1: The result of the incidence of human trafficking inflows in the GMS between 1996 and 2003

Variables	Pooled OLS	
[log]FDI	**0.048***	**[3.608]**
Trade	0.0004	[0.712]
Exchange rate	**2.38****	**[6.283]**
[log]GDP	**-0.204****	**[-4.987]**
GNI per capita (Income)	7.17	[2.256]
[log]Migration	**0.28****	**[6.269]**
[log]Population	**0.404****	**[6.603]**
Rule of law	-0.008	[-0.588]
Democracy	**1.622****	**[46.742]**
Other variables	**-3.552****	**[-8.794]**
R²: 0.998457	**Adjusted R²: 0.9981**	
F-statistic: 2732.628	**Prob[F-statistic]: 0.000**	

Note: t-statistics are in parentheses;
*: significant effect at 10% level;
** : significant effect at 1% level

Table 1 presents the result of the incident trafficking inflows. According to the F-test, our null hypothesis can be rejected, which means that the economic globalization increase trafficking inflows into GMS. However, FDI has a positive effect with conventional level of significance, while the effect of trade is insignificant. On the control variables, some of the economic factors have a significant effect, including Exchange rate, International Migration, Population, Democracy, GDP and other variables. All these factors are statistically significant at the one percent level, except FDI, which is only significant factor at the ten percent level. All factors (except GDP and other variables) increase the trafficking inflow. However, GDP and the other variables decrease the degree of human trafficking, while GNI per capita and rule of law do not have any significant effect.

Empirical Findings

The determinations so far point to the degree of trafficking inflows in the GMS, but cannot control unobserved country heterogeneity. Our results show that economic globalization is associated with a higher degree of trafficking victims, however a cross-sectional analysis cannot give the specific globalization factors that would increase trafficking. For providing better evidence of the influential factors of our model that captures a causal effect instead of a spurious effect (Cho et al., 2011), we also examined brief country case studies of the GMS. Economic globalization factors have an increasing influence on trafficking. Open trading and improved infrastructure have some benefits, such as poverty reduction, and generate greater market opportunities, but the facility has 1}eased to increase victims through the transfer of people, capital and business. Trade and similar migration also concern the movement of labor because traded goods comprise labor inputs. Growth in trade has played a great part in stimulating growth in the GMS since the beginning of the 1990s, and export has a significant role in the region's recovery after the Asian financial crisis, which occurred between 1997 and 1998. Trade has increased through the region and FDI flows have also extended throughout the last 2 decades. The early signs of trading are the appeared investment nexuses by which trade not only promotes investment, but alternately FDI boosts trade. For example, In the Lao PDR, FDI in agriculture and forestry projects has conducted increasingly to export growth, whilst FDI in the garment manufactures has encouraged Cambodia's footwear and clothing exports. These are instances of a pure circle 1}including trade and investment that associated with economic growth. We have to mention that this is a continuously spreading process at the macro level and is already occurring naturally in the portion of procedure of economic growth. This is evident in the diminishing share of agriculture and the corresponding rises in manufacturing and services (Menon & Melendez, 2011). Cross-border movement of labor (cross-border trade) over the GMS has been so dynamic that there is no sub-regional

governing or convention to ease it. Regional income disparities within Thailand had aggravated results from a decade on economic boom that was focused mainly in the Bangkok metropolitan area and the Eastern Seaboard. The concentration of growth forced people to move from rural to urban areas. Moreover, developments in the roads and infrastructure connecting the GMS in the economic special zone namely, east-west corridor in Savannakhet and along the R3 road (Luang Namtha – Bokeo province) are the crucial movers of cross-border labor mobility into Thailand. The Laotian economy is dependent on both investment and trade with its neighbors, such as Thailand, Vietnam, and particularly China in the north. Thus, these changes have led to increases in migration and related human trafficking. Large cities and other provinces; national and international highways, especially Vientiane, Savannakhet and Champasak, serve as transit points for trafficking move through into Thailand. An estimated 20,000 Lao enter Thailand annually (TIP, 2001). The opening border for the Vietnamese has meant expanding chances to migrate to China; especially women have crossed the China-Vietnam border to seek opportunities for marriage or an occupation. Because of the enhancement of roads, open border policies and especially the rapid increase of cross-border trade and tourism, it has now appeared in all provinces, and especially in the deltas of the Red and Mekong rivers. Since the late 1990s, the opening of the border, while helping economic exchange, exposed populations from both sides to economic and social opportunities, which comprise the risks of trafficking. The country is a source, transit and destination for victim trafficking. The exact scope of the problem is hardly known (because the illicit nature of trafficking and the problems with identifying the components of trafficking), official estimates show that thousands of women and girls have been victims sent to other countries, such as Cambodia, China, Australia, and as far as Europe and North America. Due to its proximity to China, in facilitating transportation and cross-border trade, the Quang Ninh and Lao Cai provinces in Vietnam have been important sources and transit provinces for international migration to China in the past few years. Mong Cai is also one of the Vietnamese border towns where the flow of goods and capital, as well as cross-border movements of people associated with human trafficking is seen. The trading routes between Burma and Thailand is Mya Maung stresses, 1}this certainly explains the routes and trading points that allowed black markets to advance along the Sino-Thai-Indo-Burmese borders. The most active illicit border trade between Burma and Thailand appeared and still occurs in three points: Mae Sai, Mae Sot, and Ranong, all which are associated with sex and labor trafficking (Maung, 1991). Recent ILO research in the Thai border town of Mae Sot faced with the difficulty of Myanmarese migrant child labor in factories exposed that 77.3% of workers were girls and 30% of the children were exploited as child workers living at the factory (World Vision, 2009). There are no reliable statistics available on the total number of trafficked persons; however, most observers believe the number of

trafficking is at least several thousand per year (TIP, 2001). The global stock of victims is estimated 800,000 to 2.5 million people that are victims of trafficking each year, containing some 1.2 million children. At least 12.3 million people are involved in exploitative labor practices, comprising children. In the GMS alone, probably a quarter of a million people are victimized by human trafficking each year (World vision, 2005). This figure is consistent with the results of a quantitative analysis which determined that the economic globalization leads to increasing inflows of human trafficking. With respect to control variables; FDI, Population, Exchange rate, International Migration and Democracy induce trafficking victims to migrate to the GMS. The evidence is lacking to reveal the negative impact of FDI on trafficking in the Mekong sub-region. However, the UNIAP (2010b) claimed that FDI sanctions in Myanmar led to factory closures in Hlaing Tharyar, Htaukkyant, Hlawgar and the Shwepyithar Industrial Zones. Many female workers became unemployed and confronted with the burden of providing for themselves and their families, which means that they are vulnerable targets for traffickers (UNIAP, 2010b). Trafficking causes a demographic imbalance, which leads to differences in sex ratios between neighboring countries. For example, the population of Vietnamese women has increased more than that of men; meanwhile, the situation is the opposite in rural China. These gender imbalances has important and long-term connotations. Gender imbalance is one of the trafficking risk causes in Yunnan. The uneven in the sex ratio has proceeded to enlarge since the 1980s, the number of males per 100 females at birth was 117 in the fifth census in 2000 (Le Bach Duong et al., 2005). Victims who are forced into marriage may be vulnerable because they usually do not know the language and are not versed in their new culture. Guang Xi and Yunnan have the highest gender imbalances within China, these provinces sharing a border with Vietnam. Migration for marriage is increasing quickly, as Vietnamese women are marrying men from China, the Republic of Korea and also Taiwan Province of China. Around 60,000 trafficked women married men from the Taiwan Province of China in 2001. The fast expansion in work and marriage associated migration flows within Asia has been supplemented by a thriving trafficking market, especially the trafficking of women and children from Vietnam for marriage or labor and often for entertainment and sexual purposes (Le Bach Duong et al., 2005). Regarding the Exchange rate, the most noticeable of the experience opportunities in the destination countries are foreign exchange earnings. Most migrant workers come to Thailand to search for better careers and have better lives than in their home countries. The majority gain more money or earn hard currencies. Pearson (2005) revealed that, for example, a shrimp peeler has saved 100,000 kyat (4,000 baht) and sent the money home. Nonetheless, not everyone is so lucky. Some people end up being exploited or become HIV positive. Everyday life and economic gain in Thailand are not easy for all migrant workers. Some workers have to work as animals. They have to escape to avoid arrest

due to their lack of a work permit. Additionally, some of them work very hard but do not earn enough money to make a living or even get diseases. International migration - particularly unauthorized migration - is a main problem for administration. The higher purchasing power and the more vigorous economies of Thailand create a demand for labor, alluring migrants from their poorer neighbors. There is a growing demand for cheap sexual and labor services. Thus, there is a violent irregular migration in the GMS for sex trafficking. Some countries in the GMS, i.e. Thailand and Cambodia, have been utilized as transit points for the human trafficking of migrants to other countries. Thailand is the main receiving country for migrants in the GMS, hosting around 2-4 million migrants. Cambodia and the Yunnan Province of China are hosts to huge migrant populations. Accurate data involving the number of migrants in the region is hard to obtain, as many migrants are long term residents in their host countries and most migration occurs through informal channels. Several studies about the living and working conditions of undocumented migrants have revealed a high incidence of violence, generally seen in retained passports, type of work, deception about wages, physical restriction, inferior working conditions and also threats of being reported to the authorities (Huguet, 2011). Such examples of Cambodian illegal migrants are increasing in number; some of them confront forced and abusive situations that consist of sexual and labor exploitation. Some people are also trafficked victims. According to the UNIAP (2010a), every year thousands of Cambodians are victims in Thailand. Men are forced to work on fishing boats or as construction workers. Women are abused by the entertainment industry, consisting largely of work in prostitution. Marshall (2001) showed that Cambodian children are being trafficked as beggars and flower vendors in Thailand. Cambodia is a destination country for labor and other types of migrants, some of whom came from Vietnam and China. In 2002, the Government of Cambodia exposed at least 70,000 irregularly registered Vietnamese (IOM, 2008). Many women are worked in the sex industry, such as in massage parlors and dance halls. Labor migration is characterized best by the international migration from the Lao PDR. The main destination country is Thailand; Lao women migrate and work with unofficial statuses, thereby increasing theirpro-bability of being forced into undesired and illegal activities, abuse and being trafficked (IOM, 2008). Concerning Democ-racy, the Cambodian[4] regime is a constitutional monarchy with an elected government, but people are dominated by the government through for example limitations in the freedom of speech. Lao PDR[5] is an authoritarian one party state ruled by the Lao People's Revolutionary Party. Its government does not respect the rights onf freedom of speech, assembly or association of its citizens. Myanmar[6] is ruled by a highly authoritarian military. All Burmese citizens suffer under a regime that restricts the freedom of speech, worker rights and promotes forced labor. Thailand struggles to grow as a democratic country. Unless Thailand recognizes the inequitable rights of stateless people as human beings it will

not grow as a democratic country. The Government in Vietnam[7] is a one party state in which citizens cannot change their government. The right of citizens' is limited, as they cannot assemble or arrange movements and there is also a restriction on workers' rights. Finally, in Yunnan Province,[8] the government continues to refuse to allow basic democratic rights, such as the freedom of speech. In short, trafficking still appears and the regimes in the GMS would seem unwilling to fight against it. On the other hand, the governments do not fully comply with the minimum standards for the elimination of these problems, either[9].Conversely, while GDP reduces human trafficking inflow, there is no data to support the linkage between the effect of GDP and the declining inflow into the GMS. Other factors decrease this problem, such as education of children, to increase skills and public health knowledge, thus giving them the ability to prevent themselves from being tricked by a trafficker. Indeed, education could serve as a key means of fighting trafficking in the future. The Women's Federation has developed brochures on trafficking prevention, safe migration and distributed handbooks for improving the vocational skills of girls and community members. Micro-finance through a Village Development Funds project also helps to relieve poverty and can be used to reduce the vulnerability of young persons to being abused. This would help people to start, expand and purchase supplies for local businesses (ILO, 2008).

