EXAMINING RURAL REGIONS IN HUNGARY AFTER EU ACCESSION: PUBLIC MANAGEMENT OF SOME KEY PERFORMANCES (2004-2014)

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Abstract
With almost half of the total population (46.85%) of the population living in rural isolated places, Hungary is one of the top rural EU-member countries. The main goal of this research in the paper is the analysis of the ten-year period starting from 2004 until the beginning of the most recently adopted the Hungarian Rural Development Programme (2014-2020). In order to achieve this goal, the paper presents the main functional EU and Hungarian efforts or decisions that pertain to the process of rural development in the country. The accent is put on testing the relationships by performing correlation analysis of the ten socio-economic variables in these regions. They are rural GDP, population density, medical doctors, hospital beds, students, roads, unemployment, mortality, infant mortality and migrations. The research results of the performed correlation analysis points to different conlusions. While some of the relationships in the matrix are statistically significant (either positively or negatively related with different strength), others are not statistically significant. The results point to many important conclusions about the Hungarian rural development from 2004 until 2014. Besides the great efforts implemented by the EU official authorities and Hungarian rural development networks, the negative trends are still present in rural communities across Hungary. Consequently, the present and future success of the most recent Hungarian Rural Development Programme (2014-2020) is very challenging and depends on many variables in the present world of worldwide integration and globalization.

Keywords: *EU, Hungary, predominantly rural regions, socio-economic trends, correlation analysis*

Introduction

Research of the rural regions in Hungary has been one of the central questions within the EU development agenda, since even before the accession of Hungary on May 1, 2004. During the years, the European Commission has been very active in setting policy guidelines for the territorial issues in Member States and the Common Agricultural Policy reforms gradually started to shift and to evolve from the focus on individual market sectors to a more comprehensive and integrated policy on rural development within regions. Thus, the urban/rural definitions were more important in setting the policy guidelines and the adoption of common standard indicators for measuring the rural progress in Member States (Jonard, Lambotte, Ramos, Terres & Bamps, 2009, p. 30).

The most recent Nomenclature of Territorial Units for Statistics 2013 classification that started to be implemented from January 1st, 2015 categorizes the Hungarian NUTS 3 level regions into total of 20 regions (also called Counties). According NUTS 2013 territorial classification, a total of 13 out of 20 NUTS 3 regions in Hungary are categorized as predominantly rural regions. Similar to OECD (2011) regional typology definitions, NUTS definition for predominantly rural region is if it contains the following characteristics: "the rural population accounts for 50 % or more of the total population. It becomes an intermediate region if it contains a city of more than 200 000 inhabitants representing at least 25 % of the regional population" (EUROSTAT, 2015).

Table 1. NUTS 2013 territorial classification of predominantly rural regions in Hungary

	NUTS Code	Predominantly Rural Region
1.	HU 211	Fejér
2.	HU 213	Veszprém
3.	HU 221	Gyor-Moson-Sopron
4.	HU 222	Vas
5.	HU 223	Zala
6.	HU 232	Somogy
7.	HU 233	Tolna
8.	HU 312	Heves
9.	HU 313	Nógrád
10.	HU 322	Jász-Nagykun-Szolnok
11.	HU 323	Szabolcs-Szatmár-Bereg
12.	HU 331	Bács-Kiskun
13.	HU 332	Békés

Source: EUROSTAT (2016). *Regional Statistics Illustrated: Population structure by urban-rural typology according NUTS 3 classification*. Retrieved from

http://ec.europa.eu/eurostat/cache/RSI/#?vis=typologies.urb_typology&lang=en, accessed on 10/10/2018.

Hungary is among top five rural EU countries with 46.85% of the total population living in predominantly rural regions (EUROSTAT, 2015). The successful implementation of the Common Agricultural Policy reform (2014-2020) for rural development in Member States must be constantly monitored and evaluated by a set of already adopted indicators including socio-economic (European Commission- CAP Context Indicators, 2015).

