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Mapping changes on agricultural and rural areas: an ex-post evaluation of the EU membership for Hungary

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Abstract

Several progresses have been made in evaluating the development policies for rural areas in the last years; many indicators[1] have been set for assessing the effectiveness of Common Agricultural Policy (CAP) and Rural Development Policies (RDPs) and their role on the convergence process of the EU members, but a shared definition of rurality is still missing. The results obtained at the level of growth and development by the most lagging behind areas, are far from being satisfactory (Brasili, 2005). The evaluation of the policies and programmes introduced evidenced lack of institutional planning and implementing abilities, and an insufficient targeting of policies and payments (Mantino, 2010). The experience of the 10 New Member States (NMSs)[2] showed how the current CAP and Cohesion policy, designed for the EU-15 (Csaki et al. 2010), aren't enough for addressing the regional specificities, hindering a process of development which is already weakened by the effects of the unfinished transition.

This paper aims at offering a methodological contribution for evaluating the EU membership, with particular attention to the CAP, in Hungary. We chose this Country among the 10 NMSs because of the relevance (96%) of the rural areas on the total land[3], and given the historical socio-economic role played by agriculture. The authors believe that more targeted – and therefore efficient – policies for agricultural and rural areas require a deeper knowledge of their structural and dynamic characteristics. Therefore, in order to identify the changes occurred before (2003) and after (2007) the EU membership on agricultural and rural areas, we use the following multivariate statistics methodologies: Principal Components Analysis, applied to the set of 42 variables, and Cluster Analysis on the results obtained by the Principal Components Analysis. Then, we offer a preliminary evaluation of the distribution of Single Area Payment Scheme (SAPS)[4], using the information on the applications provided at the County level by the Hungarian Paying Agency to show correlations with the leading factors.

Keywords: agricultural and rural development policy evaluation, rural areas, policy targeting, EU enlargement.

JEL classification: O18, P25, R58

[1] The EU has introduced the Common Monitoring and Evaluation Framework (CMEF), which 'provides a single framework for monitoring and evaluation of all rural development interventions for the programming period 2007-2013'. http://ec.europa.eu/agriculture/rurdev/eval/index_en.htm

[2] Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Polonia, Romania, Slovakia, Slovenia.

[3] According to the OECD methodology, which indicates as mainly rural the areas with a population density under 150 people/km². Therefore, this standardized indicator is not the most fitted one for understanding the colourful reality characterizing rural development within the borders of the European Union.

[4] SAPS is the simplified area-based payment system Hungary chose at the time of joining the EU, and it is complemented with additional support for rural development and for implementing the EU-15 CAP. Its support is very important because it is related to the first Pillar of the CAP, which still gets the most of the CAP financings.

1. INTRODUCTION

The European Union is currently on the way of drafting the policy and budget for the next programming period 2013-2020, and the CAP is again a protagonist, due to its financial relevance (it accounts for more than 40% and it represents its second voice[5]) and for the dimension of areas interested by the support of Pillar I (Single Farm Payment) and II (Rural Development). At the same time, the EU is required to answer to other internal and external challenges. Among the former ones there is the future possible EU enlargement to the Western Balkans, involving a redistribution of the EU budget from the current EU-27 to the new ones[6], and the evaluation of the results of the CAP and Cohesion policy adoption in the 10 NMSs, which set their 'return to Europe' in 2004 and 2007 after years of soviet influence. The much awaited convergence results, as showed by the *ex ante* and *in itinere* evaluation[7] of the last EU enlargements, are still to come. Divergence is rapidly increasing mostly due to the backwardness of the agricultural and rural areas (Monasterolo, 2008), where the highest percentage of poverty is located (Bertolini et al, 2008), in the New Member States (NMSs) and in the historically weak EU-15 regions, as the Italian 'Mezzogiorno' (Fanfani, 1999). The lack in targeting pre-accession and cohesion policies is one of the causes, originating also from the limited knowledge of transition areas, and the difficulties of current EU monitoring and evaluation system. Therefore, in this paper we are going to understand the effect of EU membership for Hungary, mapping the areas (NUTS III level) according to their main characteristics, showing changes occurred between 2003 and 2007, respectively the year before the accession in the EU, and the year after the end of the first programming period for EU-10. We use methods belonging to multivariate statistics - principal components analysis (PCA) and cluster analysis (CA) - on a group of 42 variables chosen according to their ability to catch the features of the 20 Hungarian Counties.