Conclusion

The paper examines how economic globalization affects human trafficking in the Great Mekong Sub-Region. This hypothesis is tested by employing pooled data from six countries for the period 1996-2003. Using the Pooled OLS method, as the theory predicts, economic globalization increases trafficked flow into GMS. However, while FDI has an influence on trafficking, trade does not have any significant effect. Economic factors such as Exchange rate, Democracy, Migration, Population induce more traffic flow. In contrast, GDP and other variables such as education, micro-finance through a village development fund and vocational training decrease the flow of victims into the region, while GNI per capita and the rule of law do not have any significant effect. Further research could investigate and reveal more economic indicators from the social globalization dimension in the current period, to illustrate the new incidents of human trafficking inflow into the Great Mekong Sub-Region.

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MEMBERS OF A SUPPLY CHAIN AND THEIR RELATIONSHIPS

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Abstract: Today, companies do not compete individually on the market, but as members of a supply chain, delivering their goods or services to customers through shared collaboration. The main objective of the members in the chain is to satisfy customer needs, in the interest of which they cooperate in value adding processes. The main objective of the present study is to characterise the members of a supply chain, their relationship and to measure performance. The most relevant literature published on this topic states that investigation of the performance measurement in supply chains from the side of relationships is considered 'uncharted territory'. However, the operation of a supply chain cannot be described without investigating its relationships.

Keywords: supply chain, business relationship, performance measurement, relationship indicator

Introduction

Today, business units do not compete with each other individually on the market, but as members of a supply chain, delivering the goods or service to their consumers in joint collaboration. Participants cooperate in the process of purchasing, production and selling; their mutual interest is to satisfy consumer demand, thus all the basic material and spare parts producers, product assemblers, processing units, wholesalers and retailers are parts of a chain, if they collaborate in and coordinate these processes. This collaborated supply chain view of companies is a business philosophy founded on trust, commitment, cooperation, mutual objectives and executive managerial support, as well as the acceptance and understanding of mutual dependence. The business relationship among the players defines the performance of the supply chain; therefore, particular attention should be paid to the examination of this element when the overall performance of a chain is being evaluated.

2. Methodology

In the focus of this paper, I concentrate on a supply chain and on the business relationships formed by its members. In order to properly define the supply chain, we mostly find studies. I start this paper by reviewing the most relevant literature in this subject, such as Jones and Riley (1985), Cooper (1997), Harland (1996), La Londe and Masters (1994), Mentzer and co-authors (2001), Attila Chikán (1997), Adrienn Molnár (2011), Andrea Gelei (2003), Judit Nagy (2008), József Popp (2009), Péter Lőrincz (2008) and Péter Németh (2009).

My study begins with the definition of terminology, such as supply chain and supply chain management. As there is no commonly agreed definition, I describe the definitions which provide the most complex view of a supply chain and its operation. After the definition of supply chain, I will clarify the members of the chain and the potential types of a chain. I will illustrate the power relations among the members and I will also present several indicators to explain the relationships among them.

One of the objectives of my paper is to compile a bibliographic summary of the accessible papers which generally define a supply chain, the types of supply chain and their key players, based on the existing definitions. It is also my aim to highlight the importance such shortage areas, as performance measurement, from the side of the relationships.

3. Results

In the 1980s, the definition of a supply chain meant the same as the synchronisation of a company's internal processes, such as purchasing, producing, sales and distribution. With the integration of these activities, companies facilitated the smooth operation of their internal processes and utilised their benefits. Together with the extension of the coordinated operations within a company, today we can also speak about processes which reach beyond the boundaries of a company. As this approach broadens, inter-company cooperation extends from the manufacturer of raw materials to the actual consumer. In this way, all the members of the chain are able to face ever-changing market challenges.

The supply chain and supply chain management are not unknown terms in the subject of logistics. According to Jones

and Riley (1985), the "*supply chain management deals with the total flow of materials from suppliers through end users...*". La Londe and Masters made the following statement in 1994: "*two or more firms in a supply chain entering into a long-term agreement;…the development of trust and commitment to the relationship;…the integration of logistics activities involving the sharing of demand and sales data;..the potential for a shift in the locus of control the logistics process*". The members of the supply chain take part in the purchasing, production and in the process of delivery of goods or services to the customers (Harland, 1996). Cooper et al. (1997) defined supply chain management in the following way: "*…an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user*". According to Lambert et al. (1998), the members of the supply chain take mutual part in the production and market distribution of the goods and services during their cooperation. In contradiction to Lalond and Masters' definition, Mentzer et al.(2001) describe supply chain as the cooperation of three members: "*supply chain is the group of three or more companies or individuals, who are directly involved in the inward and outward stream of all products, services, cash, information from the purchasing to the customer*".

Chikán (1997) described the supply chain as a series of value adding processes which flows across many companies and creates products and services which are suitable to fulfil the needs of customers. Gelei (2003) formulated supply chain management as a conscious treatment aiming to improve the competence of the companies within the supply chain. Felföldi (2007) stated that "to develop a successful competitive strategy, it is vital …to reveal the operation of the whole chain…and always essential to plan and calculate."

On the basis of the discussion above, it can be concluded that the condition for the establishment a supply chain is based on the collaboration of two or more companies. The basis of cooperation is trust and commitment, which needs to be improved continuously by all members. They must accept their mutual dependence and share available information with each other. Members seek to establish a long term relationship, during which all members will also try to achieve their own goals. The main objective of the members of a supply chain is to satisfy customer demands, in the interest of which they cooperate with each other. Their mutual interest is the success of the entire supply chain, as being part of a successful supply chain may provide competitive advantage for its members. As today supply chains are competing with each other on the market, companies may become dominant through their supply chain. They can utilise their sources, information and/or knowledge of a market and their social capital in a more efficient way. A company joining a supply chain will also get access to information relating to the areas of production, management and logistics. It can acquire technological advantage against an external company, as its members can share any assets needed for production or service.

As in every cooperative effort, a hierarchical order may develop within a supply chain. The central company can get to a power dominance against the other companies, which can be also due to its market position, capital power and brand knowledge (Lőrincz, 2008).

At least two business enterprises must belong to a supply chain. In order to find the length of a supply chain, all members must be counted. The more members are found, the longer the supply chain is, but it is definitely short if the producer sells directly its product or services to the customers. Three types of supply chain can be differentiated in view of the number of its members, as illustrated by the figure of Mentzer (2011).

A **direct supply chain** belongs to the simplest forms, where only the supplier, the central company and the customer take part in the product flow (Nagy, 2008).

Figure 1: Direct supply chain of Mentzer (2001)

"The extended supply chain includes the supplier of the direct supplier and the customer of the direct customer as well, thus comprehending in- and/or outflows of the products, services, monetary assets and/or information"

Figure 2: Extended supply chain of Mentzer (2001)

(Nagy, 2008).

The **ultimate supply chain** involves all the members, who take part in the flow of all goods, services, information and capital from the first supplier to the end customer. Similar to the traditional supply chain, the ultimate supply chain consists of a central company, suppliers and customers, but in this case, the ultimate supplier and ultimate customer appears, as well. Another additional participant is the **logistics supplier**, which is in contact with the customer and the central company. Its task is the delivery, distribution and the planning of all related logistics tasks.

The next participant is the **financial provider**, which supports the operation of the central company and the supplier with payment related and credit lending services. The participants of the supply chain conduct **market surveys** in order to gather useful information on the demands and on the feedback of customers. Today, we can say that companies which do not use market surveys are operating "blind". By understanding the ultimate supplier and ultimate customer, it becomes possible to track and properly manage all the
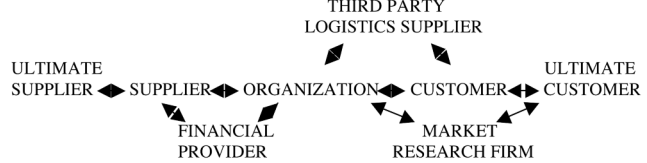

Figure 3: The figure of Mentzer(2001); simplified.

processes of a supply chain (Nagy, 2008).

The effectiveness of chains can be assessed by measuring performance, which means the numerical expression of the efficiency of processes in a chain. This measurement gives the players in the chain a direction and provides a comprehensive picture about the areas where more opportunities lie and where problems might occur. Performance measurement is mostly approached from a performance side and the significance of relationships among supply chain players is disregarded.

A supply chain is a node where the nodes are the business units. The relationships can be defined as the connecting strings among the nodes. Relationship among members determines the nature of the supply chain (Gelei 2010). "The relationship among supply chain members has an effect on the performance of the supply chain" (Cooper at. al, 1997) and "the critical factor of supply chain performance is the nature of relationships in the supply chain" (Seakman et al, 1998). Players of a well functioning supply chain could achieve competitive advantage in the market, as all members share any available information. Socio-cultural bonds, such as trust and commitment, are established. They pay attention to the fact that their decisions could also affect other players of the chain into consideration. They contribute to each others' profitability and aspire to gain mutually shared advantages.

The **performance measurement** of a supply chain means the quantification of the efficiency and effectiveness in the internal processes of the chain. Molnár-Felföldi-Gellynck (2007) discussed weaknesses of those frameworks used to measure supply chain performance, while highlighting the neglect of the fruit and vegetable sector as an important area of the agri-food sector requiring analysis from this aspect. Performance measurement shows the participants of the chain where their business is heading and provides a comprehensive picture of areas with more potential, as well as problematic areas. This measurement can be conducted from the **performance side**, for which there are plenty of economic indicators or from **relationship side**, which has not been fully discovered yet, although it is understood, that "the relationship among the chain members impacts the performance of the chain" (Cooper at. al, 1997). Molnár-Felföldi-Gellynck (2007) stated that measuring and interpreting supply chain performance with an approach leaving out the factor of relationship might lead to misunderstanding the operation of supply chains. The strong, positive relationship among the members is essential because members are able to take a competitive advantage of their market on this basis.

According to Molnár (2010), for the relationship measurement, there are several relationship indicators available, such as trust, economic satisfaction, social satisfaction, dependency, non-coercive power, coercive power, reputation and conflict. These listed indicators are less quantitative then the economic indicators. The members of a chain must evaluate the statements aligned to an indicator on an ordinal scale, thus giving us the answer whether it falls into the completely disagree or the completely agree categories. The information on how players keep their promises to each other explains the scale of **trust** within a chain. **Economic satisfaction** describes how the business relationship with the suppliers/customers contributes to the profitability of the company, while **social satisfaction** explains the level of detail to which the suppliers/customers share information with a company. **Dependency** shows how the company is dependent on the abilities and resources of its suppliers/customers. The fact that suppliers/customers prefer the partner company in cases of mutual satisfaction could be defined as **non-coercive power**. **Coercive power** reflects the scale of how sure a company can be that its suppliers/customers will not retaliate if the business partner does not accept their proposals. **Reputation** gives information on the precision and professionalism of suppliers/customers; on the other hand, **conflict** provides cases when suppliers/customers are not aligned in their decisions with a partner company. These listed indicators provide a comprehensive picture of the relationship of the suppliers/customers and the partner company and, therefore, also on the performance of a company (Molnár, 2010).

Conclusions

My description of a supply chain is based on the observations of La Monde and Attila Chikán. Therefore, I define a supply chain as the processes of cooperating companies that are aimed at creating value based on the existence and development of trust.

The significance of supply chains is becoming more obvious, as it can be observed currently that companies can operate most efficiently as players in a chain. Players in cooperation with each other have recognised that it is also worth establishing a good relationship with other players of their chains, since this could result in competitive advantage against competitors and ensure mutual advantages. Since the nature of connections determines the performance of a chain, it is worthwhile and justifiable to examine performance from the relationship side. Although it could still be seen as an area requiring further study, the relationship has to be included as a vital part of measuring performance, since a complete picture of supply chain operation cannot be gained without examining indicators on its members' connections.

