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Analysing the effect of the EU membership on agricultural and rural areas: the case of Hungary

Abstract: *Several progresses were made in evaluating the development policies for rural areas in the last years. Many indicators were introduced to assess the effectiveness of the 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.*

This paper offers a methodological contribution towards the identification of rural areas and the assessment of the changes occurred during the EU membership, with particular attention to the CAP contribution, in Hungary. Applying explorative techniques belonging to multivariate statistics and stepwise econometrics to a set of relevant variables, clustered maps of the changes occurred in the Hungarian agricultural and rural areas before (2003) and after (2007) the EU enlargement are provided. The author believes that more targeted – and therefore efficient – policies for agricultural and rural areas require a deeper knowledge of their structural and dynamic characteristics.

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

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Introduction

Rural Development (RD), and its linked issues, was for long kept away from the much needed policy attention at the European Union (EU) level and remained in the shadow of a strong CAP: just with Agenda 2000, RD was endowed with its own Fund, and became the CAP second pillar[1]. Lately, several efforts were devoted to the improvement of RD policy monitoring and evaluation, with the introduction of numerous indicators[2], but the improvement in availability and comparability of relevant statistics proceeded at a much slower pace, as well as the financial endowment. At the same time, RDPs have to cope with new challenges, as the broader concept of multifunctionality, to be considered from the protagonists' point of view, (i.e. the farmers in rural and peri-urban areas, and urban citizens) and linked to sustainability issues (agri-environmental, quality of life) and to the changing consumers' preferences for local food and public goods preservation. The CAP adaptation towards the new societal objectives would require a change in policy (and budget) orientation, which is far from the current perspectives of CAP reform post 2013 (DG Agri, 2011). The 2013-2020 programming period would also determine the reach of the full CAP payments quota for the new member States (NMSs), while the European Commission (EC) is already working at the next enlargement to Western Balkans, where agriculture and rural areas still play a central role. Therefore, successful results from the evaluation of the first five years of the EU-10 membership were much awaited by the EC, in order to support its policy agenda. However, these results did not happen, especially in the agricultural and rural areas in NMSs, which are still characterized by higher than the average level of poverty (BERTOLINI et al., 2008), driving the process of internal divergence within the EU. Among the reasons, deficiencies in timing and targeting policies (MONASTEROLO et al., 2011), overlapping measures, and the need for improving institutional planning and implementing abilities were recognized (MANTINO, 2010). Moreover, it was evidenced that the CAP and Cohesion policy introduction in NMSs was deeply influenced by the limited knowledge of agricultural and rural areas in transition for which the intervention was prescribed (CSÁKI, 2009). In fact, data availability and accountability at a sub-regional still represent a problem, and a common definition of rurality at the EU level is still lacking.

Objective of the paper

This analysis provides a methodological contribution for the identification and description of rural areas, in order to overcome the several limits imposed by the most used methodologies for area classification. I move from the results obtained by ANANIA et al. (1995) and FANFANI et al. (1999; 2003), which

1 Due to the imbalances in funds allocation between the CAP first (market support) and second (Rural Development) pillar, the latter could be better referred as a stool.

2 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

evidence the importance of mapping the territory for a better identification of rural areas and their changing characteristics. In fact, clustering areas at the sub-regional level according to a multidimensional, accountable and timely updated statistics database helps focusing on the regional and local reality, increasing the policy effectiveness, decreasing resources depletion (economic, physical, human), and reaching efficient results in the medium to long term. The final outcome is the contribution to drafting better targeted policies, able to address the needs of a specific territory.

Due to the lack of time series for disaggregated data, mapping areas allows us to catch the changes occurred on Hungarian agricultural and rural areas before and after the EU enlargement, providing a better understanding of the effects the EU membership at the county level. Hungary was chosen among the NMSs because of the importance (96% according to the OECD methodology) of rural areas on the total 93,029 km² land, and given the historical socio-economic role played by agriculture.

Therefore, the objective of this paper is to:

- provide an updated overview of the methodologies used for the identification of rural areas, and introduce an improved classification methodology, through the construction of a dataset of relevant variables (agricultural, rural development, demographic, structural and environmental sustainability issues).
- identify the changes occurred before (2003) and after (2007) the enlargement at the county level, using multivariate statistics. The specific area's structural, dynamic socio-economic and agricultural characteristics are considered when selecting relevant variables.
- offer a preliminary evaluation of the distribution of Single Area Payment Scheme (SAPS)[3], using the information on the applications provided at the county level by the Hungarian Paying Agency, and show correlations with the leading factors.
- understand whether the implementation of these reforms reveals a persistent discrepancy with the goal of eliminating regional inequality (a stated objective of the European policy of cohesion[4]).