2. AN OVERVIEW ON THE HUNGARIAN AGRICULTURE AND RURAL AREAS

Hungary covers an area of 9 303 000 ha, of which 83% used for agriculture. This sector had an historical role, both under the Austro-Hungarian Empire and under the socialist system, when it offered subsistence for the thousands of farmers who remained in the countryside during the planned policy of heavy industrialization. In the enlargement year 2004, agriculture still played a relevant role, in comparison with the EU-15 Countries. In 2008, the agricultural

[5] For decades, the CAP maintained the primacy in the budget expenditures, being replaced just in the last programming period by the Cohesion Policy.
[6] Albania, Bosnia and Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Montenegro
and Serbia, as well as Kosovo under UNSC Resolution 1244/99. These Countries present a much lower level of development in comparison with the EU average.
[7] EC, 2009.

population[8] accounted for 10.1% of the total population of circa 10 million people, and 4.5% of the total workforce was employed in agriculture (tab. 1).

Table 1: Share of agricultural and agri-food industry on the Hungarian economy

	Share of agriculture in			Share of food industry in		
Year	Employment	GDP	Investments	Employment	GDP	Investments
2003	5.5	4.3	6.1	3.9	2.7	3.6
2005	5.0	3.6	4.5	3.6	2.2	3.6
2007	4.7	3.4	3.7	3.4	2.0	3.2
2008	4.5	3.7	4.7	3.3	1.9	2.5

Source: own elaborations on KSH data

The main agricultural areas of the Country are Western Transdanubia, Northern and Southern Great Plains. In 2008, arable land covered about 6 million hectares, with 1.1 million hectares in permanent pasture (tab. 2). The production concentrates in three sectors: arable crops (cereals, maize, soft wheat) and oil seeds; horticulture; animal breeding. All of them have been influenced by the change in agricultural policy of the transition period, achieving very different results: while crop cultivations increased notably, horticulture and animal breeding (especially pigs) dropped (tab.2).

Table 2: Number of animals (thousand) and land area used by categories, 1990-2005

	arable land	agricultural area	productive land	uncultivated land	cattle	pigs	horses	sheeps
1990	4 712.8	6 473.1	8 235.7	1 067.5	1 637	8 457	76	1 865
2000	4 499.8	5 853.9	7 715.5	1 587.5	805	4 834	75	1 129
2005	4 513.2	5 863.9	7 734.8	1 568.6	723	4 059	67	1 397

Source: own elaborations on KSH data

Today, crops play a prominent role in the agricultural panorama, accounting for about 60% of the gross output of agricultural production in 2008 (fig. 1), reaching quite 17 million tons after the bad performance recorded in 2007 (9.6 million tons). Maize is the most important product (9 million tons), followed by wheat (5.7 million tons, fig. 2). Farmers dealing with arable crops were the better off ones, especially after the EU membership; the sector is characterized by large farms endowed with good equipment and able to exploit scale economies.

[8] According to FAO, *agricultural population* refers to all persons depending for their livelihood on agriculture, hunting, fishing, or forestry. This estimate comprises all persons actively engaged in agriculture and their non-working dependants.

Figure 1. Gross agricultural production, 2008

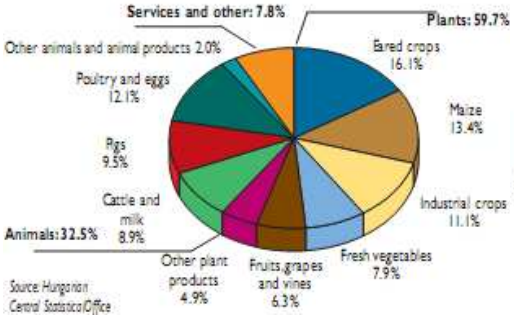
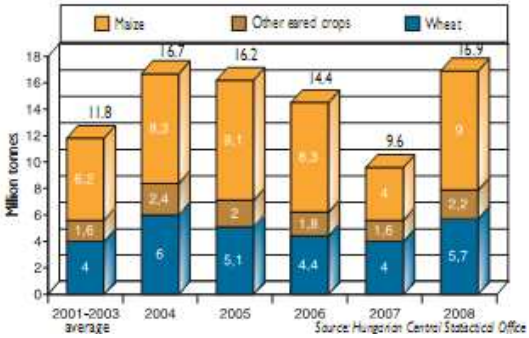


Figure 2. Crops production



Animals account for 32.5% of the gross output of agricultural production. The sector is mainly represented by pigs, poultry breeders and milk producers. The most profitable activity is the poultry sector, till the bird flue: poultry and eggs account for 12.1 % of gross output, followed by pigs (9.2%). These numbers mask the decline in relative importance of the Hungarian livestock sector, with negative trends of output and productivity that characterized the transition process. Taking pigs as an explicative example, there were quite 10 millions heads 20 years ago because of the high subsidies, while today they stop at 4 millions, and the number of cattle and sheep continues to decrease. After 2004, imports of live pigs and pork increased significantly (the quantity imported in 2006 was three times higher than that in 2003), a result of the decrease in domestic stocks.