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WELLNESS HABITS OF HUNGARIAN YOUTH

Éva Kozmáné Csirmaz

Szerző munkahelye???????

Abstract: A health conscious person might contribute to the preservation of her health and to the prevention of illnesses by her lifestyle, health conscious nutrition and regular exercise. Wellness helps to reach these goals with its complex services aimed at both the improvement of one's physical state, stamina and maintenance of mental agility. The intention to develop a health conscious lifestyle is perceptible in the ever increasing demand..

Keywords: wellness, health tourism, prevention

Literature

There is no single agreed upon definition of wellness. The following definition is offered as an example that encompasses elements of a majority of other existing definitions. Wellness is the optimal state of health of individuals and groups. The two focal concerns are realization of the fullest potential of an individual physically, psychologically, socially, spiritually and economically, and the fulfillment of an individual's role expectations in the family, community, place of worship, workplace and other settings.[1]

Historically, "wellness" conceptually arose from the "mind-cure movement" in the United States in the late 19th century.[2] Wellness at that point in time was primarily viewed from the perspective that physical health was a product of one's mental and spiritual state of being.

Over time, the definition of what it means to be "well" has expanded and now has variable meanings that are contextually specific. For example, in Europe, the term "wellness"has traditionally been associated with feelings of pleasure, and the therapeutic benefits of spa-type and alternative health treatments.[2] In the North American context, "wellness" is more likely to be associated with health and strategies to promote health such as active living, healthy eating, stress reduction and spiritual fulfillment. The Lalonde Report[3] (1981) initiated a Canadian focus on wellness promotion that builds on this North American usage of the term by noting that complete well-being for all may be beyond our grasp, given the human condition, but much more can be done to increase freedom from disease and disability, as well as to promote a state of well-being sufficient to perform at adequate levels of physical, mental and social activity, taking age into account.[4]

The goal of wellness tourism is to preserve health: in their free time, healthy people purchase tourist service packages with medical elements that are financed by themselves or by complementary private insurance sources. The providers of wellness services offer complex prevention and health promotion programs in an entertaining way and in an attractive environment for the customers, while giving them the opportunity to obtain knowledge about a healthy lifestyle. It is important for the customers of wellness tourism to attain and preserve health in its complex, comprehensive meaning, i.e. to obtain the balance between the mental, physical and biological aspects of health.[5]

In the last decades, sound changes have occurred and related new trends have emerged in the international demand and supply conditions of health tourism. In addition to forms of medical and thermal tourism which were considered to be traditional, wellness and fitness services appeared in the Nineties and gained growing popularity among consumers.[6]

Significant differences can often be observed between the consumers of traditional medical tourism and those of wellness tourism. These differences can be found in demographic, sociocultural and economic characteristics, as well as in the motivations and expectations towards the service of the health tourism providers. In the case of demand for health tourism services the need for higher quality has become obvious. The requirements concerning quality cover all elements of the service purchased, i.e. the state of the physical environment, the human factors, the efficiency of the specific medical tourism services, of the

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[1] http://education.alberta.ca/media/1113116/wellness_lit.pdf
[2] http://www.fhjoanneum.at/global/show_document.asp?id=aaaaaaaaaabdjus&downloa1
[3] Marc Lalonde, Canadian Minister of Health and Welfare
[4] http://www.hc-sc.gc.ca/ hcs-sss/com/fed/lalonde_e.html
[5] www.nfu.hu/download/15665/OES.pdf
[6] Kiss, K.- Török, P. 2001, Rátz, T. 2004

treatments and of the methods and the development of the equipments used.[7]

- Participants of wellness tourism require the service providers to offer a wide range of services promoting the balance between the body, the soul and the mind.
- Increased need for personalised services and personal care is prevalent concerning both the customers of the services of medical tourism and that of wellness tourism.
- The demand for diversity shows a rising trend in wellness establishments, which covers not only the range of services, but also the development of the premises (spaces furnished in oriental, natural or modern style) and the gastronomic offerings (international, domestic and special wellness cuisine).
- One of the most important trends on the market of health (primarily wellness) tourism is that customers increasingly look for all-inclusive services. They intend to enjoy the basic tourism services (accommodation and food), the full range of wellness and spa services, other services related to healthy nutrition, lifestyle consultancy, health state assessment, spiritual courses or community programmes in one place.[8]

Methods

The questionnaire survey was carried out in order to explore the wellness habits of the 18–25 age group. In the frame of the survey, 472 students were questioned according to the random sampling method.[9] When assessing the outcomes of the survey, I applied the statistical methods below.

Analysis of the rentability of the survey (defining Cronbach's Alfa)

The reliability of measurement scales is characterised by the precision of their measurement, i.e. how precisely and errorless a given scale is able to measure the phenomenon of whose measurement it was designed for.[10]

Frequency Tables

Evidently, one primarily wishes to see the distribution of the analysed data and variables. In cases of variables assessed on nominal and ordinal scales, frequency distributions can be applied as single-variable analysis. It can be observed, for example, what the share of men and women is among those questioned or what the distribution of the opinion related responses is according to the different categories. Distributions can be expressed as a percentage.

Cross tabulation analysis, Chi-square test

Cross tabulation analysis is suitable for exploring the association among nominal or ordinal variables. Data are displayed in the form of categorical or categorized metric variables. In fact when cross tabulation analysis is carried out two frequency distributions are analysed together.

Correlation analysis

The strength of the association (linear relationship) between two continuous variables is measured by the correlation coefficient. The association between the variables is called correlation. The value of the correlation coefficient (r) varies between -1 and +1. The closer its absolute value is to 1, the stronger the association is between the variables. The closer it is to 0, the weaker the association is.

Description of the sample

According to the analysis of the reliability of the questionnaire, it can be stated that the items constituting the scale suited the sub-objectives of the analysis and met the requirements: i.e. the items constituting the scale measure similar things (Cronbach-Alfa (1) = 0.71; Cronbach-Alfa (2) = 0.84; Cronbach-Alfa (3) = 0.79). There were 169 men (35.8%) and 299 women (63.6%) from among the total 472 questioned. There were 4 unknown data in the sample (0.8%).

459 (97.7%) of the 472 answered the age question. The youngest respondent was 17; the oldest was 39 years old. The mean age of the respondents was 20 years, with a deviation of 1.816. The majority of the respondents were 20 years old (33.3%), the rate of the respondents aged 18-19 years was also significant (18 years old: 12.1%; 19 years old: 29.6%); thus almost three fourth of the respondents were in the 18-20 age group.

1. What do you do to preserve your health?

To answer the question "*What do you do to preserve your health*" (hereinafter: the respondents were asked to choose the most characteristic answer from a total of 5 given possibilities. The possible answers: (1) regular exercise, (2) healthy nutrition, (3) stress relief, (4) massage, (5) other.

Table 1 contains the frequency of the answers given to the question *"What do you do to preserve your health"*.

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[7] Rátz T. 2004

[8] http://www.pannontermal.hu/_userfiles/Online_GYSZR/Strategiak_szakmai_anyagok/ nemzeti_strategiak/A_wellness_regiospecifikus_jellemzoi-kutatas.pdf

[9] The number of participants is equal to 16.9% of the total number of the full-time students of the AGTC on 15 October 2010.

[10] Polit and Hungler, 1995

Table 1: Frequency of the answers given to the question "What do you do to preserve your health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Regular excercise	201	42.8	43.5	43.5
	Healthy nutrition	130	27.7	28.1	71.6
	Stress relief	47	10.0	10.2	81.8
	Massage	22	4.7	4.8	86.6
	Other	62	13.2	13.4	100.0
	Total	462	98.3	100.0	
Missing	System	8	1.7		
Total		470	100.0		

42.8% of the respondents chose *regular exercise*, 28.1% marked *healthy nutrition*, 13.4% put a ring around the *other* answer option, 10.2% chose the *stress relief* and 4.8% chose the *massage*.

Table 2 is the cross-table of the answers given to the question *"What do you do to preserve your health"* according to gender.

– 56.0% of the men questioned chose *regular exercise*, 18.1% marked *healthy nutrition*, 10.2% put a ring around the *other* answer option, 11.4% chose *stress relief* and 4.2% chose *massage*.

– 36.5% of the women marked *regular exercise*, 33.8% chose *healthy nutrition*, 15.2% chose the *other* option, 9.5% marked *stress relief* and 5.1% marked *massage*.

Significant differences between the genders based on the answers are summarized in Table 3. There were no differences in the case of two answers, namely *stress relief* and *massage*. Nevertheless, regular exercise is significantly more notable in the case of men and healthy nutrition in the case of women.

Table 2: Cross-table of the answers given to the question "What do you do to preserve your health" by gender

Gender of the respondent * What do you do to preserve your health ? Crosstabulation

			What do you do to preserve your health?					
			Regular exercises	Healthy nutrition	Stress relief	Massage	Other	Total
Gender of the respondent	male	Count	93	30	19	7	17	166
		% within Gender of the respondent	56.0%	18.1%	11.4%	4.2%	10.2%	100.0%
		% within What do you do to preserve your health ?	46.3%	23.1%	40.4%	31.8%	27.4%	35.9%
		% of Total	20.1%	6.5%	4.1%	1.5%	3.7%	35.9%
	female	Count	108	100	28	15	45	296
		% within Gender of the respondent	36.5%	33.8%	9.5%	5.1%	15.2%	100.0%
		% within What do you do to preserve your health ?	53.7%	76.9%	59.6%	68.2%	72.6%	64.1%
		% of Total	23.4%	21.6%	6.1%	3.2%	9.7%	64.1%
Total		Count	201	130	47	22	62	462
		% within Gender of the respondent	43.5%	28.1%	10.2%	4.8%	13.4%	100.0%
		% within What do you do to preserve your health ?	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	43.5%	28.1%	10.2%	4.8%	13.4%	100.0%

Table 3: Significant differences between the genders concerning the question: **"What do you do to preserve your health"**

Answer	**Men**	**Women**
Regular exercise	*	
Healthy nutrition		*
Stress relief	no significant difference	
Massage	no significant difference	

* shows for which gender a given sport activity is significantly more characteristic

There is significant difference between the genders concerning the answers given to the question *"What do you do to preserve your health"* (Pearson's Chi-square: 15.541; df=4; p<0.05). To preserve their health, men prefer doing exercise regularly, while in the case of women both healthy nutrition and regular exercise play similarly important role in preserving health.

2. Do you use wellness-therapeutic services regularly?

To answer the question "*Do you use wellness-therapeutic services regularly*" (hereinafter: kerdes_2) the respondents were asked to choose one out of 3 given answers. The answers:
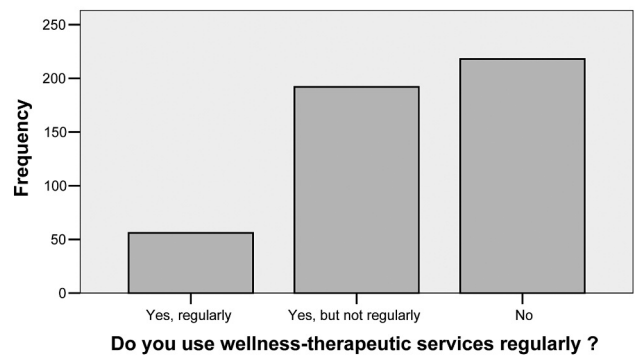

Figure1 Frequency graph of the answers given to the question "Do you use wellness-therapeutic services regularly"

(1) yes, regularly, (2) yes, but not regularly, (3) no. I received 466 answers that were appreciable, so 98.7% of the sample answered this question. 46.8% of the respondents do not use wellness-therapeutic services, 41.2% use them, but not regularly and 12% use such services regularly.