Advances toward a shared definition of rurality

In the last decades, sociologists and economists tried to define rurality, focusing on the determinants of localization of economic activities. Relevant examples are the theory of growth poles (PERROUX, 1955), the center-periphery model (FRIEDMAN, 1972), the cumulative causation (KALDOR, 1970) and,

3 SAPS is the simplified area-based payment system chosen by Hungary at the time of joining the EU, and it is complemented with additional national top-up payments for implementing the CAP. SAPS support is very important because it is related to the first pillar, which still gets the most of the CAP budget.

4 Article 158 of the Treaty states that "in order to promote its overall harmonious development, the Community shall develop and pursue its actions leading to the strengthening of its economic and social cohesion. In particular, the Community shall aim at reducing disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands, including rural areas."

recently, the new economic geography (KRUGMAN, 1991). Their common point is the conception of rural areas as dependent, or residual from urban ones (BERTOLINI et al., 2008). Looking at the EU level, every country has its own definition of rurality, influenced by the national perception of the elements that characterize rural areas, and affected by difficulties in providing reliable disaggregated data.

Nowadays, internationally the most used methodology was proposed by OECD (OECD, 1994; 2005), which classifies regions (NUTS3 level) in three groups – Predominantly Urban (PU), Intermediate Rural (IR), and Predominantly Rural (PR) – according to three criteria, relying on population density. Appealing features of this classification method are the simplicity in its application, in interpreting the results and their comparability between States. Several limits emerge from its application: according to the OECD classification (which is also adopted by the EU), PR represent 54% of the territory (reaching 91% together with IR), and 19% of the population (EC, 2009). Then, it doesn't consider the historical and developmental characteristics of different regions (i.e. productive structure, specialization, etc...), nor the natural influence of the presence of mountainous areas, deserts, and semi-Nordic areas on population density. Finally, it doesn't catch the heterogeneous development pattern: within the same country it is possible to identify winning (rich) or losing (poorer), agricultural based[5] or services-oriented rural regions (BERTOLINI, 2009). The growing availability of indicators at sub-regional level contributed to introduce new approaches, in order to overcome these limits. ANANIA and TARSITANIO in 1995 provided a new geographical analysis of agricultural systems and rural areas, later applied to Emilia Romagna (BOCCAFOGLI et al., 1998), and used for drafting the Italian Regional Plan for Rural Development 2000-2006. It consists of 49 indicators available at the municipality level, divided into 4 groups (economic, agricultural, demographic structure, and indicators of dynamic changes) and analysed through multivariate statistics. This approach allows us to identify disparities and similarities between rural areas (which emerge as a part of the dynamic changes in the economic system) belonging to the same Province, Region or Nation, and to monitor their evolution.

BERTOLINI et al. (2008) provided an adjusted definition of rurality: it considers the population density but it also introduces the concept of adjusted density (100ab/km²)[6] and the share of employment in agriculture on the national average[7] at the NUTS3 level. This approach helps us understanding if the population of a region gathers in one town or is more equally distributed; it highlights the relevance of the primary sector on the regional and rural econo-

5 Agriculture is still a very relevant feature for rural areas development, and it is interested by serious structural changes in the growing urbanization process, especially in peri-urban areas.

6 Adjusted density: total population – population belonging to the main inhabited centre of the area in km²

7 EU level would lead to underestimate the rural regions in Countries where the share of employed in agriculture is low.

my; it corrects the overestimation of rurality in Countries presenting few large urban centres (i.e. Ireland, Slovenia) produced by the OECD methodology[8].

Lately also the EU developed a revised rural-urban typology (EUROSTAT, 2010) in order to avoid the spatial problem represented by NUTS3 regions that are too small (<500 km²), and the size-discrepancies between LAU2 and NUTS3. It follows the OECD methodology in that it is centred on population density (population grid) and it can easily be reproduced in countries outside the EU for comparability. It is composed of a two-step approach to identifying population in urban areas[9]. The results are, so far, not very satisfactory: it classifies 68% of EU-27 population as living in the urban areas and 32% in rural ones (5% points higher than the original OECD definition).

Methodology

The limits of the OECD classification of rural areas in Hungary are highlighted in figure 1, where just one county (Budapest) is classified as PU, while 47% of the territory is PR. Different results are provided applying the Adjusted Rurality methodology, where three counties are classified as PU, and only 28% of the territory is PR.

Therefore, in this paper rural counties are selected applying a revised methodology, mainly influenced by the adjusted rurality definition provided by BERTOLINI et al. (2008), enriched with some meaningful indicators. A group of 44 socio-economic-demographic and agricultural variables, which are available periodically at a county level (NUTS3) for the years 2003 and 2007, is used. Relevance and representativeness of indicators have been inquired by the literature[10], and they appear to be fundamental also for shaping targeted local policies. In this case, as for some NMSs, the identification of relevant and statistically meaningful variables is a demanding step, due to the persisting limitations of data availability, and data reconciliation issues.