3. STRUCTURAL TRANSFORMATION IN TRANSITION

In Hungary, before the system change, the agricultural production was fully integrated in the planned production system, and the Country was an important producer and exporter of agri-food products (which was the second contributor to the State budget in 1980), and received a low level of state support in comparison with the other ex satellite states. Moreover, some embryonic forms of market were introduced (following Lange's market socialism), which determined the full functioning of the collective system, i.e. exchange channels which allowed some private products to be sold on public market, moving away from simple self-consumption of overproduction. Agriculture, including processing, trade and other industrial activities of large farms, produced 17% of GDP and employed about the same percentage of the labour force; since the '90s these proportions fell, reaching respectively 3.7% and 4.5% in 2008 (tab.1). Rural regions were the most affected: 45% of unemployed people lived in villages, especially the undeveloped Eastern parts of the Country. They were mainly unskilled men and women previously employed in the cooperative farms and in big state companies[9].

[9] Data were provided by the National Labour Centre, Budapest.

The same declining trend was recorded for in investments and productivity[10] (also due to the end of soft budget constraint[11]), and the disruption of the terms of trade for producers, caused by the loss of the old exchange area. Market economy also meant the spread of inequality in living conditions, and the identification of a *winner* and two *losers*: the Capital and the main cities belong to the first group, rural areas and Eastern peripheries to the second one (Iara and Traistaru, 2003). In order to improve the situation of the agricultural areas, the most urgent interventions in the early '90s were[12]:

- market liberalization (end of the productive plans which asserted the goods to be produced and their quantity, with no attention to consumers' preferences);
- farm restructuring, interesting the property status, management and organization, and requiring the launch of the privatization process, and a land reform. Point 1. and 2. are linked: market liberalization can foster farm restructuring, because farmers can see place for a new own activity, growth in productivity and profitability;
- change in upstream (supply of agricultural inputs) and downstream product (transportation and distribution) operations, able to ameliorate the productive performance of all the actors of the agri-food chain;
- creation of market – friendly infrastructures as institutions and services, among which financial and banking services; market analysis; a commercial law able to state clear property rights, to enforce contracts, and to help solving disputes, provided both by public and private sector. All of them deeply influence the performance of the upstream and downstream operations.

For a successful agricultural transition, the four interventions above should be completed by price liberalization, the demonopolization and privatization of the processing industry and distribution chain, and the creation of a rural credit system (Csaki et al, 2004). It was asserted[13] that the success of the reforms is deeply influence by it timing and therefore all the necessary interventions had to be introduced at the same – and shortest – time. In the CEEs, these reforms were introduced at a different pace and obtained different results, as evidenced by the World Bank list[14] which marked Hungary as the 'best reforming performer' with 8.8 points up to 10, followed by Czeck Republic and Estonia. However, this result will not last for long, as already in 2003, right before the EU membership, several problems remained unsolved (tab. 1). After an initial fall, the role of agriculture on GDP reached 4.3%, while investments had a contrasting trend, increasing till 6.1% of GDP in 2003 and then declining.

[10] We must take care of the low accountability of the statistics and data provided before the system change. Moreover, some indicators were calculated in a different way (i.e. MNP – for GDP – didn't include services).
[11] Kornai, J. 1986.
[12] Among the most important studies related to the need for change in agriculture during transition, we find Csaki,C e Kray, H., 2004; Liefert W., 2002.
[13] From the so called *Big bang approach*, supported at that time by the World Bank and several experts.
[14] WB Report, 2002.

4. MAPPING THE EFFECTS OF THE EU MEMBERSHIP: APPLICATION OF THE PCA AND CLUSTER ANALYSIS

In order to identify the changes occurred after the EU membership in Hungary at a disaggregated level, two maps of Hungary are provided, using a group of 42 socio-economic-demographic and agricultural variables which are available periodically at a County level (NUTS III), for year 2003 and 2007. Aiming to focus the attention to the transformations occurred on agricultural and rural areas, the variables were chosen also coherently with the Agenda 2000[15] indications for analyzing rural areas and accounting for the new visions of the CAP (i.e. diversification and environment sustainability). The relevance and representativeness of indicators for understanding rural areas was inquired by the literature[16,] and it appears to be fundamental also for shaping targeted local policies.