Figure 1 demonstrates the frequency data of the answers given to the question "*Do you use wellness-therapeutic services regularly*".

Table 4 is the cross-table of the answers given to the question "*Do you use wellness-therapeutic services regularly*" according to gender.

– 56.0% of the men questioned do not use wellness-therapeutic services, 33.5% use them, but not regularly and 10.2% of the men answered to use such services regularly.

– 45.5% of the women use wellness-therapeutic services, but not regularly, 46.8% do not use

and 13.0% of the women use such services regularly.

Gender of the respondent * Do you use wellness-therapeutic services regularly ? Crosstabulation

			Do you use wellness-therapeutic services regularly ?			Total
			Yes, regularly	Yes, but not regularly	N	
Gender of the respondent	male	Count	17	56	94	167
		% within Gender of the respondent	10.2%	33.5%	56.3%	100.0%
		% within Do you use wellness-therapeutic services regularly ?	30.4%	29.2%	43.1%	35.8%
		% of Total	3.6%	12.0%	20.2%	35.8%
	female	Count	39	136	124	299
		% within Gender of the respondent	13.0%	45.5%	41.5%	100.0%
		% within Do you use wellness-therapeutic services regularly ?	69.6%	70.8%	56.9%	64.2%
		% of Total	8.4%	29.2%	26.6%	64.2%
Total		Count	56	192	218	466
		% within Gender of the respondent	12.0%	41.2%	46.8%	100.0%
		% within Do you use wellness-therapeutic services regularly ?	100.0%	100.0%	100.0%	100.0%
		% of Total	12.0%	41.2%	46.8%	100.0%

Table 5 contains the results of the Chi-square test concerning the answers given to the question according to gender.

Table 5: Chi-square test on gender
Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.474a	2	.009
Likelihood Ratio	9.486	2	.009
Linear-by-Linear Association	7.155	1	.007
N of Valid Cases	466		

a. 0 cells (,0%) have expected count less than 5. The minimum expected count is 20,07.

Significant differences between the genders based on the answers are summarized in Table 6. **According to the table, if we ask the question about participation on wellness-therapy from a men, he will answer "*no*" with higher probability, while if we ask a women, she will answer "*yes, but not regularly*" with higher probability.**

Table 6: Significant differences between the genders concerning the question "Do you use wellness-therapeutic services regularly"

Answer	Men	Women
Yes, regularly	**No significant difference**	
Yes, but not regularly		*
No	*	

* shows for which gender a given answer is significantly more characteristic

There is significant difference between the genders concerning the answers given to the question "*Do you use wellness-therapeutic services regularly*" (Pearson's Chi-square: 9,474; df=2; p<0.05). It is more characteristic of the women (58.9%) to use wellness-therapeutic services than of the men (43.9%).

3. What kind of services do you use?

To answer the question "*What kind of services do you use*" (hereinafter: kerdes_3), the respondents were asked to choose one out of 8 given answers. The answers: (1) massage therapy, (2) health state assessment, (3) corrective-gymnastic therapy, movement therapy, (4) sauna, (5) infra sauna, (6) solarium, (7) gym/fitness, (8) other. The last option was "I do not use anything". I received 321 answers that were appreciable, out of which 37 respondents answered that they do not use wellness services. 33% of the respondents marked sauna, 25% marked solarium, 16% marked gym/fitness, 11% marked massage, 6% marked infra sauna, 4-4% marked corrective-gymnastic therapy and the *other* answer option, respectively. (Figure 2)
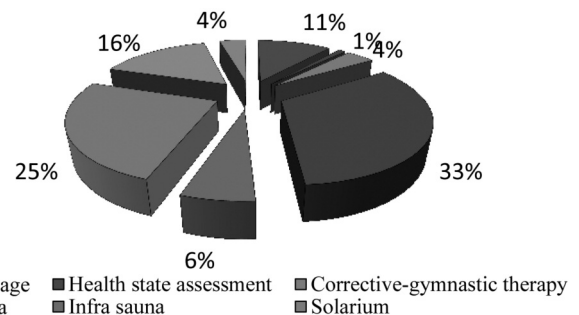
Figure 2 Distribution of the answers given to the question "What kind of services do you use"

Figure 3 demonstrates the frequency data of the answers given to the question "What kind of services do you use".
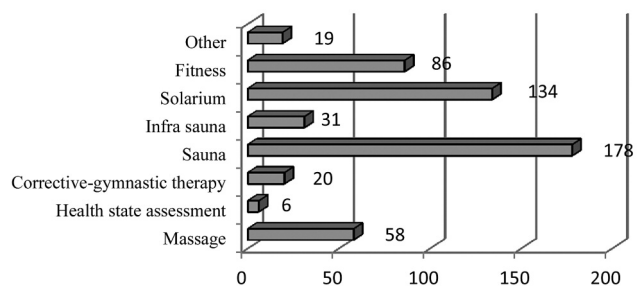
Figure 3 Frequency graph of the answers given to the question "What kind of services do you use"

4. How often do you use wellness services?

To answer the question "*How often do you use wellness services*" (hereinafter: kerdes_4) the respondents were asked to choose one out of 5 given answers. The answers: (1) weekly, (2) once a fortnight, (3) monthly, (4) quarterly, (5) half-yearly. I received 311 answers that were appreciable. 50.2% of the respondents marked the answers *quarterly* and *half-yearly*. 10.9-10.9% of the respondents use wellness services weekly and once a fortnight correspondingly. The most frequent answer was that of *monthly* which was marked by 28.3% of the respondents.

- 52.6% of the men surveyed use wellness services relatively fewer times: 19.6% of them quarterly, 33% of them half-yearly. 24.7% of the male respondents chose the answer *monthly*, 11.3-11.3% chose *weekly* and *once a fortnight,* respectively.
- In case of the women, the most frequent answer was that of *monthly* (29.7%). The ratios of the answers *quarterly* (24.1%) and *half-yearly* (25.0%) was almost identical. The ratios of those using such services weekly or once a fortnight is also roughly identical.

There is no significant difference between the genders concerning the answers given to the question "*How often do you use wellness services***"** (Pearson's Chi-square: 2.788; df=4; p>0.05). Both the men and the women do wellness in a similar ratio weekly and once a fortnight (20-24%), and the ratio of the answer *monthly* is also similar for both genders: for the men it is 24.7%, for the women it is 29.7%. (Figure 4)
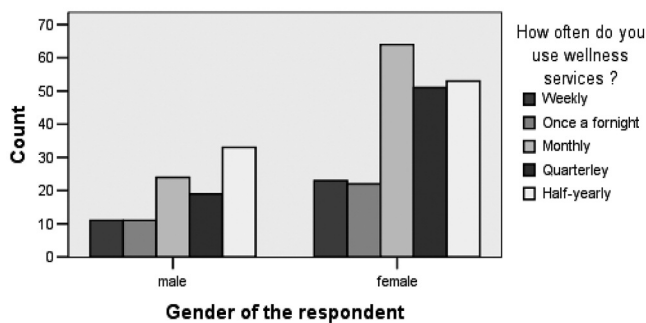
Figure 4 Answers given to the question "How often do you use wellness services" by gender

Connections

- There is significant difference between the genders concerning the answers given to the question *ìWhat do you do to preserve your healthî.* **To preserve their health, men prefer doing exercise regularly, while in the case of women both healthy nutrition and regular exercise play similarly important role in preserving health.**

- If we ask the question about participation on wellness-therapy from a men, he will answer "*no*" with higher probability, while if we ask a women, she will answer "*yes, but not regularly*" with higher probability.
- **There is significant difference between the genders concerning the answers given to the question "***Do you use wellness-therapeutic services regularly***".** It is more characteristic of the women (58.9%) to use wellness-therapeutic services than of the men (43.9%).
- Concerning the popularity of the wellness services, 33% of the respondents marked sauna, 25% marked solarium, 16% marked gym/fitness, 11% marked massage, 6% marked infra sauna and 4-4% marked corrective-gymnastic therapy and the *other* answer option, respectively.
- There is no significant difference between the genders concerning the answers given to the question "*How often do you use wellness services*". Both the men and the women do wellness in a similar ratio weekly and once a fortnight (20–24%), and the ratio of the answer *monthly* is also similar for both genders.
- 29.9% of the respondents marked massage therapy, 24.1% marked sauna, 19.0% marked fitness/gym as wellness service used. Less than 10% used solarium (9.4%); corrective-gymnastic therapy, movement therapy (8.4%); health state assessment (6.6%) and infra sauna (2.8%).

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FACTORS INFLUENCING THE GROSS VALUE ADDED IN THE SHEEP PRODUCTION CHAIN

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Abstract: The competitiveness of the sheep sector in East Europe has been decreasing from year to year. The value added in the sector is not generated in the countries as a high proportion of the lambs are exported. For example, in Hungary, 95% of the lambs, unnecessary for replacement, are sold at an average weight of 21 kg and are slaughtered abroad. A stochastic model was constructed to investigate the connections between the cycle phases of the mutton production. Three modules were distinguished, the lamb production, fattening and slaughtering-processing sub-modules. The aim of our study was to identify the gross value added generated in the three sub-modules and to analyse the main factors influencing its volume using the conditions in Hungary as an example. The major hypothesis of our research was that the profitability of the production chain is mainly determined by the breed. The results showed that, considering market prices, the gross value added in the processing module was mostly influenced by the number of lambs sold per ewe per year at the bottom level of the mutton product chain. The next most important factors were the weight gain in the lamb producing and fattening sub-modules and dressing percentage in slaughtering-processing sub-module. Contour plots were constructed which help to describe the relationship among analyzed factors. Using the contour plots, the gross value added for different combinations of these factors might be forecast.

Intorduction

The four major products of sheep production are mutton, wool, milk and skin. In several parts of the world, especially under temperate climate conditions, mutton is the most relevant sheep product and its importance has continuously increased all over the world (Morris, 2009). Mutton has a highlighted significance also in Hungary for years, because the largest part of the revenues comes from selling live animals for slaughter (Cehla, 2009). Hungary has a rich sheep breeding traditions; however the sheep sector contributes only 1 % to the total production value of the agriculture and merely 2 % to the whole livestock sector (Cehla, 2009). The number of females over 6 months of age was 1 015 556 in 2010. Sheep are currently kept on 6892 farms with the average size of 141 ewes. Mutton consumption in Hungary is about 0.3 kg/person/year and 19 571 tons of sheep for slaughter were produced in 2008. Presently only one sheep slaughterhouse operates in Hungary and even its capacity is not utilized due to the low domestic demand. The Hungarian sheep sector is not sustainable in the long term due to its declining competitiveness, its low efficiency in terms of added value and lack of innovation (Nábrádi, 2009). This situation has been mostly caused by the poor Hungarian mutton supply chain.

For economic analyses of livestock enterprises, several Monte Carlo simulation models have been tested for sheep (Blackie & Dent, 1976; Cacho *et al.*, 1995). The economic efficiency of non-dairy sheep production system under various production and economic conditions were analysed also by bio-economic models (e.g. Wang & Dickerson, 1991; Connington *et al.*, 2000; Krupová *et al.*, 2012), but these models do not include the processing chain of the sheep sector. In Hungary, Cehla (2011) constructed a product chain model for analysing the coupling of the different parts of the sheep production sector.

The aim of our study was to analyse the economic-market problems of sheep production applying the extended model of Cehla (2011). The main factors should be found which are crucial for the generation of gross value added in the sheep production chain. Furthermore, we intended to establish the value creation process innovation by describing the function of the gross value added and the main factors in each sub-module. The research hypothesis was that the profitability and the success of the production chain is mainly determined by the breed.

Material and methods

To calculate the effect of influencing factors on the economics of the sheep sector, a stochastic model with Monte Carlo simulation was used which was constructed by Cehla (2011) originally only for lamb production and fattening, but in its extended form connects all three modules of the product chain, lamb production, fattening and slaughtering-processing sub-modules.