Besides the great financial and technical support for rural development in Hungary after the EU accession, the goal of the research in this paper is the analysis of some of the key socio-economic trends and relationships in predominantly rural regions in Hungary from 2004 until 2014. In other words, searching for the trends and relationships between a total of ten socio-economic variables in predominantly rural regions in Hungary, such as: migrations, roads, unemployment, population density, GDP, higher education students, medical doctors, hospital beds, mortality rate and infant mortality rate. Consequently, the research question that follows is: What are some of the key rural socio-economic trends and relationships in predominantly rural regions in Hungary after the country accession to EU in 2004 until 2014 or the beginning of the present and future Hungarian Rural Development Programme (2014-2020)?

Some key rural socio-economic trends and rural support in Hungary after the accession: literature review

The contemporary rural trends in Hungary are similar to those in the other Central and Eastern European countries. According Kárpáti and Francia (2007), the out-migration is a serious threat to less favourable rural regions in Hungary (Kárpáti & Francia, 2007, pp. 2-3). The active, well-educated and trained population leaves the rural settlements i.e. small towns and villages and migrates to predominantly urban regions and big cities in Hungary as well as in other countries. Consequently, the rural population is becoming older and the natural population increase is falling which causes the process of massive depopulation of rural settlements in Hungary. Regarding rural migration trends, only some parts of Hungary such as in Central Hungary and Western and Central Transdanubian Regions are characterizing with some positive population trends (Kárpáti & Francia, 2007, pp. 1-6). Ritter (2004) points out that the agricultural sector that once was the most important sector for rural growth and employment in Hungary is no longer a dominant economic factor of rural development. During the years, the agricultural sector in rural regions in Hungary was largely marginalized. Simply, the Hungarian rural countryside started to be in line with the general trends in Europe of using rural places more as recreation and living

with small local industries and access to services and much less recognized as agricultural areas (Ritter, 2004, pp. 152-153).

During 2005-2007, the migration rate in Hungary increased while the constantly negative migration balance of Budapest turned into positive in 2006 and the rural migration in the countryside became negative. After 2007, the negative migration trends and depopulation of rural places continued as in the past. In addition, there are considerable differences in employment and unemployment between regions. In 2008 a total of 16.1% of the population belonged to unemployed households of different size in Northern Hungary to only 6.9% in most developed Central Hungary (the national average was 10.7%) (Albert & Hárs, 2012, pp. 8-11).

Another important issue and one of the main reasons for the growing socio-economic inequalities was the poor access to roads i.e. transportation network. According North Hungary Operational Programme from 2007, the rural isolation was further accelerated by the lack of regular lines of public transport that contributed to additional difficulty for rural poor people when travelling to their workplaces (North Hungary Operational Programme, 2007). Many regular public services in rural places in Hungary are missing or they are of bad quality especially in those regions where small settlements or isolated villages dominate in the region.

The situation with the health inequalities among regions in Hungary is similar to other socio-economic trends (migrations, unemployment, roads, access to services, GDP). The socio-economic disproportions caused many health-related problems to largely influence many important general socio-economic indicators, such as life expectancy, mortality rate, infant mortality rate. Similar to European trends, the mortality and infant mortality rates in rural regions in Hungary were increasing. For example, the statistical data for 2008 points out that infant mortality rate in Northern Hungary was 8.8 while nationally was 5.6 measured on one thousand inhabitants (Albert & Hárs, 2012, pp. 24-25).

The trends concerning medical doctors and health capacities in rural regions are similarly negative. The migration pressures on medical doctors in rural regions to leave the workplace were gradually arising due to a number of factors, such as poor and deteriorating work equipment, low wages, and informal payment methods. According Meszaros (2006), after the EU accession hundreds of medical doctors expressed their willingness to leave the country (Meszaros, 2006, p. 15). As an example, he points to the fact that between 2004 and 2006 almost 1000 Hungarian medical doctors applied for a new job in UK. Other important alarming information was provided by Eke et al. (2011) that after the EU accession, almost 5000 medical doctors, more than 700 dentists, around 200 pharmacists and more than 2000 other health professionals (such as midwifes, nurses, health technicians) filed applications to leave the country. Mostly, the

Hungarian medical doctors emigrated in Member States, such as UK Germany, Austria or Scandinavian countries (Eke, Griasek & Szócska, 2011, p. 15).