We apply the methodology, belonging to multivariate statistics, of principal components analysis (PCA), which helps in reducing the number of variables of a system, while preserving the most of the information (represented by the variance). This methodology allows us not to make strong assumptions on the model (and to deal with not optimal quality of data and indicators) and was already used in the literature for this kind of analysis with good results (Fanfani et al. 1999; Bogdanov, 2007; Monasterolo et al. 2010). The most famous formulation of PCA is due to Hotelling (1933), while the methodology refers to Pearson (1901).

With PCA, we can transform a group of p indicators, obtained on a group of n statistical units, into a much smaller group of variables which are still able to explain a high level of variability present in the original data, therefore avoiding an important loss of information (Mazzocchi, 2008). While the original indicators we use are highly correlated, the variables we get (principal components), which are a linear combination of the original indicators, are uncorrelated. We have chosen to compute the components on the correlation matrix to avoid the distorting influence of the indicators with higher variance during the extraction[17]. Having obtained the values of the components from the correlation matrix, we calculate the scores of every statistical unit (County) for every component.

The k principal component (k<p) comes from the following linear combinations, expressed as a matrix:

Y= XA, where

Y is the *nxk* matrix, containing the scores of the n statistical units in the k components

A is the vector matrix *pxk* of the normalized coefficients

X is the *nxp* matrix of the standardized data.

[15] The criteria used for the ex Objective 2 refer to: population density, the level of employment in agriculture, the average rate of unemployment, the demographic dynamics. Fanfani et al., 1999.
[16] OECD, 1994. Brasili et al. 2007. WB, 2000.
[17] The correlation matrix is used when the original variables we have to deal with have different measurement units. Therefore, a 'standardization' of the original indicators takes place.

The scores of the Y matrix are utilized for the cluster analysis[18], which we use to get regions almost heterogeneous between themselves, and homogeneous within themselves. This approach helps identifying areas with similar structural features and describing them.

4.1. Application of the PCA and cluster analysis to the Hungarian Counties in 2003

The sample is composed by the 19 Counties plus Budapest

Figure 3. Hungarian Counties (NUTS III)

Source: KSH

The variables: we worked on a data set of 42 variables. The identification of the variables is a critical point for the analysis, because every area follows its own development path according to its natural, historical and productive endowments. We have chosen a list of indicators able to catch the dynamics of evolving areas characterized by structural, socio-demographic and agricultural features, and which are able to show the EU membership effect (mainly through the introduction of the instruments provided by the Cohesion policy and by the CAP), after an in depth analysis and accounting for data quality and availability19. Finally, we referred to some examples provided by the literature (Bogdanov et al, 2007; Fanfani et al., 1999). For a better understanding of the results obtained, the variables were listed in four groups (Brasili et al, 2007):

- 1. economic and productive structure: they present an image of the economic and productive system of the area, with a particular attention to the employment structure;
- 2. structural indicators for agriculture, which consider the productive features of the sector;
- 3. socio-demographic structure, to monitor the evolution of the population in its age structure, cultural aspects and accessibility;

[18]Some software, as SPSS (used here), automatically provide standardized values, which are used in the cluster analysis. Then, all the components are supposed to share the same variance equal to 1, and therefore the same weight in the mapping, carrying possible distortive effects.

[19] We used secondary data provided by the Census 2001, sub regional data provided by the Hungarian Statistical Office (KSH), and by Eurostat database, according to the value needed.

- 4. economic dynamism: indicators reflecting the dynamism of the productive system, which allow us to analyze the fluxes of the structural components of the agricultural sector and the employment structure within the national macroeconomic framework.

There are different methods used to establish the number of principal components to choose: we considered the Guttman-Kaiser criterion, which states to take the principal components able to explain the 70-80% of cumulative variance, and principal components with eigenvalue over 1; we looked at the elbow on the scree plot. Being the 7th and 8th components very contiguous, we preferred not to consider the latter, in order to easier the interpretation phase. The principal components are orthogonally rotated (maintaining uncorrelation of the factors) with VARIMAX because the first interpretation of factor loadings was not straightforward. We selected the first 7 principal components, explaining 86 % of the original variance:

PC1- component of economic development (29%). It identifies areas characterized by a high population density, high GDP in comparison with the national average, good earnings, university education, employment rate in the services, and a high value of industrial production. These results are confirmed by the negative values, which are associated to the dependency ratio, employment in the primary sector, role of primary sector on GDP and the unemployment rate.

PC2 – component of social and industrial decline (17.8%). Positive values are associated with unemployment rate, number of recipients of social support, employment in the public administration and dependency ratio. Particularly negative are the values for the employment rate, especially in the secondary sector, the role of the secondary sector on GDP, labour productivity and population change.

PC3 – component of demographic structure (12.1%). Positive values are recorded for the youth index, for generational change, for the presence of younger farmers and prevalence of small farms (< 5 ha), recipients of social support and population change. Coherently, negative values are associated with the aging index, population density, employment rate, average GDP and net earnings, and with the presence of older farmers.