The gross value added (henceforth abbreviated as GVA) was chosen as an indicator variable and was calculated using the method of the Hungarian Central Statistical Office. GVA at basic prices was defined as the difference between the value of output at basic prices and the value of intermediate consumption at purchaser's prices. Basic price is the price for a good or service the seller collects for the sale, less any tax and plus any subsidies.

The output of the lamb producing sub-module was calculated from the value of the produced lambs and other products (wool, manure) counted at basic prices. The output of lamb fattening sub-module was from the fattened lambs sold on basic price. The value of slaughterhouse output was calculated as a product of the weights of useful lamb body parts and their prices applied at the investigated slaughterhouse (Cehla & Nábrádi, 2010).

Intermediate consumption is the value of such products and services that were purchased in the accounting period from another producer and were used for the production of new products and services. However, the depreciation of tangible assets is not included in intermediate consumption. Intermediate consumption is evaluated at purchaser's prices and was calculated separately for each sub-module.

The three sub-modules of the model were connected through the number of sold lambs. Parts of the models were based on experts experiences, while in other cases on analyzes of empirical data. In the stochastic model, differences among production parameters of special breeds were reflected in appropriate distributions.

For the simulation, Crystall ball software package was used. OptQuest is a multiple optimization tool of Crystal Ball developed by Glover *et al.* (1996) on the basis of the so-called "scatter search methodology" principle. "Scatter search" is a population based method which bears common similarities with genetic algorithms, but it is basically built on another search philosophy (Laguna & Armentano, 2005). In OptQuest, the objectives (e.g. the minimization of the standard deviation of the GVA or the maximization of the GVA or its fall between two values) are the actually values which become known after the Excel model has been evaluated for actual input values. During optimization, the ratio of Easter, Christmas and August lambs, number of ewes and number of newly born lambs per ewe were set as decision variables. When determining the stock size, the simulation of the lamb fattening sub-module was run in case of a farm size of 500 to 1000 ewes. During the sensitivity analyses, the model was run 250.000 times in a way that the values of decision variables were fixed and only conditions (input variables as feed prices, weight gain, gross wages, monthly average prices of slaughter lambs of different weight group, feed conversion, dressing percentage, number of lambs sold per ewe per year) were varied. The distributions of inputs were simulated on the basis of time series data from previous years, farm level data and expert assessments. During simulations, saved data were analyzed and a sensitivity report on GVA was prepared revealing the size of the effect of the input variables. Crystal Ball

calculates sensitivity by computing the Spearman rank correlation coefficients between all the inputs and the GVA. In order to interpret rank correlations, Crystal Ball also provides the so called "Contribution to variance" index. We must emphasize the fact that this index is not precisely a variance decomposition, only an approximation. Contribution to variance is calculated by squaring the Spearman rank correlation coefficients and normalizing them to 100%. This index estimates the percentage of the variance in GVA due to the given inputs.

During the simulation, Response Surface Methodology (RSM) was used to describe the GVA as a function of input variables. RSM is a combined method of mathematical and statistical techniques, which is beneficial when the modelled variable is a function of several other variables (Myers & Montgomery, 2009). In addition, we also attempt to exploit the multi-dimensional surface generated by dependent and independent variables, its local maximum, minimum, and optimum (Bradley, 2007). Quadratic response surface methodology is a mixture of polynomial and factorial regression. The regression function includes the secondary polynomials of variables and the interaction effects (Bradley, 2007):

$$y = \beta_0 + \sum_{j=1}^{q} \beta_j x_j + \sum_{j=1}^{q} \beta_{jj} x_j^2 + \sum_{i<j} \sum \beta_{ij} x_i x_j + \varepsilon$$

where y is the GVA in the three sub-modules of the product chain; x_i, x_j are the most influencing factors obtained in the sensitivity analysis, β_0 is an estimated constant; β_j are regression coefficients; β_{ij} are parameters indicating interaction effects between the factor j and i and ε is the error term with normal distribution. The values of i and j are 1 and 2 in the two-dimensional graphs and $j \neq i$.

In each sub-module, the two most influential factors were selected in order to construct two-dimensional contour plots. For lamb producing sub-module, these were the price of meadow hay (χ_1) and number of lambs per ewe (χ_2), for fattening sub-module, the price of starter lamb feed (χ_1) and feed conversion efficiency (χ_2) and for slaughtering-processing sub-module, daily weight gain (χ_1) and dressing percentage (χ_2). The value of q in the formula is therefore equal to 2.

The two-dimensional contour plots, that show one-dimensional curves on which the plotted quantity q is a constant, were defined according to Boyd (2000):

$$q\ (x, y) = q_j \quad j = 1, 2, \ \ldots, Nc$$

where Nc is the number of contours that are plotted. These curves of constant q are known as "contours" or as "isolines" or as "level surfaces" of the parameter q.

We fitted a second-order polynomial surface to the points in the 3-D scatter plot by using the Respose Surface Methods package of R 2.11.1 software (Lenth, 2009).

The input data used for the simulation were taken from the databases of the Hungarian Central Statistical Office, Research Institute of Agricultural Economics, Sheep Product

Council and Hungarian Sheep and Goat Breeders' Association. Several distributions were fitted to the inputs establishing the stochastic nature of our model.

Results and Discussion

The results of the sensitivity analyses are presented in Table 1. Only the most influencing variables (rank correlation is higher than 0.2) to the GVA are summarized in this table.

Table 1: The relationship between inputs and the GVA in the three sub-modules

Input variable	Spearman rank correlation coefficient	Contribution to the GVA variance (%)
Lambs producing sub-module		
Meadow hay price Eurocents/kg	-0.214	5.86
Number of lambs sold per ewe per year	0.858	94.14
Fattening sub-module		
Starter lamb feed price Eurocents/kg	-0.378	18.59
Feed conversion kg feed/kg gain	-0.371	17.91
February's average price of 16-20 kg weight slaughter lambs	-0.353	16.21
July's average price of 16-20 kg weight slaughter lambs	-0.224	6.53
August's average price of 24-27 kg weight slaughter lambs	0.202	5.31
December's average price of 27-30 kg weight slaughter lambs	0.224	6.53
December's average price of 24-27 kg weight slaughter lambs	0.242	7.62
March's average price of 27-30 kg weight slaughter lambs	0.277	9.98
Daily weight gain in fattening	0.295	11.32
Slaughtering-processing sub-module		
March's average price of 27-30 kg weight slaughter lambs	-0.425	22.36
December's average price of 27-30 kg weight slaughter lambs	-0.303	11.36
Daily weight gain in fattening	0.241	7.19
Dressing percentage	0.691	59.09

Contribution to variance percentages indicate that the variance of the GVA (given in Table 2) increased by the given percents when the input variables with positive correlation

coefficient increased to the maximum value and input variable with negative correlation coefficient decreased to the minimum value.

Table 2: Some statistics of the (GVA) per lamb sold in the three sub-modules (in EUR)

Statistics	Lamb producing sub-module	Fattening sub-module	Slaughtering-processing sub-module
Mean	5.4	9.6	15.3
Median	6.2	9.6	15.2
Standard Deviation	7.8	2.8	3.7
Minimum	-31.1	-5.6	1.8
Maximum	31.9	24.3	31.5

The demanded increases in the inputs for the change in the GVA variance presented in Table 1 can be seen in Table 3.

Table 3: Some statistics of the main input variables employed in the simulation

Main input variables	Mean	Hungarian average	Standard Deviation	Minimum	Maximum
Starter lamb feed price Eurocents/kg	25.00	23.39	3.38	15.00	60.40
Meadow hay price Eurocents/kg	4.23	3.79	0.97	1.90	15.20
Number of lambs sold per ewe per year	1.30	1.38	0.22	0.60	1.81
Daily weight gain in fattening	276.67	280.00	30.63	200.11	349.81
Feed conversion kg feed/kg gain	4.03	3.95	0.51	2.80	8.49
Dressing percentage	50.60	50.00	0.01	48.00	55.00

The results of sensitivity report showed that the GVA in the lamb producing sub-module was determined primarily by the number of newly born lambs per ewe per year.

Similar results were obtained by Dickerson (1969), who stated that the profitability of a breed is determined by the number of lambs weaned, by fertility of females and by meat production of young animals. According to Dickerson (1969), an increasing in prolificacy of ewes from 1 to 2 lambs means a 34 times higher economic efficiency than an increasing in prolificacy of sows from 16 to 17 piglets. Borg *et al.* (2007), calculating the impact of different traits on economic efficiency of American Targhee sheep, found the number of lambs weaned and weaning weight be the most important trait .

Under British extensive grazing conditions, the profitability of sheep industry was determined by ewe prolificacy, survival rate and sale weight of lambs (Conington *et al.*, 2004). The authors concluded that the market prices had only a small impact on the relative economic importance of traits. All these founding were strengthened by the results of our simulations. When investigating the prices of lamb feed, among others (rearing

lamb feed, alfalfa hay and corn) meadow hay had the largest negative influence on the GVA in the lamb producing sub-module with a rank correlation coefficient of -0.214 and its contribution to the GVA variance was 5.86% (3.57 EUR according to Table 2).

The starter lamb feed price had the largest negative influence on the GVA in the fattening sub-module with a rank correlation coefficient of -0.378 and its contribution to the GVA variance was 18.59% (1.46 EUR according to Table 2).

Regarding animal traits, weight gain and feed conversion rate had high relevance in the fattening sub-module. In the slaughtering-processing sub-module, mainly the dressing percent determined the GVA. The summary statistics for the GVA obtained in the sensitivity analyses in the three sub-modules of the sheep production chain are shown in Table 2. We did not assume that all lambs sold in the first sub-module will also be slaughtered in the last sub-module as there was a 2-5% loss in the fattening sub-module.

The average GVA values generated in the three sub-modules of the production chain were 5.4, 9.6 and 15.3 EUR per lamb per ewe per year and the highest values were 31.9, 24.3 and 31.5 EUR per lamb sold per ewe per year (Table 2). That means, in favourable scenarios, a positive GVA could be realized. Therefore, reproduction and production traits should be paid more attention in the sheep industry. The value of these traits was highly influenced by sheep breed and the breeding values.

The most important parameters influencing GVA, which was selected in the sensitivity report, are illustrated in the two-dimensional contour plots. The lines (contours) reflect the varying combinations, which represent equal GVA in the simulation (Bradley, 2007). The distance between the contour lines is also important as it reflects the amount of change in one of the inputs that causes an increase in the output ceteris paribus. Observing the contour plots, the contours of two types of surfaces may be separated. The first type of surface is an inclined plain, on its contour inclined lines may be found. The other type of surface is similar to a plain, which has a bulge or a valley on a part of it, and the plain bends to any direction.

The contour plots of the GVA generated in the lamb producing sector is illustrated in Figure 1.