The level of disaggregation NUTS3 - which doesn't allow us to mark the internal distribution of the phenomena analysed and the presence of polycentrism - was chosen due to the lack of data at the municipality level. The variables were listed according to their relevance in shaping the evolving trend of rural areas, coherently with the EU Common Monitoring and Evaluation Framework (CMEF), with the last findings on the determinants of wealth gaps among EU regions[11], and with the new CAP visions (i.e. diversification and environment sustainability). Six variables important for agricultural produc-

8 By the way, similar final classification of rural areas in EU: 73%, but more differentiated urban ones.

9 Therefore, the population living in RA is the one living outside the urban areas identified in this way. Grids are not applicable to overseas regions, which follow the OECD classification.

10 OECD, 1994; Brasili et al. 2008,

11 EC: Speech by Commissioner Andor László to the High-Level Policy Roundtable on Human Capital in Cities and Regions.

tivity and quality of life - topography; youth unemployment rate; long term unemployment rate; number of patents; private and public funds invested in R&D; people in top business positions - were included.

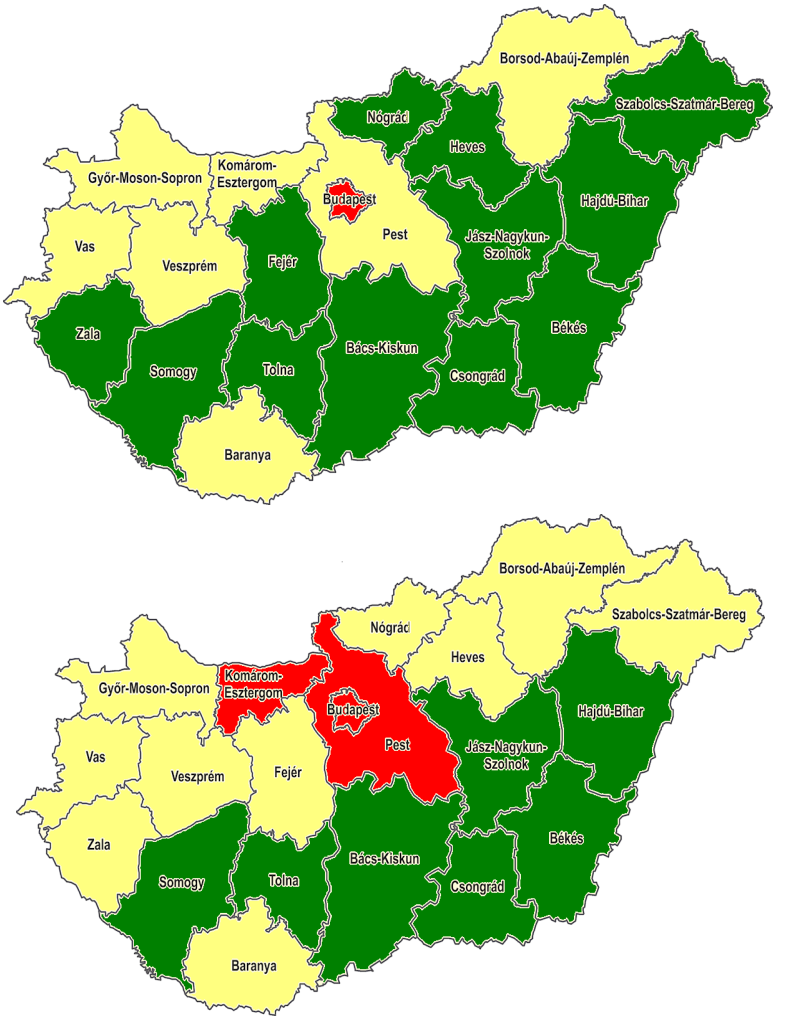

Figure 1. Hungarian Counties from the OECD (left) and Adjusted Rurality (right) perspectives

Legenda: PU: red; PR: green; IR: yellow

The variables were listed in four groups in order to ease the interpretation of results:

1. economic and supply structure: they offer an image of the economic and productive system of the area, paying particular attention to the employment structure;
2. structural indicators for agriculture, considering the productive characteristics of the sector;

3. socio-demographic structure, to monitor the evolution of the population bearing in mind its age structure and cultural characteristics;
4. economic dynamism: indicators reflecting the dynamism of the productive system. It facilitates the analysis of the fluxes of the structural components in the agricultural sector and in the employment structure, within the national macroeconomic framework.

On the identified IR and PR counties, I apply the following multivariate statistics methodologies:
- Principal Components Analysis (PCA), for the years 2003 and 2007, to obtain a restricted group of variables able to reassume the main characteristics of the counties, with a minimal loss of information.
- then, I proceed with a Cluster Analysis (CA) on the results obtained by the PCA, in order to classify municipalities according to their characteristics of rurality.
- to further test the results of the CA, the Discriminant Analysis (DA) is used to rank the counties on the basis of their level of rurality according to the discriminant variables (backward regression was used to identify these predictors).