PC4 – component of economic backwardness (9.7%). It identifies areas characterized by the presence of unemployment, high number of recipients of social support, occupation in the public administration and part time in agriculture. The highly negative values are mainly associated to the agricultural sector: occupation in agriculture and role of primary sector on GDP; average farm size, full time occupation in agriculture.

PC5 – component of agricultural development (8 %). It is characterized by areas with good agricultural performance, relevant role of primary sector on GDP, high land price, the prevalence of cereals and maize among the cultivations, and touristic vocation.

PC6 – component of area productivity (5.4%). Positive values are associated with labour productivity, in-migration rate, the presence of infrastructures, and employment in the secondary sector, index of population change and the presence of older farmers. Negative values are recorded for land price, average farm size and occupation in the primary sector.

PC7 - component of touristic attractiveness (3.7%). Highly positive values are associated with the number of beds in hotels and similar facilities, infrastructural endowment, employment rate and employment in services, agricultural productivity.

The next step was the application of the cluster analysis on the 7 components, using a non hierarchical method of clustering, the *k-means algorithm*, where *k* stand for the number of clusters chosen to start the process. With this method, all individual observations are assigned to the nearer cluster seed20. The choice for 6 clusters was compared with the results we got from the application of the *Ward's* (hierarchical) *method.*

The **first cluster** is composed by the area of the capital town Budapest, and it is characterized by positive values for the first and second component, reflecting the presence of high economic development in comparison with the rest of the Country, and the declining role of secondary sector in favour of the tertiary and public administration. GDP p.c. is 3 times higher than the national average, and net earning 39% higher; the number of beds in hospital is quite 6 times the national average and number of university students reaches 4 times.

The **second cluster** is composed by 3 Counties – Baranya, Somogy and Tolna. It borders with the Lake Balaton from the North, it is characterized by rural areas vocated for agriculture (positive component 5), which plays an important role on the economy and society (employment in primary sector and GDP produced by it are respectively 42% and 36% over the national average), and are able to offer naturalistic and folkloristic attractions and accommodations for tourists (60% over the average, positive component 7). At the same time, negative component 2 evidence the ongoing industrial decline and economic difficulties (lower GDP, higher unemployment than the national average).

The most backward Counties, Heves and Nograd, located in Northern Hungary, compose the **third cluster.** Components 1, 3 and 5 are negative, component 4 (economic backwardness) is positive, highlighting the structural problems in the economic, social, agricultural and demographic sectors, unsolved and even increased during the transition period. These Counties were characterized by the presence of heavy industries (mining and chemistry), already declining before the system change. The value of industrial production was two times lower than the national average, GDP p.c was 25% lower and unemployment rate 22% higher.

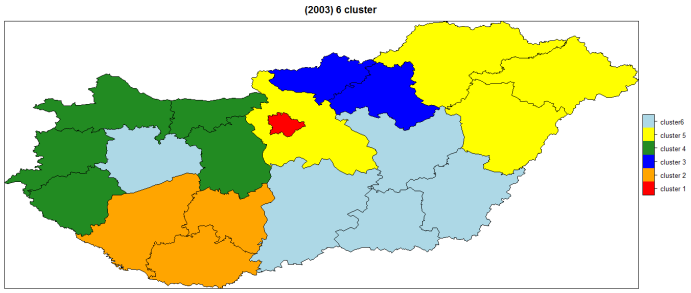
The **fourth cluster** is composed by five Counties – Fejér, Komárom-Esztergom, Győr-Moson-Sopron, Vas and Zala – belonging to Western and Central Transdanubia. They have good productive performance and an advanced economic structure which makes this areas one of the most developed of Hungary, thanks to manufacturing (machine industry, textiles and foods, positive component 2), service sector and agriculture (component 5 positive). During the transition period, several foreign companies, especially from Austria and Germany, invested here (i.e Audi, Renault, General Electrics); therefore the living standards are above the national average.

[20] The main obstacle in using k-means derivates from the need of the researcher to specify the number of clusters.

Cluster 5 is composed by 4 Counties – Pest, Borsod-Abaúj-Zemplén, Hajdú-Bihar and Szabolcs-Szatmár-Bereg – mainly on the Eastern Hungarian border. It is traditionally a farming area with an agricultural and food industry-related machine manufacturing, but it also hosts industrial sites (also brown fields developed by multinational companies, i.e. Samsung and Michelin) and an important University centre in Debrecen, the second largest city in Hungary. These endowments were not able to reverse the difficult structural changes in the primary and secondary sector, which led to a persisting high unemployment rate, low agricultural productivity and the need for social support (component 4 positive, component 5 negative).