In addition to the process of so-called brain-drain is not just typical for medical doctors in Hungary. Csanády and Személyi (2006) point out that the other well-educated professionals and scientists from natural sciences and to a lesser extent from social sciences are not immune to general emigration trends for higher wages and better working conditions (Csanády & Személyi, 2006, pp. 79-83).

One of the greatest socio-economic problems in rural regions in Hungary is the lack of economically active population in rural as well as the growing number of inactive and unemployed people. In addition, the transformations of the economy caused huge GDP misbalances between regions. The share of industry and later agriculture in the total GDP started to drop and services started to share a big portion of GDP production in rural regions in Hungary (Kovacs, 2008, pp. 58-59).

On other hand, the official EU and national rural support for Hungary was rich and dynamic. On February 2, 2004 the EU Press officially announced that Hungary, upon accession on May 1 would start to implement the country's Operational Programme for Agriculture and Rural Development for 2004-2006 that was previously formally approved by the European Commission. The Program was aimed at helping rural regions in Hungary with a number of broad and specific measures in improving the socio-economic living conditions of the rural population with an emphasis on sustainable development and jobs. The EU financial support was planned at €317.2 million, supported by the national funding of €105.6 million for a total of €422.8 million. The launch of this programme was a condition for further negotiations and agreements between EU and Hungary in the area of so-called Structural Funds for 2004-2006 (European Commission- Agreement on Rural Development Programmes for Hungary, 2015).

Generally, during 2004-2006, the EU support for rural areas in Hungary was implemented through two main programmes that were both financially supported by the EU official bodies such as the European Agricultural Guarantee and Guidance Fund (EAGGF). The programmes were the Agriculture and Rural Development Operational Programme (ARDOP) including the Financial Instrument for Fisheries Guidance (FIFG) and the National Rural Development Plan (NRDP). The implementation of ARDOP was linked to the so-called Community Support Framework aimed to improve the socio-economic conditions and competitiveness in rural areas in Hungary. RDP concentrated on four rural priorities of which the so-called B, C and D priority were fully devoted to improving the socio-economic picture of rural areas. The rural socio-economic issues, such as: vocational training, matching production with market conditions, financial support to producers (by establishing so-called producer groups) and

better marketing of rural products as well as transferring additional income to rural producers in order to make their business sustainable on the long run to creating a business environment for opening more job opportunities were the key areas of RDP "intervention" in the Hungarian rural areas. A total of €1,176,94 were spent on the implementation of both programmes of which €919.50 millions or approximately 78% was EU money (European Commission- Rural development programmes, 2015). The responsible authority for the management of both Rural Programmes (2004-2006) was the Hungarian Ministry of Agriculture and Rural Development (MARD), also called Ministry of Rural Development from 2010 (Government of Hungary, 2016).

In addition, similar to EU-related efforts in that time, the Government of Hungary or more precisely the State Secretariat responsible for Community Affairs at the Ministry of Agriculture and Rural Development (MARD) was active in the overall management, monitoring and evaluating the rural development measures undertaken in the Hungarian rural localities. One of the most important ideas was the National Rural Development Plan 2004-2006 of Hungary. The Plan considered numerous rural development objectives, measures and priorities (European Commission - National Rural Development Plan, 2015).

The role of Leader + initiative was very important. Until 2006, for the overall EU rural development including Hungary, under Leader + approximately €5046.5 million was spent. A big portion of that money or €2.105.1 came from the European Agricultural Guarantee and Guidance Fund (EAGGF) (European Commission- Leader+, 2015).

Over time, the CAP reforms gradually evolved. Following the reforms of the first pillar of CAP in 2003 and 2004, one of the most significant reforms of rural development for 2007-2013 was adopted in September 2005 by the Agricultural Council on the basis of the European Commission proposal provided in July, 2004. In addition, the so-called Leader Community Initiative (LCI) was at the "heart" of the reform complemented by further actions which simplified the overall process of rural development programming and funding. As in the past, the role of the popular Local Action Groups (LAGs) continues to be an important part of the rural policy. Of course, each Member State was obligated to prepare its own national plans on rural development following the strategic guidelines set by the European Council in February 2006. Also, the existence of the rural development networks on EU level and in Member States was an important institutional and administrative support for a successful delivery of the rural development policy in Member States.