These methodologies, belonging to the group of the explorative techniques, allow us not to make strong assumptions on the model (and to deal with not optimal quality of data and indicators). Moreover, they were already used in the literature for this kind of analysis with good results (FANFANI et al. 1999; BOGDANOV, 2007; MONASTEROLO et al., 2010).

Application of Principal Components Analysis and Cluster Analysis to Hungarian rural Counties in 2003

The sample is composed of the 17 PR and IR counties. A principal component analysis (PCA) was conducted on the 44 variables. An initial analysis was run to obtain eigenvalues for each component in the data. Five components had eigenvalues above 1 (Kayser's selection criterion), and the scree plot showed inflexions that would justify retaining either 3 or 5 components. Given the sample size, and the convergence of the scree plot and Kaiser's criterion on five components, the latter number of components was retained in the final analysis. These components explain 75.2% of the original variance, in line with the Guttman-Kaiser criterion, which suggests PCs explaining 70-80% of cumulative variance.

PC1 - rurality (28%). This component gathers the main features of Hungarian rural areas. Positive values are associated with the presence of recipients of social support, dependency ratio, employment in public administration (PA) and in the primary sector; presence of a young population and university students; all the unemployment indexes; presence of small farms. Coherently, negative values are shown for GDP p.c. and net earnings on the national average; employment rate; role of secondary sector on employment and GDP; labour productivity in agriculture.

PC2 - agricultural development (16%). Positive values are associated overall with the primary sector: its role on GDP and employment (full-time mainly); the presence of larger farms and younger farmers; cereals, maize and pig breeding among the activities; land price and R&D expenditures. Negative values are shown in labour productivity in agriculture; population density and immigration rates; all unemployment indexes, in particular long term unemployment.

PC3 - economic development (14%). This gathers the developmental features of rural areas: positive values are recorded for population density and population change; GDP p.c. and average earnings; employment in services, value of industrial production and university students. Instead, negative values are associated with long term unemployment; aging index; older farmers; employment in public administration (PA).

PC4 - emerging rural diversification (10%). This identifies areas with natural and agricultural assets (positive land price, cereals and maize, forests and livestock), and a tendency toward economic diversification but persisting unemployment and low salaries.

PC5 - touristic vocation (7%). Positive values underline the role of natural attraction (forests, pastures, accommodation, temporary immigration) and the primary sector in the economy (agricultural and labour productivity in agriculture). Negative values are recorded for long term unemployment, employment in the PA, presence of recipients of social support, average farm size.

The next step was the application of cluster analysis to the 5 PCs. A two-step process was adopted. First, Ward's hierarchical method was applied and a dendogram showing the nesting process was obtained. As hierarchical methods often present problems with data containing a high level of error, the final clustering was obtained by applying non-hierarchical method, the k-means algorithm, where k stand for the number of clusters chosen to start the process. In fact, this method is faster and more reliable when working with large databases. All the individual observations are assigned to the nearer cluster seed, and the researcher needs to set the initial seeds and specify the number of clusters. Furthermore, reallocation is allowed for in each iteration step.

5 clusters were finally identified:

1. **Deep rurality**. This includes two counties (Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg) located at the North-Eastern border of Hungary. In former Communist period they were invested in heavy industrialization, but due to the unsolved structural problems during transition they now

show high unemployment rates (+30%, youth unemployment +50%[12]), presence of recipients of social support and employment in PA (+60% and +20%), low GDP p.c. (-30%). The secondary sector still plays a relevant role (thanks to the delocalization of multinational companies i.e. GE and Borsch, mainly in the food industry, manufacturing, chemical and metallurgy), while agriculture is lagging behind (farm size is the half of the national average, as full-time work in agriculture).

2. Potential rurality. This identifies the Southern Transdanubia Region (Baranya, Somogy, Tolna), characterized by a positive PC2 due to the role of the primary sector (9% of GDP, +20%), with maize as main cultivation (+40%); high natural endowments (Lake Balaton, vineyards); good services, infrastructures, and investments, which contribute to economic diversification and tourism (positive PC4 and 5, +30% accommodation).
3. Manufacturing sector. This is composed of five counties belonging to Western and Central Transdanubia, with good productive performance and living standards above the national average (+25% GDP, -80% long term unemployment). It specializes in manufacturing activities (machine industry, textiles and foods, +30% value of industrial production), also due to the several foreign companies, especially from Austria and Germany, which invested in the area during transition (Audi, Renault, General Electrics). Moreover, it is rich in historical and natural endowments, which helps diversification (positive PC4 and 5).
4. Agricultural activity: composed again of five counties, located in Northern and Southern Great Plain, this is characterized by the role of the primary sector (+30% on GDP and +22% of employment in agriculture) and the presence of natural attractions (i.e. Puszta, flood plains, spa water). In this cluster, Debrecen, the second largest Hungarian city and an important national research and university centre (+20% expenditures in R&D), is located. These features were not able to contribute effectively to area development (-10% GDP and net earnings, -20% labour productivity in agriculture).
5. Backwardness cluster includes Heves and Nógrád (Northern Hungary). It shows negative values for all the PCs, highlighting problems in the economic (-20% GDP), social (+20% recipients of social support, +40% long term unemployment) and agricultural (prevalence of small farms and old farmers) sectors, which were unsolved and even worsened during the transition period. These counties were characterized by the presence of mining and chemistry industries, already declining before the system change: now the value of industrial production is twice as low as the national average, and expenditures in R&D and request for patents reach one third of the national average.