The **sixth cluster** identifies the 3 Counties located in the Southern Great Plain Region (Bács-Kiskun, Békés, Csongrád), plus Vezprém and Jász-Nagykun-Szolnok. It shows positive values for the component of touristic attractions (here the famous Hungarian "Puszta" is located, featuring five large rivers, flood plains, dams and lakes), but negative values for the 1st, 4th and 5th component, highlighting a lower economic and agricultural development. In fact, GDP p.c. reaches 70% of the national average and net earnings 76%, quite low unemployment rate (6%) but high rate of part time agriculture (50%).

Figure 4. 6 clusters in 2003



Red: cluster 1;
orange: cluster 2;
blue: cluster 3;
green: cluster 4;
yellow: cluster 5;
light blue: cluster 6

4.2. Catching the enlargement effect. An application of the PCA and cluster analysis to the Hungarian Counties in 2007

In order to understand the changes occurred with the European membership in Hungary, we repeated the same process, using the same 42 variables, for 2007, after the end of the first programming period 2004-2006 for the new member States. We could identify again 7 principal components, differing from the previous ones both in the values and in the interpretation:

PC1- component of economic development (30%). Positive values identify areas with high population density; GDP and net earnings in comparison with the national average; occupation in the services sector and the contribution of the tertiary sector on GDP; number hospital beds and university students.

PC2- component of social disease (19%). Positive values are associated with a notable unemployment rate; distribution of social support and employment in the public administration; dependency ratio. At the opposite, negative values are recorded for the employment rate; population change and GDP in comparison with the national average.

PC3 - component of industrial decline (10.8%). This component is characterized by negative values for occupation in secondary sector and its contribution to the GDP; employment rate; value of industrial production. Instead, positive values are associated to the occupation in the public administration and to the number of recipients of social support.

PC4 - component of age structure (8.8%). Positive values are recorded for the youth index and the generational change; for farmers under 35 years old; the presence of small farms and part time work in agriculture; distribution of social support. At the opposite, GDP in comparison with the national average, population density and the employment rate have negative values.

PC5 - component of agricultural development (7.2%). Positive values are associated to land price; to the average farm size; to the presence of cereals, maize and livestock; to the employment and in the primary sector and its contribution to the GDP.

PC6 - component of touristic attraction (6.2%). Positive components are recorded for the number of hotel/pension beds; to the presence of forested area; to the land price.

PC7 - component of agricultural productivity (3.8%). Positive values are lined to the agricultural value added, to labour productivity in agriculture, to the contribution of the primary sector on GDP, and to the presence of maize.

Comparing the composition and meaning of these principal components with the ones referred to 2003, we can notice an accentuation of the decline recorded by the industrial sector, and an increased role of agriculture for the Country.

We applied the cluster analysis on the 7 principal components, using again the *k-means algorithm.* In 2007 we could identify that Counties gather in 5 clusters.

The **first cluster** is again composed by the capital town Budapest, confirming the leading role for the economic development of the Country, even if at a lower pace (GDP p.c. increased by 6% but net earnings decreased by 4%), the persisting decline of the secondary sector together with a rising relevance of the tertiary (role of services on GDP is 40% over the national average), and the presence of ageing population.

Three Counties from different Regions – Vezprém, Zala and Pest – compose **cluster 2**. They are characterized by a good touristic potential (number of touristic accommodations 30% over the average, thanks to Zala), and from a positive age structure, but also from the effects of industrial decline (decrease in employment in industry and role of secondary sector on GDP, also driven by Zala).

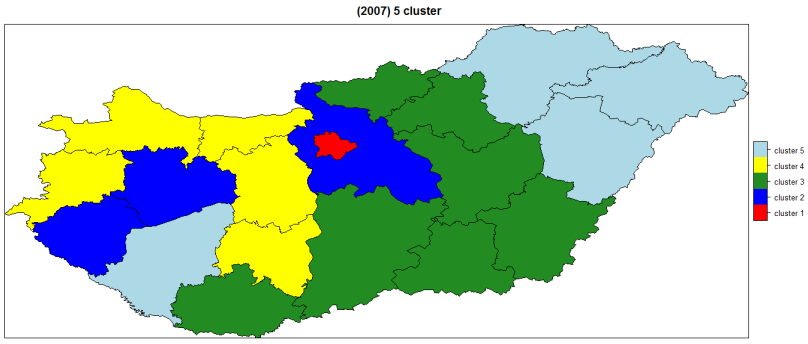
The **third cluster** is composed by seven Counties, Baranya, Heves, Nógrád, Jász-Nagykun-Szolnok, Bács-Kiskun, Békés, Csongrád. They show negative values for the component of economic development, age structure and agricultural development, and a positive value for the component of industrial decline. This result is coherent with the findings from 2003 and represents a worsening of the difficult development conditions recorded before the EU membership. GDP p.c. declined in 4 years by 6% and unemployment increased by 26%;