The GVA value is mainly influenced by two variables, by meadow hay price and by the number of lambs sold. In the horizontal axis number of lambs was inserted. The more steep the contours are, the larger is the effect of the number of lambs on the output in comparison to the price of meadow hay. Vertical lines would mean that meadow hay price could be neglected. If there is a bugle or valley on the surface, the direction of the lines will change, thus it may happen that the line curves back on a given area. The surface of GVA regressed on these two variables is of typically sidelong plain, thus there are sidelong lines on its contour. Considering the given price of meadow hay, an increase in the number of lambs sold per ewe per year by 0.1 to 0.15 was necessary for one stage increase in the value of GVA. Fixing the number of lambs, a decrease of meadow hay price by 2-
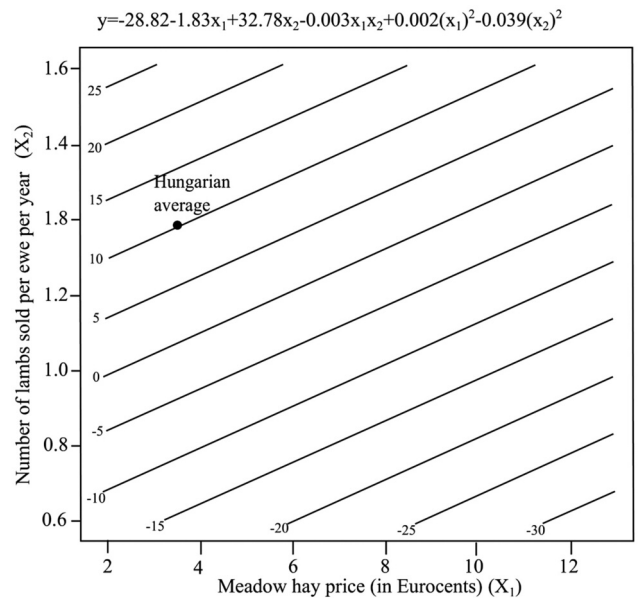
Figure 1. The contour plot of GVA (y) in EUR per lamb sold in the lambs producing sub-module

2.5 Eurocents caused a stage increase in the surface. Regarding the steepness of the lines, the effect of the two variables was not balanced relating to stage increases, the effect of the number of lambs sold per ewe per year was more important which was supported by the sensitivity report as well. On the basis of Figure 1, at least one lamb per ewe per year had to be sold in order to reach zero GVA regarding minimum prices for meadow hay. A relatively high number of sold lambs (1.7) may cause zero GVA if the price of meadow hay will be high (15.2 Eurocents/kg). Regarding high hay prices, GVA may be positive if the number of lambs sold per ewe per year will be high as well (at least 1.4-1.5). In general, the price of meadow hay price should not exceed 9 Eurocents in Hungarian conditions (number of sold lambs of
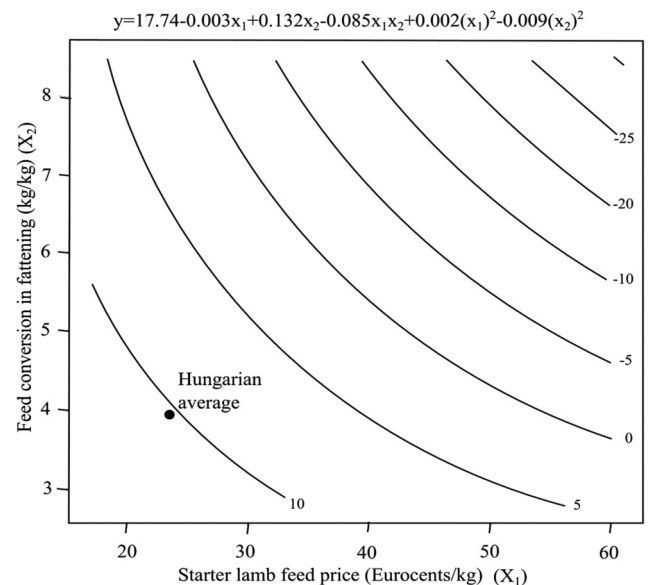
Figure 2. The contour plot of GVA (y) in EUR for the fattening sub-module

1.38). Considering the simulation-average number of 1.3 lambs sold per ewe per year and an average meadow hay price of 4.23 Eurocents, the GVA in the lamb-producing sub-module may be around 5 EUR per lamb sold.

The next participants of the product chain are the fattening farms, for which the contour plot is summarized in Figure 2 for the two most important factors (feed conversion and starter lamb feed price).

The contour plot of fattening farms may be classified into plots of bended surfaces. Regarding the width of the contours under unchanged feed conversion, there was a stage increase in GVA by approximately 5 EUR per lamb sold when decreasing the starter feed price by 10 to 20 Eurocents. If the price of the starter feed was held constant, a decrease in feed conversion rate of 1 to 2 kg feed/kg gain was necessary for GVA to increase by one stage. Under the simulation average feed conversion of 4.03 kg/kg and starter lamb feed price of 25 Eurocents per kg, the GVA would be around 10 EUR/lamb. In the case of an extreme high feed conversion (above 6 kg/kg), the prices of starter feed price may not exceed 35 Eurocents/kg to generate positive GVA.

The GVA in the slaughterhouse-processing sub-module depended mainly on the dressing percentage of slaughtered lambs and on daily weight gain in fattening. From the two factors, the second one was more important (Figure 3).

$$y=-56.70-0.08x_1+130.1x_2-0.215x_1x_2-7.79(x_2)^2$$
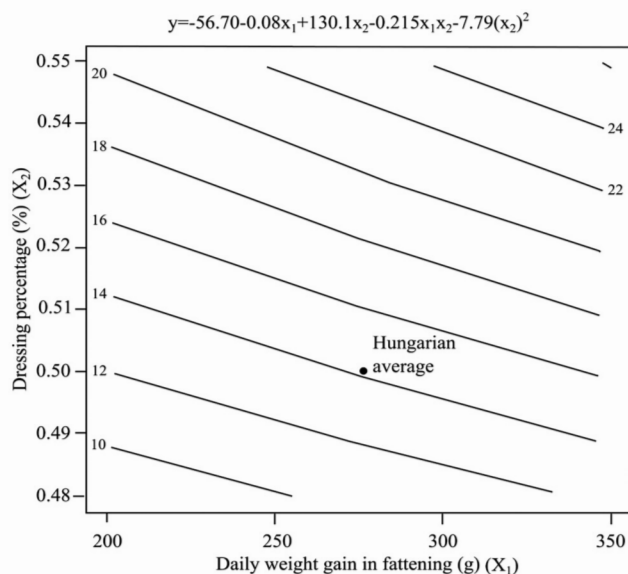
Figure 3. The contour plot of GVA (y) in EUR for the slaughtering-processing sub-module

The surface is typically sidelong plain, which is reflected on the basis of the contour plot. An increase of the dressing percentage by around 1 per cent points caused an increase of GVA by one stage (2 EUR/lamb). For the investigated range of the two parameters, the GVA may be as high as 31.5 EUR per slaughtered lamb per year. To reach this value or higher value then 24 EUR per slaughtered lamb per year, daily weight gain of 300 g and dressing percentage of 55% was necessary. In case of lower dressing percentage (54%), a

higher daily weight gain (350 g) was needed. Considering the simulation-average daily weight gain of 276.67 g, already dressing percentage of 49% resulted in GVA of 12 EUR/lamb.

Factors influencing the GVA in the sheep mutton product chain were examined using the conditions in Hungary as an example. On the basis of the sensitivity report, the value added depends mainly on the number of lambs sold per ewe in the lamb producing sub-module, on the feed conversion and daily weight gain in lamb fattening and on the dressing percentage in the slaughtering-processing sub-modules. Regarding the inputs prices, lamb feed, alfalfa hay, corn and meadow prices had also large influence. Overall, our hypothesis that the profitability and the success of the production chain is mainly determined by the breed was supported. We might also conclude that animal traits as feed conversion, daily weight gain and the number of the newly born lambs should be further improved.

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COMPARISON OF FISHERIES SECTORS OF JAPAN AND TURKEY IN PRODUCTION, CONSUMPTION, TRADE AND FUTURE POSSIBILITIES

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Abstract: The purpose of this study is to show some view-points such as the expansion of the mutual trade scale in fish and/or marine products, and newly effective use of edible marine bio-resources in each country. Total quantity of fisheries production, consumption (per capita), export and import quantity of Japan and Turkey based on 2010 were reported as 75.27 million tons, 653 thousand tons; 8.5 kg, 70.9 kg, 566 thousand tons, 55.1 thousand tons,; 473 thousand tons, 80, 7 thousand tons respectively. Turkey- Japan total amount of fisheries trade was more than 56 million US $ in 2011 and, but in 2000 was just over 14 million US $. Japan and Turkey bilateral relations are friendly and cordial, and they are steadily improving. Therefore, they should prepare business plans or obtain funding for business plan development to identify new markets and explore business expansion opportunities.

Keywords: Turkey, Japan, fisheries, trade, potential

Present condition

Turkish Relation with Japan

Turkey and Japan have traditionally good relations since the 19th Century in the Ottoman Empire Period. Turkish and Japanese society is very warm and friendly attitude towards each other. In this case, the relations based on mutual trust and cooperation between the two countries, creating a suitable atmosphere for further development and diversification of bilateral relations based on mutual trust and cooperation, all fields. The most important element of trading and economic relations between them is Japanese investments in Turkey (MOFA, 2010). Japan is one of the main financial partners of Turkey on the financial reports. The level of financial assistance from Japan is 8 billion. In 2010, Turkey's export is US $ 399 million (2009 was US $ 399) and import soared 61% to US $ 2.5 billion (Japan country report, 2011).

This paper intends to enhance Japan-Turkey economic ties that its first time survey of fisheries relation across the both of them. The 90 adults in Tokyo, Istanbul and Trabzon fish market`s fishermen, fisheries businessmen in both country, Japan-Turkey economy forum members, JICA, JETRO, Turkstat , Embassy of Turkey in Tokyo, university professor in Nagasaki University, Karadeniz Technical University, Tokyo University of Marine Science and Technology and Trabzon Fisheries Research Institute, since September 1–15th to November 4–15th were interviewed on Japan Turkey relation, especially on fisheries relation.

It was difficult to find people who know Japan and Turkey fisheries industry. Therefore there was a limit of people to add on a survey. Every member of them agrees with the idea that Japan and Turkey relation is positive. (82% very positive and 18% positive). Many participators indicated that Turkey has become a meeting place in the heart of the nation, Europe, Middle East, and Central Asian countries; therefore Japan could pay more attention to Turkey on economic relation. Furthermore, Japan holds great economic potential for Turkey. This group is also the most likely conclude that the economic relationship is not properly positive between both country as social relation and cooperation.

Fisheries Sector in Turkey

According to the State data; Turkey's eastern Mediterranean located 3% of the territory in Europe and 97% in Asia. Turkey is surrounded by sea on three sides by the Black Sea in the north, the Mediterranean in the south and the Aegean Sea in the west. In the north-west is also an important internal sea, the Sea of Marmara. Each of these seas differs in their content of organic matter and weather conditions. The exclusive economic zone of about 172,199 km² and inshore fishing area is 19,608 km² (PEW, 2011). This natural resource offers significant advantages in the use of various aquatic organisms. Each of these seas differs in their content of organic matter and weather conditions (FAO, 2011).

With 255 countries, Turkey is ranked 50th in aquaculture production and 26th in marine fisheries according to Global Aquaculture Production, published by the FAO in 2011 (FAO, 2011). In latest data, 480 sea fish species and 236 inland waters fish species are known to live in Turkey (The European environment, 2011). Regarding our interview, 80% participators reported that there is a reduction of more abundant species of marine fish taken in Turkey. Nearly 20 years, about 20-25 species of fish have been caught mainly, but there have been reduced to 6-7 species in recent years.