12 Percentages used for describing clusters values are intended in comparison with the national average.

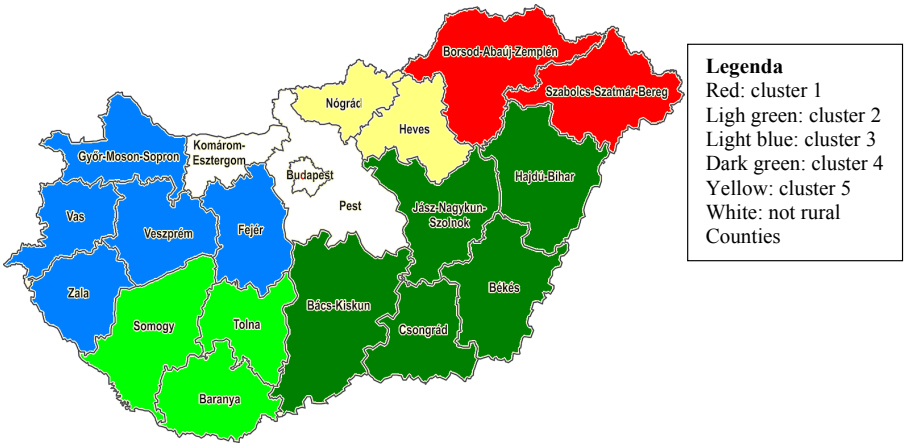

Figure 2. Hungarian rural counties, 2003

Application of Principal Components Analysis and Cluster Analysis to Hungarian rural counties in 2007

In order to understand the changes that occurred in Hungary after the European membership, I repeated the same process (PCA and CA) on 2007 data, using the same set of variables after the end of the first programming period 2004-2006 for NMSs.

5 PCs were again identified, explaining 74% of the original variance:

1. **PC1 - rurality (26%)**. This first component shares the same features of PC1 in 2003, but it shows worse results. Positive values are associated with the presence of recipients of social support; dependency ratio; all the unemployment indexes; employment in agriculture and the role of PA. Coherently, negative values are associated to GDP p.c., net earnings and employment rate.
2. **PC2 - age structure (15%)**. Positive values are associated with the presence of a young population (youth index, university students, youth unemployment), population change and with the value of industrial production, while negative values are associated with the role of the primary sector on employment and GDP, presence of older farmers and the ageing index.
3. **PC3 - agricultural productivity (14%)**. This component gathers the performance indexes for agriculture. Positive values are associated with occupation (mainly the presence of younger farmers), agricultural productivity, cereals and maize production; investments in R&D and patents, temporary immigration, which show the role of external investments in agriculture in less favoured areas (negative land price).
4. **PC4 - lagging agriculture (10%)**: positive values are recorded for crops, family farming, land price, touristic accommodation and employment in PA. Instead, negative values are associated with farm size, farmers' age and full-time work in agriculture, agricultural and labour productivity; relevance of the secondary sector and investments.

5. **PC5 – rural diversification (9%)**: this component is characterized by natural attractions (forests, pastures) and tourism (accommodation, employment and role of the tertiary sector on GDP), positive immigration indexes, with part-time and older farmers prevailing in agriculture. Instead, negative values are associated with the secondary sector and the value of industrial production.

Applying the *k-means*, after running the analysis with Ward's method, five clusters were again identified. They differ from the analysis provided for 2003 in composition and values:

1. **Lagging rurality**. It gathers three counties located in North-Eastern Hungary which share the features of declining rurality: high rate of recipients of social support (+50%[13]), high unemployment (+30%), GDP and net earnings lower than the national average (-15%), positive demographic balance. Low productive agriculture is mainly conduced at the family level (negative PC3 and positive PC4), with the prevalence of industrial crops.
2. **Agricultural vocation**. This is composed of four counties, mainly in Southern Great Plain, showing agricultural vocation (+30% contribution of primary sector on GDP and +23% employment, larger farm size, young farmers), high rate of expenditures in R&D (+30%) and patents (+20%). The natural attractions could be better exploited for diversification, creating touristic facilities.
3. **Industrial areas**: Fejér and Győr-Moson-Sopron, in Central and North-Western Hungary, are the most developed of the counties examined. In fact, they have a high GDP, net earnings and population density (+30%, +10% and +20% respectively), the lowest unemployment rate (-50%) and employment in PA, a dynamic population. The economy is driven by the secondary sector (highest value of industrial production), while agriculture is conducted in a productive way (larger farms, high labour productivity).
4. The **backward** cluster is composed of just one county, Nógrád, located in Northern Hungary, presenting characteristics of deep rurality and low development perspectives. GDP p.c. is 60% lower than the national average, long term unemployment and relief on social support are high (30%). Industrial production is still declining, and investments are lagging, and no of diversification (i.e. tourism) are on offer.
5. **Diversification**. This is the largest cluster, composed of seven counties on the Southern and Western Hungarian borders. The rich natural, historical, wellness (medicinal and thermal waters) sites and the eco-touristic infrastructures are an important source of attractiveness of this flat and green area, where agriculture is dominantly composed of crops and vineyards, and conducted in a quite productive way. In fact, GDP p.c. and permanent immigration are above the national average, while unemployment indexes are considerably low. Apart from in the tertiary sector, also industry has a good role on the economy of the area, in the energy, telecommunications and food industry sectors (PannonPower, SMT, Elcoteq, Sió).

13 Percentages for describing clusters must be intended on the national average value.

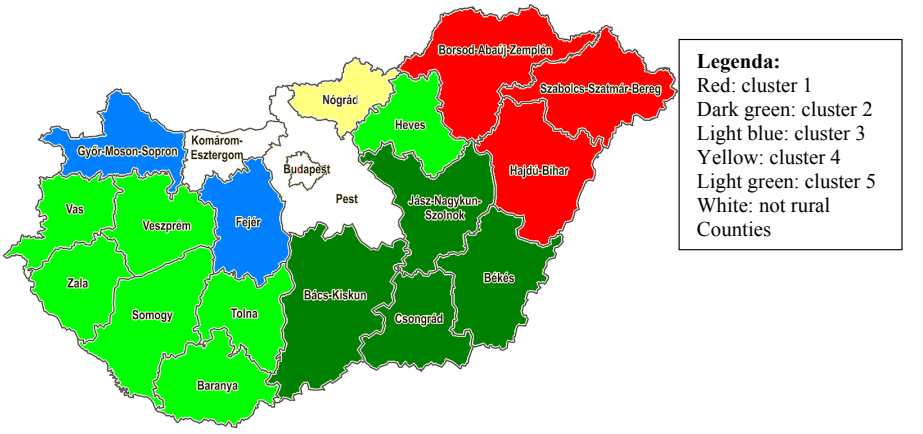

Figure 3. Hungarian rural counties, 2007

Testing the results through Discriminant Analysis

A discriminant analysis was run for 2003 and 2007 in order get a confirmation of the classification results obtained with the previous CAs, ranking counties according to the set of relevant variables (Klecka, 1980). The predictors (discriminant variables) were defined through a backward regression run on the variables composing the PC1 (from the previous PCA analysis), which is the one explaining the most of the variability of the original dataset. The backward method was preferred to the forward one in order to avoid the possibility of incurring in suppressor effect.

For 2003, the backward regression evidenced four variables - number holdings <5 ha AA, ageing index, dependency ratio, % secondary sector on GDP, population density (GDP p.c. as dependent variable). According to the results of the diagnostics, two variables were excluded due to possible multicollinearity problems - number holdings <5 ha AA and % secondary sector on GDP which showed condition index over 30. Tolerance index was over 0.260 for all predictors, VIF ranged between 1.6 and 3.8.

Table 1. Model summary 2003

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
7	.988[g]	.976	.967	5.986481	2.162

Dependent variable: GDP p.c.

The discriminant analysis was run on four variables - dependency ratio, population density, GDP p.c., ageing index (this last one deleted from the groups due to not significant value for the Wilk's Lambda). The most influencing discriminant variable was population density (Table 2). Table 3 shows the number (and percentages) of correctly classified cases. In total 90% of the

cases were correctly classified: 2 previously classified urban counties (Pest, Komárom-Esztergom) resulted rural, while all the former rural counties maintained their classification. The most urban county was Budapest, and the most rural one was Borsod-Abaúj-Zemplén.

Table 2. Standardized canonical discriminant function coefficient

	Function
	1
Dependency ratio	-.644
density	.876
GDP Hung=100	-.103

Table 3. Classification results

			Predicted Group Membership		
		rurality	Urban	rural	Total
Original	Count	urban	1	2	3
		rural	0	17	17
	%	urban	33.3	66.7	100
		rural	.0	100	100
a. 90% of original grouped cases correctly classified.					

The backward regression for 2007 identified the following variables: recipients of social support, population density, agricultural value added, part time in agriculture and value of industrial production (GDP p.c. as dependent variable). Agricultural value added showed not significant t test for the regression coefficient and was excluded.

Table 4. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
11	.994[k]	.987	.983	4.750485	1.694

Dependent variable: GDP p.c.