The **fourth cluster** includes Fejér, Vas, Tolna, Komárom-Esztergom and Győr-Moson-Sopron. In comparison with 2003, the social and economic situation worsened: GDP p.c.

decreased and unemployed increased (+ 35% in average), while employment in agriculture and its role on GDP increased by 30% and 10% (in fact, positive component of agricultural development), reaching 9% and 6%.

Finally, **cluster 5** is composed by four Counties: Somogy, Borsod-Abaúj-Zemplén, Hajdú-Bihar, Szabolcs Szatmár-Bereg, mainly located on the Eastern border (with the exception of Somogy). They are characterized by high and positive values for the component of social disease and age structure, with a remarkable unemployment rate (12%, 50% increase) and a low GDP p.c., underling the persisting problem of the bordering areas of the Country.

Figure 5. 5 clusters in 2007



Red: cluster 1;
blue: cluster 2;
green: cluster 3;
yellow: cluster 4;
light blue: cluster 5

5. THE CHARACTERISTICS OF CAP INTRODUCTION IN HUNGARY

As shown by the tables above, at the time of the EU membership, transition in agriculture was still an unfinished process, to which the EU policies should give an answer. Moreover, the EU 2004 enlargement had a huge impact on agriculture: the EU-10 took 7 million farmers to the EU farmers population (6 millions) and 55 million hectares of agricultural land (+40%), but production in the EU-27 expanded much less (by about 10 - 20 % for most products) confirming the potentiality of developing agriculture in the EU-10[21]. Moreover, regional disparities doubles: GDP p.c. decreased by 12.5%, and the share of population living in Convergence areas increased to 25%.

The inclusion of Hungary in the CAP implied the introduction of new provisions and the gaining of new opportunities: the access to the single market in the EU, relatively stable commodities prices, direct payments phased in gradually to reach the full EU level, and rural development measures. At the same time, applying the complexity of the CAP rules to the NMSs introduced difficulties (i.e. need for the introduction of managing and paying institutions), and uncertain from an equity point of view (i.e. payment per ha based on the historical yields).

[21] DG Agri

The way toward the EU accession was paved by the PHARE programs (1990-2003), which helped to introduce the European directives and objectives in the Hungarian Law and public administration, while in the agricultural sector they promoted the development and restructuring of institutions, enhancement of investments, establishment of loans and development of a cadastral registry. Between 2002 and 2004, the SAPARD program assisted in the preparation for the implementation of the Common Agricultural Policy clarifying the objectives and the implementation instruments, receiving 8 828 applications from farmers. The SAPARD experience was later used in the creation of the Agricultural and Rural Development Operational Programme (ARDOP[22]) and the National Rural Development Plan (NRDP), which includes the Hungarian priorities, instruments and funds for agriculture and rural development in the first programming period 2004-2006.

For their first complete programming period (2007-2013), the EU-10 could opt for the Single Area Payment Scheme (SAPS), and they could pay farmers a Complementary National Direct Payment (CNDP) for those sectors which were already supported by the CAP[23]. From the date of the EU accession, three types of support are available for producers: low market support; single area payment scheme (SAPS); rural development support and top-up payments (paid from the national budget as an integration of SAPS, till 30%).

Being all Hungary included in the Convergence area between 2004 and 2006, it received 2 billion Euros under Structural Funds and 1,2 billions under cohesion Policy. Moreover, Hungary paid for agriculture 1.34 billion Euros as EU direct payments, 1.02 within the framework of SAPS and 0.27 as market support. Direct payment improved the situation of holdings involved in plant growing and crop production or mixed farming, but very little in animal husbandry. The maximum amount of direct area payments, based on reference yield[24] starts from around 50% of the historical payments for EU-15 in 2004[25], and it will reach 298 Euros from 2010 until the end of the programming period. Moreover, Hungary could maintain the sugar sector as a still coupled sector and could get transitional coupled payments for the fruit and vegetable sector.

Table 3 shows the favourable difference in the amount of payments for the EU-15 (300.5 Euros vs 269 Euros per ha) in comparison with the new member States. Therefore, inequality of treatment between the two groups can be assessed.