According to Turkish Statistical Institute; Fish production increased to 4.83% in 2010 over the previous year and it was about 653,000 tons in 200. Turkey produces about 0.6 percent of total world production of fish. Products of sea fishing are the largest segment of the industry. Marine fisheries production by catch was 485,000 tons. Aquaculture production was 137, 000 tons. Inland fishery production was 42,000 tons. There is 14% decrease in total fishery catches, but 13% increase is in aquaculture production. The total fishery production consisted of sea fish by 68, 25%, inland water products by 6, 16% and aquaculture by 25, 59%. Marine fish a stock in the seas surrounding Turkey is descending, resources in freshwater is to offer a significant scope for the development of aquaculture and capture fisheries for freshwater. Figure 1 is for more details. The total production of Turkey by catch (tons), East Sea is a ratio of 58.75% in the first place, West Black Sea follows it by 17, 28%, Aegean by 8, 89%, Marmara by 8, 86%, and Mediterranean by 6, 22% in 2010 (Turkstat, 2010).
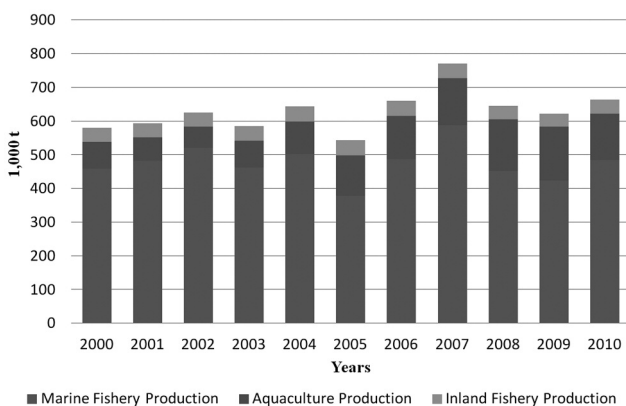
Figure 1. Source of Fishery Products (tons/year) in Turkey by years
Source: Turkish Statistical Institute, various years

The fish processing industries play their vital role in increasing production and contribute to foreign exchange earnings for Turkey. The processed fishery products are mostly frozen products, then marinated, smoked and canned products. The processing of fresh fish for export has increased rapidly in lately years (FAO, 2008. Karkacier O, 2000). Regarding our interview, Domestic consumption of Sea bream and Sea bass has increased in recent years. Therefore, Turkish companies have spent more and more their effort for the domestic market and some fish dealers have also created their own market chains.

According to the results of the survey released; Turkey tries to export oriented fisheries may divert resources such as labor and capital away from production for local consumption on Anchovy, Atlantic bonito, Horse mackerel, Trout, Sea bream, Sea bass, Striped venus.Therefore, we would like to explain in more detail for these spices production. In 2010, around 57% of the total landings are anchovy which is the pelagic most important in terms of harvest and taste of the Turkish people. Anchovy production was about 229,000 tons; increasing 11.88% in 2010. Atlantic bonito is one of the highest rate of catch of sea fish; 9,401tons was caught in 2010. Its easy to find the high quality bonito products within Turkish bonito suppliers. Horse mackerel is one of the main seasonal supplies of small pelagic fish species in Turkey which 14,392 tons was caught in 2010. Who it tasted in Turkey says Turkish horse mackerel is delicious and Turkish companies export it EU and Middle East by fresh and frozen. Technical and operational overview of fishing vessels caught striped venus; shown up on store and export to EU countries, especially Italy until next fishing season and 26, 931 tons was caught in 2010 (Turkstat, 2010). See Figure 2 for more details.

Aquaculture had begun in Turkey in 1980`s with rainbow trout (*Onchorhynchus mykiss*), culture shows a sharp increase in 1990`s. Modern fish farming is one of the most promising and fastest growths in Turkey. Between the years of 1986-2011, aquaculture production has increased from 3,000 tons to 167,000 tons. Turkey is rich in inland water with a high potential for fisheries and aquaculture.

Designed as a division of aquaculture production by species, trout aquaculture (inland water) has the highest percentage (47.6%) of production. The others are sea bass with 29.3% and sea bream with 17.9%, trout (marine water), carp (inland water) and mussel production etc. Figure 2 shows more detail on these explanations. (Turkstat, 2010).
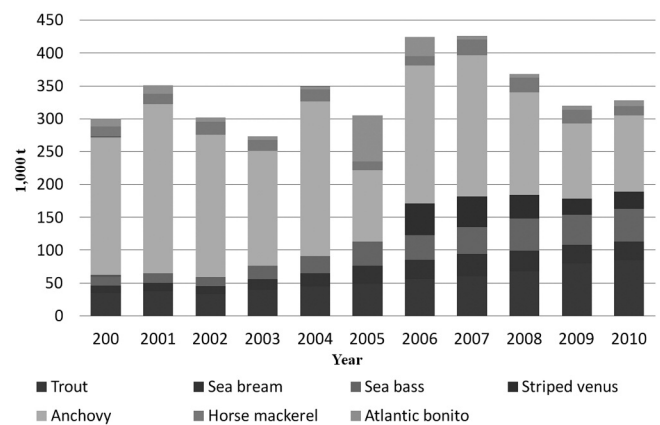
Figure 2. Catch of high potential fish types to export Japan in Turkey by years
Source: Turkish Statistical Institute, various years

Export and import by Turkish fisheries

Fishery sector is not a key trade sector for Turkey at the moment. However, fish and fish-related-products, especially exports and imports from Turkey have increased rapidly in

recent years. Exports were 55,109 tones in 2000, worth US $ 131 million and imports reached 80, 726 tones, with a value of US $ 105 million in 2010. In terms of value (price), there is a significant positive trade balance of US $ 131 million in 2010 (DIE, 2011). The trend of export growth for the fisheries sector over the past two decades (see Figure 3) shows large potential export fishing opportunities in Turkey.
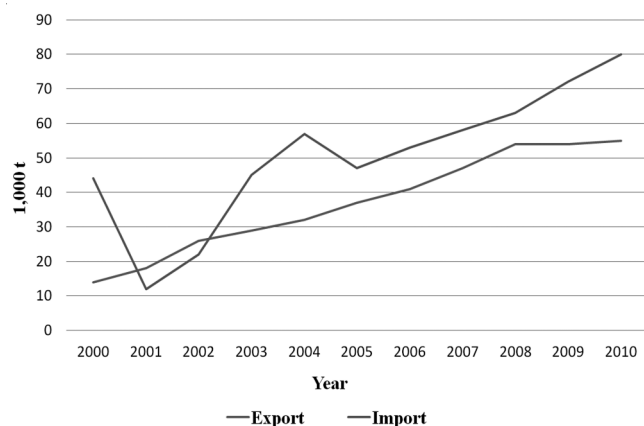

Figure 3. Export and import of fishery products in Turkey by years
Source: Turkish Statistical Institute, various years

Turkish participators expect in our interview that fisheries sector turn can be further pressure on stocks of seafood in near future. More detail can be seen in Figure 3 export and import of fishery products in Turkey 2000–2011.

The relatively developed nature of Turkey fisheries industry has no limits the import potential. Turkish trade policy employs hardly a mixture of high rates and import bans to discourage imports and promote local production on fisheries industry very few times. The 80% of the total import of fishery products in Turkey is the frozen fish. Creating the two tuna canneries import large objects in Turkey with frozen. Most of the yellowfin tuna and skipjack tuna are frozen-imported from Indian Ocean and Spain. The main countries which export to Turkey are Norway, France, Iceland, Spain, China, USA and Greece (DIE, 2011. Turksat, 2011). In recent years, Turkish government acts as an intermediary in establishing business contacts among foreign importers to Turkish business man for development and promotion.

Turkey exports more than 200 types of fishery products to more than 60 countries. Exports from Turkey were carried out to 30 destinations without interrupt. Turkey's current regulatory environment characterized by export prohibitions, complex inspection procedures and foreign exchange repatriation requirements makes it difficult to promote exports previous years.

In recognition of what the government began a number of export bans and pre-shipment inspection is to be removed under the microscope. Also Turkish government starts to support expeditiously for export business products and services. This is due to the importance of high value bluefin tuna, sea bass and sea bream in the export statistics. Almost

50% of sea bass and sea bream, 33% of rainbow trout production is exported to the EU and whole bluefin tuna production is exported to Japan (DIE, 2011. Turksat, 2011). Exports from Turkey stopped increasing at 2008 mainly by decrease of the export volume of tuna to Japan.

Fisheries Sector in Japan

The fisheries industry is an important industry in Japan. It plays a significant role in providing fish protein to the population. Japanese land area is 377,801 km² and the length of coastal line is 29,751 km. The exclusive economic zone of about is 4,050,000 km², the sixth in the world and 10.7 times as large as the national territory (White Paper on Fisheries Japan, 2010).

Many fishermen in Japan are currently engaged in coastal fishing and allow the difficulty to find their successors. Traditional fishing methods are designed with the environment and the characteristics of fish biology. They are managed in each of the community of the coastal fishing village and under the low of the fisheries. Japan has developed a unique marketing and distribution system of fishery products with a network of fish markets in landing places and those in the centers of consumption (MAFF (a), 2011). These particulars were made successful fish organization and high fish consumption in Japan.

Japanese fish production has increased and reached its peak at 1988. Since 1972 the former half of 1980 Japanese fisheries have gotten the biggest production in the world, with a maximum capacity of 11.6 million tons in 1988. Since then, Japanese production of fish has declined steadily. China and Peru has passed over in recent years. In 2010, the total fishery production of Japan was 5.27 million tons, which 4.08 million tons were from marine fisheries. Marine aquaculture produces 1.1 million tons. Japan`s recent aquaculture tries to culture the bluefin Tuna in order to fulfill the responsibility of the reasonable resource use.

Figure 4 shows more detail of the amount of caught fish in Japan 2000–2010 (MAFF (b), 2011). The rich coastal and
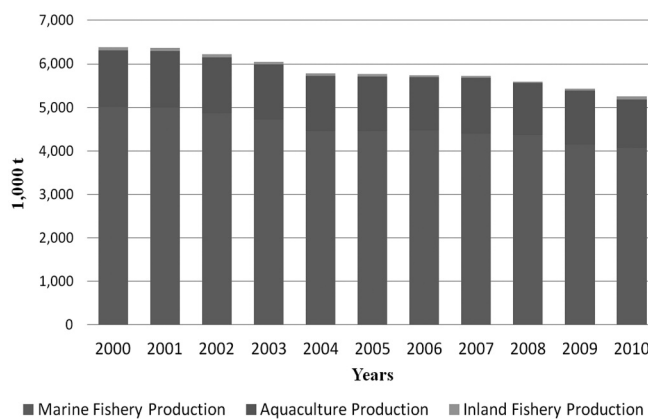

Figure 4. Source of Fishery Products (tons/year) in Japan between 2000–2010
Source: MAFF, catch by sector of fisheries in Japan on various years

marine areas surrounding Japan has developed fish-eating culture. Japanese marine fisheries are torn in three categories: the distant water fishing (mainly due to the pelagic and the foreign exclusive economic zone) the offshore fishing (in the domestic exclusive economic zone, as well as in bilateral agreements in there of the neighboring countries), and coastal fishing.

According to our interview released; tunas, bonitos, red sea-bream, pacific saury, jack mackerels and yellowfin tuna trade may indirectly contribute to the creation of new jobs through expanding trade from Japan to Turkey. The wild catch of tuna in Japan waters has decreased from 2010 in a previous year; it was approximately 188 thousand tons. Tuna trade, processing, markets, consumption, price and profits are spotted for sashimi, fresh tuna steak, katsuobushi (hard-smoked skipjack) and canned tuna. Bonito is e main catch, and even in a poor season, such as 2010 it dominates Japanese fisheries, and annual wild catch of sole is around 304 thousand tons in 2010.