For the 2007-2013 programming period new financial instrument called European Agricultural Fund for Rural Development (EAFRD) was introduced. Different from the past, the rural development was represented under Pillar 2 of the (CAP). During September 2006, the Commission adopted a decision for the total amount of the rural development budget of €90.98 billion for the next seven-

year period (2007-2013) (European Commission, 2015). From the available sum, a total of €3,805,843,392 were planned to be allocated to Hungary of which convergence a total of €2,496,094,593. The Hungarian rural development policy between 2007 and 2013 was significantly based on the National Strategy Plan and the so-called Community Strategic Guidelines (CSG) which, in addition to other objectives, put a strong accent on sustainable development and further improvement of entrepreneurship and access to public services in rural places under so-called Axis 3 for which successful implementation were allocated a total of €690,690,802 million. The EAFRD contribution rate was 71.77% or €495,711,102 in total. As in other Member States, the Leader approach in Hungary played a very important role for the successful implementation of all objectives in all axes defined within the Hungarian Rural Development Programme for the period 2007-2013. Leader approach was supported by €272,355,669 with a significant participation support from EAFRD of 76.86% or €209,321,387 (European Commission- Hungary's Rural Development Plan, 2015).

Nationally, the Hungarian Government adopted its National Rural Development Program for 2007-2013, known as 'New Hungary'. The program document was submitted to European Commission, containing all necessary aspects of the past rural development efforts as well as future perspectives (Ministry of Agriculture and Rural Development, 2007). In the meantime, the National Strategic Reference Framework of Hungary (2007–2013) under the New Hungary Development Plan was adopted in May, 2007 by the Hungarian National Development Agency. This strategy was the basic direction for the use and implementation of the EU funds in Hungary for 2007-2013 with an accent on long-term growth and employment in six priorities i.e. economy, regional development, the society renewal, environment and energy, state reform and transport (National Development Agency, 2007).

Other very important documents, such as National Strategy Report on Social Protection and Social Integration & Inclusion and the National Program against Child Poverty (2007-2032) also called 'Legyen jobb a gyerekeknek', adopted by the Hungarian Government between 2007 and 2013 were important in support of the less developed rural areas in the country (Vukovich, 2008, p. 123; Czibere & Rácz, 2014, p. 253).

Finally, the present and future rural efforts in Hungary are represented by the Hungarian Rural Development Programme (2014-2020) adopted in August, 2015 by the European Commission. This programme for Hungary accounts for €4.2 billion of which €3.4 billion is from the EU budget and around €740 million from national co-funding. For the sixth priority of social inclusion, poverty reduction and economic development in the Hungarian rural areas the total amount of available public funds are equal to €753,193,553 or 18.04% of the total rural development funds. The financial support is oriented toward a few

important targets, such as: fostering local development by supporting small enterprises, creating jobs, improving services and infrastructure. Within these targets, the focus is on improving the process of diversification of rural businesses, access to basic services in small villages and the organization of 'community spaces' for satisfying different needs within the rural population. The measures such as investments in physical assets (€ 1, 425 million), rural business development (€ 328 million) and basic services (€ 279 million) are key aspects of the planned socio-economic 'interventions' in the rural life in Hungary until 2020. Local Action Groups are planned to cover over two-thirds of the rural population which by calculations will help in creating a total of 4500 new jobs (European Commission- HRDP, 2015, pp. 1-6).

Similar to the previous national rural development efforts, the lastly prepared New Hungary Rural Development Programme (NHRDP) was published in May, 2014. It is a logical continuation of the past evaluation on rural development efforts, containing all the necessary information on Hungary's socio-economic conditions, priorities and information on axes key measures. Also, it will serve as an important source of data for monitoring and evaluating purposes of the Hungarian Rural Development Programme (2014-2020) (New Hungary Rural Development Programme, 2014).