[22] ARDOP 2004, NDRP 2006
[23] Based on this rule, Hungary has created 11 different "top-up" envelops for the year 2005
[24] Average value of the yield recorded in 1995-1999. Therefore, SFP per hectare will be lower for the EU- 12 than in the old member States because the transition process resulted in a substantially lower yields compared with the EU-15 countries during this period.
[25] Payments vary according to farm size, from 300 Euros for smaller farms to 40 000 Euros for the larger ones.

Table 3: Area payment granted per hectare, in EUR/ha (SAPS+CNDP)

Country	Reference yield	2004	2006	2008	2010	2011-13
Hungary	4.73	149.5	174.3	238.4	298	298
EU-10	4.00*	138.6	163.8	201.6	252	252
EU-15	4.77	300.5	300.5	300.5	300.5	300.5
EU10/15, %	83.8	46.1	54.5	67.1	83.8	83.8

Source: EC DGAgri.

5.1. Insight on SAPS payments and farmers' applications at the County level

Looking at the applications for public (SAPS and TOPUP) payments within the Agricultural and Rural Development Operative Program (AVOP) in 2005[26], it emerges clearly that land size and the area of provenience affects both the quality and quantity of demands. In fact, farmers with less than 0.3 hectares presented the lowest number of applications and the most was refused by managing authorities. By the way, also in this category we can find better performing Counties, as Somogy, where 90% of applications were approved, although just 9 were presented. At the opposite, several applications came from Jász-Nagykun-Szolnok and Heves but they did not succeed. The number of presented applications increases moving to farms between 0.3 and 1 ha, and it reaches the most for the land size class 1-5 ha. Bigger farm size also influences the quality of applications: the bigger the farm, the most successful the applications. The most of applications for an area lower than 5 ha came from one of the most backward and rural areas, Szabolcs-Szatmár-Bereg. Instead, for farm size over 100 ha, the most came from better off agricultural areas, as Fejér and Bács-Kiskun, till Pest for over 1000 ha.

Following the previous findings from Katona Kovács (2007), which found no significant correlations between SAPS payments, GDP p.c. and unemployment rate, and the results from Forgács et al. (2008), we looked at correlations between the number of applications received, the payments (TOPUP + SAPS), farmers' age, average farm size and farm location in less favoured areas (LFA), at the County level. We found no significant correlation between applications (or payments) and farms size and farm location in LFA, while we recorded significant - but negative - correlation between applications received, payments and farmers' age (over 55 years old). Therefore, the younger the farmer, the higher the applications and payments for the County.

6. CONCLUSIVE REMARKS

The analysis highlights the differences in the evolution of the Hungarian Counties after the EU membership. Therefore, mapping represents a first – but essential - step in planning and drafting future economic and rural development policies for the specific areas. The results

[26] The only public data available refers to 2005. Source: Hungarian Agricultural and Rural Development Agency.

obtained are easy to be read and to be interpreted by policy makers interested in policy drafting, and by project managers, as a difference from the complexity of interpretation of the numerous indicators proposed by the EU for the evaluation of rural development measures27. Moreover, they could be usefully utilized for understanding the development characteristics of the current EU candidate and pre-candidate countries from Western Balkans, avoiding the 'knowledge gap' (and consequent budget ineffectiveness) of the previous enlargement.

Comparing the Hungarian Counties in 2003 and 2007, a clear divergence between the initial objectives of the EU membership and the results obtained emerges, especially in the already worse off rural areas, as previously feared by Hubbard et al. in 2009. The EU funds for convergence and the disbursements provided by CAP could be the reason for the moving from the secondary sector to agriculture in some Counties, as in Zala and Győr-Moson-Sopron, but without an increase in the economic performance and living conditions, due to the lack in structural transformation required in agricultural and rural areas (Csaki et al, 2010). Contemporary, phenomenon of marginalization increased in lagging behind Counties as Nógrád and Szabolcs-Szatmár-Bereg, confirming the presence of winning and loosing regions from the enlargement. Budapest and the Western border are among the formers, able to attract initiatives in the tertiary sector the first, and to become specialized centres for industrial production the second, while in the Eastern peripheries the socio-economic situation worsened, due to the lack of ability in attracting investments and the low agricultural productivity after the land reform.

CAP introduction was accompanied by inequality issues in SAPS payments, low information provided to farmers by the national agencies, and a lack in targeting measures, shown by the prevalence of bigger farms located in economically active Counties among the beneficiaries.

In the conclusions, this study evidenced the serious obstacle represented by working with limited national statistical sources for undertaking minute statistical analysis and future evaluations of the accession experiences. Disaggregated, accountable and periodically updated data on farms performances, on the socio-economic trend and new CAP objectives would be much necessary in assessing the role of an EU value added, as well as information from the national paying agencies at the regional and sub-regional level.

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[27] DG Agri counts more than 150 indicators to assess rural development.

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