The red sea bream is one of the most important commercial fish in Japan. A whole red sea bream is quite expensive and enough for an entire meal. It produces was around 95 thousand tons in 2010. Pacific saury is important commercial pelagic fish in Japan. Japan is one master place to learn, and share about mixed rice with pacific saury and the volume. The value of pacific saury landings were approximately 217 thousand tons in 2010. There are more than 140 types of jack mackerel in the world. 40 types of jack mackerel live in coastal waters of Japan. Jack Mackerel is often served in Japanese restaurant and known for Turkish consumer as well as tuna, bonito and pacific saury. The volume of jack Mackerel landings in 2010 amounted around 154 thousand tons. The three main customer groups of yellowfin tuna are Japan, US and EU. Yellowfin tuna is caught highly in Japan for the sashimi market and they amounted approximately 100 thousand tons in 2010. All of six kinds of spices data were obtained from MAFF, fisheries agency and white paper of Japan. Figure 5 shows more detail for catches by years.
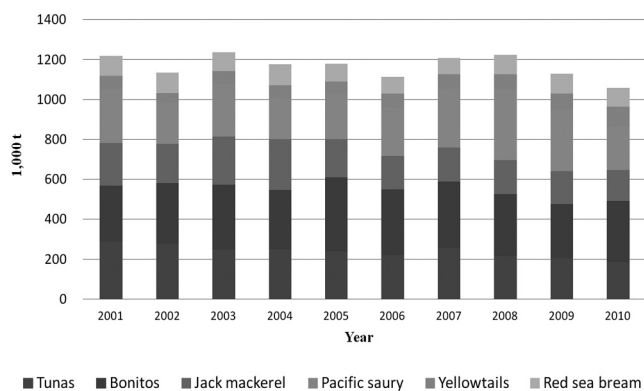
Figure 5. Catch of high potential fish types to export Japan in Turkey by years
Source: MAFF, various years

Export and import in Japan

Due to the fish and fishery products in the world, the export of products from Japan increases as Figure 6. The export in fisheries products of Japan in 2010 can be summarized as follows 566,000 tons and valued at approximately US $ 2 billion. The main commodities in value are pearl, salmon, mackerel, dried sea cucumber, Alaskan Pollock, scallop and bonito. The largest increase was in export to China and Hon Kong. The other main markets for export opportunities, in terms of value of exports are Thailand, USA, South Korea and Hong Kong. Approximately 99% of the tenth ranked sea cucumbers (dried) are exported to Hong Kong (MAFF, 2010). As explained (Figure 3) Turkey fisheries industry represents a significant growth potential, here is a story about a Japanese businessman that might give new perspective to increase export.

Japan is the largest importer of marine products, with imports valued at US $ 14.2 billion in 2010. Japan relies on imports for 40% of its supply of fish for human consumption. Imports of the fresh, the chilled and the frozen fisheries products are the major products in Japan. The main imported products are bonito, salmon, trout and shrimp. The main countries which export to Japan are China, the U.S, Chile, Thailand and Russia. Japan is the largest consumer of tuna in the world, supplied with 473,000 tons of tuna (the main export from Turkey to Japan as well) (MAFF, 2011). Figure 7 shows more detail for fisheries trade.

According to our interview, there are enormous potential trade opportunities for Turkey business in Japan when they realized Japan is the largest importer of marine products. Turkish people are so regret that why we could not to see understandably greatest trade potential for both exporters and importers until now.
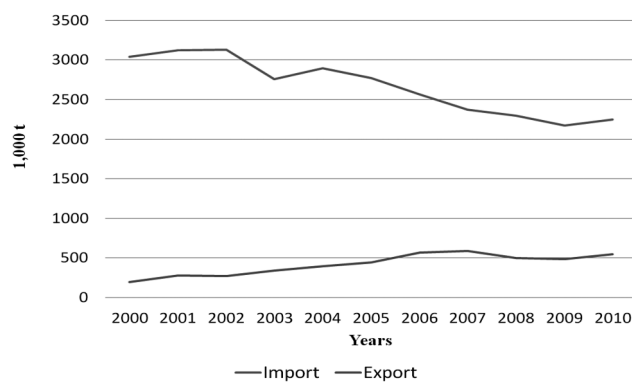
Figure 6. Export and import of fishery products in Japan by years
Source: Trade statics of Japan, various years

Consumption of fish in Turkey and Japan

The Red meat is preferred for consumption by Turkish people in general The main fisheries are highly seasonal, as the demand for fresh anchovies to the season debut will rend

to increase market prices (Karkacier O, 2000). Locate on the basis of these results can safely say that the amount of consumption of fishery products in Turkey lags far behind developed countries. Average consumption of fishery products in Turkey, which is 8.5 kg per year, well below the EU average is 22.0 kg / year, the global average is 16.0 kg / year. (See Figure 7 for more detail). This variation depends mainly on the availability of small pelagic fish, mainly anchovies (FAO, 2010. Turkstat, 2010). In this survey was shown up that, Turkish government should start to support fish farming financially and join with the companies to support commercial on fish protein foods as represented by products such as developed countries.

Sources of food for the ocean in the past played an important role in the Japanese diet. Even today, nearly 40% of the protein consumed by Japanese people comes from the sea food. In fact, 63% of Japanese fisheries and aquaculture for human consumption in the domestic fishing industry of Japan as a raw material (Fisheries of Japan, 2010). Japanese consumption for fish remains strong (H.Ikeda, 2010). Japanese people eat 70.9 kg of fish per capita a year; 9 times higher than Turkey as Figure 7. Turkish government should read Japanese fish consumption method exemplary to successes and see how these models were created. Besides, Japanese fisheries consumption was decreased through to western developed countries food culture and foreign food products as beef and chicken (The Japanese Consumer, 2010).
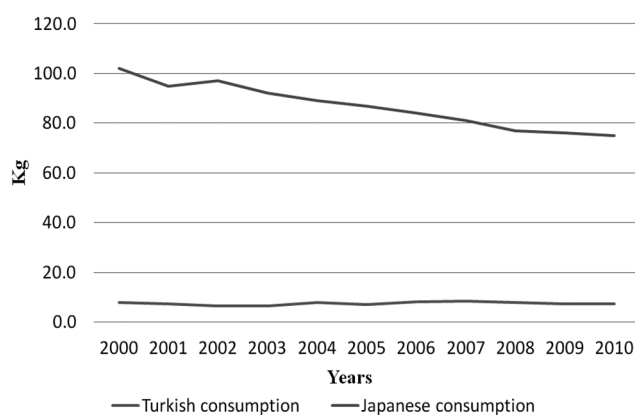
Figure 7. Consumption per capita Turkey and Japan 2000-2010
Source: MAFF, Turkish Statistical Institute, various years

Turkey and Japan fisheries industry and discussion

The Turkish economy has shown remarkable performance with its steady growth over the past eight years. As the levels of GDP more than tripled to 736 billion US $ in 2010 compared to 231 billion US $ in 2002, GDP per capita rose to US $ 10,079 compared with US $ 3,500 in the period (Turkstat, 2011). In addition, Turkey continues to make efforts for adjustment of the EU standards (handling, processing, storing and transporting and food safety for good quality).

Overall the analyses which are showed in Table 1 and 2 that the economic and environmental impact of increased government economical condition and standards are positive. A positive economic surplus for both producers and economical benefits resulted from an increase in qualified standards.

In 2009, the total fish trade from Japan to Turkey was approximately 101 million US $ but that of 2000 was just over 14 million US $ which include; tuna (predominantly), octopus, shrimp, sea snails and shell export from Turkey to Japan. Some kind of Japanese fish spices which use sashimi and sushi export from Japan to Turkey for Japanese restaurant in Turkey. In 2010, due to the effect of the global economic crisis and Japan's tuna over-stock problem, Turkey's international trade dropped approximately to 34 million US $ (Zeikan, 2011).

Table 1. Fisheries export from Turkey to Japan 2000–2010

Year	Ton	Value (10,000 $)
2000	2404	1474
2001	1369	7969
2002	1359	9387
2003	2859	4027
2004	3882	6262
2005	3634	6167
2006	3838	6586
2007	4129	8516
2008	2623	8213
2009	3653	10122
2010	1769	3325

Source: Trade statics of Japan, various years

Table 2. Fisheries export from Japan to Turkey 2000– 2010

Year	Ton	Value (10000 $)
2001	35	33
2003	98	49
2008	29	207

Source: Trade statics of Japan, various years

As shown up before in our interview, Japan and Turkey have good relation and positive for each other. However, others interesting points were shown up in our interview; 78% of participant survey slightly accepted that Japan and Turkey fisheries relation is slightly positive, 14% were positive and 8% were not positive.

The reasons perceived as effective by this group are on 3 answers: lack of knowledge on fishing activities and industry sectors have the potential much greater with both country (82%), Japanese companies are very sensitive for business, food safety (43%) and far for transportation (23%). Here are

some reasons people in interviewed have told us how Japan and Turkey fisheries relation increase to intended position: to increase communication program and activities by government support (54%), to try to figure out fisheries industry and potential clearly by scientifically (88%), to support Japan and Turkey sea food by commercial (71%). Whole of these descriptions clearly explained about significance in this study and the importance of the proposed research.

The fisheries sector is not an important export sector for Turkey at the moment (The case of Turkey, 2011). However, the upward trend of exports of fisheries in the last two decades shows a great potential for export opportunities for fish-related business in Turkey in the future. The fishermen and especially the exporters in Turkey have adapted their product line and sales to international standards and their share in the world market keeps on growing. Turkey considerably tries to increase more and more its use of temporary trade barriers (as explained previously).

Besides, the export of fish and fishery products from Japan has increased due to the popularity of Japanese food in the world as explained before. These positive circumstances may help increase opportunities for business in near future between both countries. Likewise, it was shown up in our interview; every member of in my survey agrees with the idea that Japan and Turkey fisheries trading will increase near future (92%; Yes, 8%; maybe).

The participators indicated in our interview that there are some problems still in their business. The main problems for Turkish people (participators) in Japan are Japanese high standards, complex Japanese domestic networking system. Japanese companies already have made their business with China and Asian countries which goods may products from Turkey. The problems for Japanese people (participators) in Turkey are complex procedures in the trade tax system, economic and political stability problem, administrative barriers, high inflation and legislative arrangement problem in Turkey. Other common main problems between Japan and Turkey are to increase the price of raw materials and intermediate goods, energy cost and the exchange rate. Besides, people in interviewed said that trade relation problems in both countries have decreased moderately over the past 10 years.

Conclusion

There is regular exchange of cultural troupes between the two countries. Their bilateral relations are friendly and cordial, and they are steadily improving. This study aims to further develop the bilateral economic relations between the two countries. It consists of a series of workshops on various themes and sectors such as establishing a business in Turkey and Japan.

The innovation is vital to the knowledge-based business to gain new ground and maintain competitive edge. Therefore the fisheries sector in Turkey needs a comprehen-

sive strategy to ensure sustainable development to maximize their potential. Turkish business group looking for new business and establish business contacts and they run the weekly meetings of networks in the world during (participators are mentioned former).

Besides Japanese trade deficit of $32 billion with the rest of the world in 2011. The first annual deficit in 31 years for the first time because of the effects of the devastating earthquake and tsunami, the Finance Ministry said (The Telegrap, 2012). Therefore Japanese businessmen move to find new partners for investing and memorandum for bilateral cooperation to create fruitful partnerships between the related business sectors in the other countries. Japanese officials have realized Turkey's role in the Middle East and Africa region. Participators said in our interview that these opportunities may make some chances on us (for Turkish and Japanese people) with commercial cooperation as well as increasing the commercial exchange and consolidating the relations between the businessmen in the two countries.

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Label each table with an Arabic number (*Table 1, Table 2,* and so on) and provide a clear title. Tables should be quoted in text and placed in their position in the manuscript. Keep tables as simple as possible. Tables spreading across double pages are difficult to read and typeset. Proposed format for table headings are: Table (number): Title of table (note if any). Table heading is located before the table. Row and column headings should only have the initial letter capitalized. Below the table, give its source as a note. Figures should be numbered consecutively, quoted in text and placed in their position of the manuscript. Camera-ready copies of line drawings and photos should be submitted. Proposed format for headings of figures including graphs, charts, drawings, and photographs are: Figure (number): Title of figure (note if any). Figure title and tables should appear below the figure. Discuss the most significant features of each figure. Mathematical formulas should also be placed in the text. Units should conform to the International System of Units (SI). Although the amount of explanation and data included depends upon the study, do not give formulas for common statistics (i.e. mean, t test) and do not repeat descriptive statistics in the text if they are represented in a table or figure. When including statistics in written text, be

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Articles in journal Author, A. (Year of publication). Title of paper. *Title of journal, Volume number* (issue number if available). Pages.

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