Some key rural socio-economic trends and disproportions in Hungary (2004-2014)

The long-term trends pertaining to the 11-year time frame of Hungary's accession to EU in 2004 to 2014 in predominantly rural regions show that within certain variables, such as '-mortality rates-', '-infant mortality rates-', '-medical doctors-' and '-students in higher education-' there are stable trends with slight changes over time between rural regions. In other words, there are evidently much smaller disproportions compared to other variables that are subject to analysis. Medical doctors per 1000 inhabitants range from 3.32 in Fejér to 4.52 in Vas County, higher education students per 1000 inhabitants range from 36.73 in Nógrád to 45.48 in Szabolcs-Szatmár-Bereg County, mortality rate per 1 000 inhabitants from 24.99 in Gyor-Moson-Sopron to 31.36 in Békés County and the infant mortality rate per 1 000 inhabitants from 4.36 in Zala to 6.72 in Nógrád County.

On other hand, the rural disproportions between rural regions are much higher when compared according to '-population density-', for such parameters as '-roads-', '-GDP-', '-unemployment-', '-migrations-' and '-hospital beds-'. Thus, the only difference is the size of disproportion. Population density ranges from 25.39 inhabitants per 1000 square km of land in Somogy County to 51.15 in Gyor-Moson-Sopron County. The value of GDP is lowest in Nógrád County i.e. 1230 (HUF) per inhabitant to 3081(HUF) per inhabitant in Gyor-Moson-Sopron

County. Next, the unemployment disproportions start with the lowest unemployment rate in Gyor-Moson-Sopron County that equals to 4.9% to the highest of 15.1% in Szabolcs-Szatmár-Bereg County. The value of crude rate of net migrations ranges from 6.3 per 1000 inhabitants in Gyor-Moson-Sopron County to -5.28 per 1000 inhabitants in Nógrád County. Roads range from 236.65 km in Jász-Nagykun-Szolnok County to 460.13 in Vas County per 1 000 square km. Finally, hospital beds range from 584 in Bács-Kiskun to 848 in Veszprém County per 1 000 inhabitants.

In the following sections of the paper a correlation analysis is performed in order to search for the possible links between the above rural variables.

Data and variable measurements

The research in this paper considers a total of ten demographic and socio-economic rural variables. In order to test the relationship between each of those variables data series over time were surveyed. The sources of data were the official statistical reports provided and available by the Hungarian Central Statistical Office as well as EUROSTAT (Hungarian Central Statistical Office, 2016; EUROSTAT, 2015). The data for each variable pertains to eleven-year period. In other words, from 2004 when Hungary joined EU until 2014. The reason why 2015 is not included is because for many rural variables (including the variables in our model) the data was missing or not yet calculated and officially provided by the official statistical institutions that served as data source. In order to test the relationships between the variables there is a need to quantify or to set numerical expressions for each of those variables.

The variable of '-unemployment-' is measured and numerically expressed as the unemployment rate, calculated as a ratio between the numbers of unemployed in the rural region with the total labour force or working age population. It refers to a percent of people from the total labour force that currently is without a job.

'-The Roads' variable is expressed by the indicator of road network density. Road density is a widely used statistical measure of road infrastructure. The indicator considers the network of all types of roads without making distinction between first, second or third category of roads by condition of quality or whether they are classified by other typologies, such as urban-rural, regional-local. The indicator is calculated as the ratio between the total lengths of roads per total area. In our case, it is numerically expressed as total km per 1000 square km of land area in the rural region.

The variable of '-population density-' is expressed as a number of inhabitants per 1000 square km of land area in the rural region.

The ‘medical doctors’ variable pertains to the total number of general practitioners, family paediatricians and physicians in the rural region per 1000 inhabitants.

Similar to the ‘-medical doctors-’ variable, the ‘-hospital beds-’ variable is expressed as the total number of hospital beds in use per 1000 rural inhabitants.

‘-GDP-’ per capita is measured as the total amount of GDP per inhabitant expressed in 1000 Hungarian Forint (HUF).

The ‘-migrations-’ variable is measured as the crude rate of net migration including statistical adjustment. EUROSTAT defines this indicator as a ratio of a net migration to the population numerically expressed per 1000 inhabitants. In other words, this indicator gives very valuable information about the total and the natural change of the population (EUROSTAT- Crude rate of net migration, 2015). Accordingly, EUROSTAT provides time series of this indicator for all predominantly rural regions in EU member countries, EFTA countries and candidate countries and in this paper serves as a main source of migration data for the predominantly rural regions in Hungary.