Thus, a discriminant analysis was run on the remaining predictors. Looking at the values of the Fischer's discriminant coefficients in Table 5, the variable which most contribute to the discrimination of Hungarian counties is GDP p.c.

Table 5. Standardized canonical discriminant function coefficient

	Function
	1
Recipients of social support (%)	1.137
density	-1.249
GDP Hung=100	1.784
work time <50% on total holders	-1.281
Value of production, million HUF	-.268

Significant Wilks' Lambda for the discriminant function and chi-square p-value allows rejecting the hypothesis of equality in the groups' means. From the discriminant analysis, all the counties emerged as rightly classified (Table 6), confirming the results of the previous CA. Then, we can assume that the variables identified through the PCA and the backward regression is important in determining the classification of Hungarian Counties in urban or rural.

Table 6. Classification of results

			Predicted Group Membership		
		Rurality	**Urb**	**Rur**	**Total**
Original	Count	Urb	3	0	3
		Rur	0	17	17
	%	Urb	100	.0	100
		Rur	.0	100	100
a. 100% of original grouped cases correctly classified.					

Discussion of results

Analysis of the changes that occurred in the Hungarian rural counties between 2003 and 2007 presented in this paper follows a previous one conducted on all twenty counties, including the urban ones (MONASTEROLO et al., 2011). Analysis conducted on the whole Hungarian territory evidenced the following changes between 2003 and 2007:

- a decrease in the importance of the components linked to: **economic development** (positive values recorded for population density and GDP p.c., net earnings, university education, employment in services);
- an increased **social and industrial decline** (positive values for unemployment, recipients of social support, and high employment rate in the public administration);
- **increased role of agriculture** (full-time employment in the primary sector, small farms).

At the same time, the CA showed:

- the move from the secondary sector to agriculture in some counties (Zala and Győr-Moson-Sopron), without improvements in the economic performance and living conditions;

- diffusion of phenomenon of marginalization in the counties that are already lagging behind (Nógrád, Szabolcs-Szatmár-Bereg).

Therefore, this analysis confirmed the presence of winning and losing regions from the enlargement: the former group is represented by Budapest (able to attract initiatives in the tertiary sector and finance) and the Western border (a specialized centre for industrial production), while in the Eastern peripheries the socio-economic situation worsened, together with agricultural productivity after the land reform.

The PCA and CA analysis made on Hungarian prevalently and intermediate rural counties, shows, partially, similar results. In fact, between 2003 and 2007:
- greater importance is held in the **component of rurality** (recipients of social support, dependency ratio, employment in PA and in the primary sector; unemployment; small farms);
- the only component related to **economic performance** in 2003 (population density and population change; GDP p.c. and net earnings; employment in services, value of industrial production and university students) disappear in 2007;
- a greater role is played by **agriculture**, with both positive (agricultural productivity) and negative (lagging agriculture) features;
- components of economic diversification have a residual importance.

Cluster analysis in 2003 highlighted the role of rurality, both in its positive (C. 2 Potential rurality) and negative features (C.1 Rurality, C.5 Backwardness). Moreover, a clear distinction emerged between counties characterized by agricultural (C.4 Agricultural activity) or manufacturing activities (C. 3 Manufacturing sector). Instead, cluster analysis on 2007 evidenced the features of declining rurality (C. 1 Lagging rurality, C. 4 Backward), and the decision to diversify activity (C.5 Diversification) in several counties previously interested by manufacturing and agriculture (ex. C. 3 and C.4).

The counties of Vezprém (Central Transdanubia Region), Vas and Zala (Western Transdanubia Region) for example, in 2003 belonged to cluster 3, characterized by manufacturing activities and the secondary sector. Instead, in 2007 the role of the secondary sector in GDP and employment decreased (-7%, -9%), as well as GDP p.c. (-10%), while employment in the primary sector, its contribution to GDP and agricultural productivity increased (+ 111%, +22%, +57%). The number of recipients of social support doubled, and the long-term unemployment rate increased by 42%.

The county of Heves, included in the cluster Backwardness with Nógrád in 2003, in 2007 joins the cluster Diversification: land price doubled, the amount of touristic accommodations increased (+6%, +5.7%), as well as temporary immigration (+28%) and employment in the primary sector (+32%), but not its role on GDP (-34%). Investments in R&D grew by 55% and the value of industrial production increased by 88%.

In the same period, the county of Hajdú Bihar moved from the Agricultural activity cluster to the Lagging rurality cluster. The number of recipients of social support and long-term unemployment increased (+40%, +112%) while GDP p.c and employment rate decreased (-7%, -3%). Employment in the primary sector and in PA increased (+32%, +3%), as well as part-time agriculture (+10%) and average farm size (+22%). Employment in the secondary sector and its role on GDP dropped (-11%, -17%).

Finally, Nógrád confirmed in 2007 its position as county most lagging behind: GDP p.c and employment in the secondary sector decreased (- 17%, -4.2%), while the number of recipients of social support, ageing index and long term unemployment increased (+43.4%, +12% and +31%).