The ‘-students-’ variable is measured as the total number of bachelor and master level students enrolled in higher education institutions in the rural region per 1000 inhabitants.

Finally, the ‘-mortality-’ and ‘-infant mortality-’ variables are measured or calculated per 1000 inhabitants and expressed as mortality rate and infant mortality rate respectively. All the values for the variables of interest in this research are calculated as average values for the period under analysis (2004-2014).

Hypotheses and model

Before testing the relationships, there is a need to define the general hypothesis that will be a subject of empirical test in this paper. The general hypothesis that will be a subject of empirical test in the research is the following:
H1: -‘There is a relationship between unemployment, roads, population density, medical doctors, hospital beds, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-.

Furthermore, the following ten alternative (specific) hypotheses that are derived from the general hypothesis will be a subject of empirical test. Those are:

h1: -‘unemployment is related with roads, population density, medical doctors, hospital beds, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h2: -‘roads are related with unemployment, population density, medical doctors, hospital beds, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;

h3: -‘population density is related with unemployment, roads, medical doctors, hospital beds, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h4: -‘medical doctors are related with unemployment, roads, population density, hospital beds, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h5: -‘hospital beds are related with unemployment, roads, population density, medical doctors, GDP, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h6: -‘GDP is related with unemployment, roads, population density, medical doctors, hospital beds, migrations, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h7: -‘migrations are related with unemployment, roads, population density, medical doctors, hospital beds, GDP, students, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h8: -‘students are related with unemployment, roads, population density, medical doctors, hospital beds, GDP, migrations, mortality and infant mortality in the predominantly rural regions in Hungary’-;
h9: -‘mortality is related with unemployment, roads, population density, medical doctors, hospital beds, GDP, migrations, students and infant mortality in the predominantly rural regions in Hungary’-;
h10: -‘infant mortality is related with unemployment, roads, population density, medical doctors, hospital beds, GDP, students, migrations, and mortality in the predominantly rural regions in Hungary’-.
Accordingly, the null (Ho) and the alternative hypotheses (Ha) have the following equations:
Ho: $\rho = 0$ (null hypothesis)
Ha: $\rho \neq 0$; Ha: $\rho < 0$; Ha: $\rho > 0$ (alternative hypothesis)

The above means that if the null hypothesis is rejected, the alternative hypothesis is accepted and vice versa. In testing the assumptions for the possible relationship between the above-mentioned demographic and socio-economic variables from Hungary’s accession to EU in 2004 until 2014, it was determined that the most suitable research approach would be to calculate the Pearson correlation coefficient as measure of the strength of association or the dependence between two continuous variables. According to the literature, there are many types of correlation coefficients while the most appropriate for testing the linear relationships between any two variables in the model is the Pearson coefficient. The Pearson correlation can be sensitive even if one function is a nonlinear in relation to the other.

However, before calculating the population correlation coefficient we need to perform a t-test of statistical significance or to test the alternative

hypotheses that are subject of analysis. The results of the t-test of statistical significance point out to the nature of the relationship between the variables (linear or non-linear). Consequently, the ρ -value is determined by using n-2 degrees of freedom within the t-distribution. The level of significance is set at $\alpha = 0.05$ level and in order for the relationship to be statistically significant and linear it must fulfills the condition of $p<\alpha$ (Pennsylvania State University, 2016).

The Pearson correlation can be applied to both sampling and a population for a given number of units that are subject of analysis. Because the research in this paper pertains to all predominantly rural regions in Hungary (N=13), we will use population correlation coefficient in measuring the strength of the possible relationships between the variables. According the literature, we estimate the population correlation coefficient by the given values of the confidence interval (TutorVista, 2016). According to StatTrek (2016), the population correlation coefficient is best calculated using population means and standard deviations from population data (StatTrek, 2016):

$\rho = [1 / N] * \Sigma \{ [(Xi - \mu X) / \sigma x] * [(Yi - \mu Y) / \sigma y] \}$ where,

N- number of observations,
Σ- sum,
Xi- X value for observation i,
μX- population mean for variable X,
Yi- Y value for observation i,
μY- population mean for variable Y,
σx- population standard deviation of X, and
σy- population standard deviation of Y

However, all the needed statistical calculations (t-test, ρ- population correlation coefficient) with the purpose of getting the research results in this study are performed with the help of SPSS as very useful software for performing statistics in social sciences.