Some variables play a very important role in the characterization of clusters and their description, both for the years 2003 and 2007, and they are mainly linked to employment, living conditions, and to the primary sector.

The characteristics of CAP introduction in Hungary

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 enlargement in 2004 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[14]. Moreover, regional disparities doubled: 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 induced 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).

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, the enhancement of investments, the establishment of loans and the 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

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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[15]) 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[16.]. From the date of the EU accession, three types of support are available for producers: low market support; SAPS; rural development and top-up payments (paid from the national budget as an integration of SAPS, till 30%).

Hungary was completely included in the Convergence area between 2004 and 2006, and it received EUR 2 billion under Structural Funds and 1.2 billion under cohesion Policy. Moreover, the country paid additional EUR 1.34 billion for agriculture from the 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[17] starts from around 50% of the historical payments for EU-15 in 2004[18], and it will reach EUR 298 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.

The favourable difference in the amount of payments for the EU-15 in comparison with the new member States is presented in Table 7. Therefore, inequality of treatment between the two groups can be assessed.

Table 7. 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, DG Agri, Popp (2005).

15 ARDOP 2004, NDRP 2006

16 Based on this rule, Hungary has created 11 different "topup" envelops for the year 2005.

17 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.

18 Payments vary according to farm size, from EUR 300 for smaller to 40 000 for bigger farms.

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[19], 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 1,000 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 ELEK et al. (2008), I 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. 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). Thus, the younger the farmer, the higher the applications and payments for the County.

Conclusions

In this paper, Hungarian rural counties are identified through the application of the Adjusted Rurality methodology, in order to overcome some of the problems left unsolved by the OECD methodology. Ten Hungarian counties up to twenty are classified as intermediate rural, and the remaining seven as predominantly rural. Principal components analysis (PCA) was computed on a controlled dataset of 44 variables to understand the underlying features of the IR and PR areas. The results of the PCA were later utilized in the cluster analysis (CA), which returned groups of counties that are homogeneous within themselves and heterogeneous among themselves. The operation was repeated for two years, 2003 and 2007, in order to catch the changes that occurred in Hungarian rural counties after the EU enlargement in 2004, and

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

to provide a preliminary evaluation of EU membership for the country. Five principal components and five clusters were identified both in 2003 and 2007, but presented different characteristics.

This analysis highlights the developmental features that characterize Hungarian rural counties in the long transition path, and their evolution during the introduction of required costly (from a budgetary and social perspective) reforms, CAP and RD policies. The enlargement did not maintain its growth and convergence promises. Negative trends even accentuated, as did the increase in poverty, marginalization, social exclusion, unemployment and subsistence agriculture. The analysis of applications for SAPS payments evidenced that CAP introduction was accompanied by inequality issues, 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. Thus, as already suggested by CSÁKI et al., 2010, the EU cohesion and CAP subsidies were not able to set a strong foundation for the structural transformation required in agricultural and rural areas, decreasing the internal divergence and the development gap.

The previous author's study on all the Hungarian counties for the same period 2003-2007 evidenced the decline of the industrial sector and an increased role of agriculture. The analysis conducted just on rural counties partially confirms it: the declining role of industry is true also on the Western border (Vas, Zala, Veszprém) previously characterized by growing secondary and tertiary sectors, and low productive agriculture is expanding, particularly in Eastern Hungary (i.e. Hajdú-Bihar). At the same time, natural and cultural attractiveness of Southern counties could be better valorised, also due to the presence of young and skilled people, and the increased role of the tertiary sector. Then, marginalization increased in the already worse off counties located in the Northern Great Plain and Northern Hungary (Nógrád county in particular).

A serious limitation for the policy impact analysis is represented in the persistent poor statistics. Accountable, disaggregated, and periodically updated data on farm performance, on socio-economic trends and new CAP objectives, together with easier access to information from the national paying agencies at the regional and sub-regional level would contribute to assessment of the role (if any) of an EU value added. Given these statistical limitations, future RD policy evaluations could return better results if conducted using the "mixed approach" methodology proposed by TERLUIN et al. (2011), integrating quantitative analysis into case-study approach. Analysis of data through multivariate methodologies offers results that are easy to be read and to be interpreted by policy makers involved in policy drafting and implementation, and by project managers. In this way, it is possible to overcome the complexity of interpretation of the rural development measures and indicators[20] proposed by the EU. This point fulfils the need recognized by the EC institutions to better

20 DG Agri counts more than 150 indicators to assess rural development.

communicate and disseminate results from RD monitoring and evaluation, and for the introduction of more targeted policies. Finally, the methodology applied here helps to understand the developmental characteristics of current EU candidate and pre-candidate countries from Western Balkans, and to avoid the "knowledge gap" (and consequent budget ineffectiveness) experienced during the previous enlargement.

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