Research results

The results revealed that there are many linear relationships between the rural variables that are subject of analysis in this study. The SPPS calculated the descriptive statistics and correlation matrix with scatter-plots for each of the relationships between the variables in the model.

From the Correlation Matrix one can notice that the relationship between the '-medical doctors-' variable and the '-migrations-', '-unemployment-' and '-GDP-' variables is statistically significant or statistically different from zero ($p< \alpha$) or ($p< 0.05$). The relationship between '-medical doctors-', '-migrations-' and '-GDP-' is positive and moderately strong ($\rho= .675$; $\rho= .637$ respectively). The

more medical doctors in the rural region means higher crude rate of net migrations per 1000 inhabitants and vice versa. In addition, the more medical doctors in the rural region the higher the GDP per capita and vice versa. On other hand, the relationship between '-medical doctors-' and '-unemployment-' is negative and moderately strong (ρ= -.635). In other words, more medical doctors mean less unemployment in the rural region and vice versa. The rest of the relationships between the variable of "-medical doctors-" with the '-hospital beds-', '-students-', '-roads-', '-mortality-', '-infant mortality-' and '-population density-' are not statistically significant (p> α) or (p> 0.05).

Next, the relationship between '-mortality-', '-migrations-', '-GDP-' and '-population density-' is negative (inverse) and moderate to moderately strong (ρ= - .571; ρ= -.585; ρ= -.682 respectively). The higher the mortality rate will imply less migration, smaller GDP per capita and less densely populated areas in the rural region. The remainder of the relationships are not statistically significant with (p> α) or (p> 0.05).

From the Correlation Matrix one can notice that the '-infant mortality-' variable is only positively correlated with "-unemployment-" variable. The relationship is moderate to strong (ρ= .617), which means that the higher infant mortality rate means higher unemployment rate and vice versa.

Besides the significant relationships with '-medical doctors-' and '-mortality-' variables, also, the '-migrations-' variable is correlated with '-unemployment-' and '-GDP-' variables. Surprisingly, the relationship with the '-GDP-' variable is positive and very strong (ρ= .920) at α = 0.01 level of statistical significance, which means that the higher the crude rate of net-migrations, the higher the GDP per capita and vice versa. On other hand, the relationship with '-unemployment-' variable is strongly negative (ρ= -.760), also at α = 0.01 level of statistical significance. Accordingly, the greater scope of migrations is associated with decreasing unemployment rate in rural region and vice versa.

Finally, the results from Correlation Matrix reveal that the 'unemployment' variable is strongly negatively related with 'GDP' variable. The ρ= -.881 at α = 0.01 level of statistical significance. In other words, the higher the GDP per capita results in less unemployment in the rural region and vice versa.

Besides the statistically significant relationships (either positive or negative, weak, moderate or strong), the correlation results, however, pointed to three variables, '-hospital beds-', '-roads-' and '-students-' not being significantly related with any other variable included in the correlation matrix because (p> α) or (p> 0.05). Consequently, the correlation results partially accepted the general hypothesis because not all of the assumed relationships in the model are statistically significant or the relationship is statistically not different from zero.

Table 2. Correlation Matrix

	med.	beds	roads	stud	mort	inf_mor	migr	unemp	GDP	p_dens
med. Corr.	1	.340	.537	.265	-.128	-.328	.675*	-.635*	.637*	-.088
Sig.		.256	.059	.381	.677	.274	.011	.020	.019	.776
beds Corr.	.340	1	.548	.222	-.049	-.419	.032	-.109	.048	.151
Sig.	.256		.052	.465	.874	.154	.917	.723	.877	.622
roads Corr.	.537	.548	1	.430	-.408	-.355	.492	-.286	.508	.542
Sig.	.059	.052		.143	.167	.234	.087	.343	.076	.056
stud Corr.	.265	.222	.430	1	-.518	-.466	.212	-.045	.244	.340
Sig.	.381	.465	.143		.070	.108	.487	.885	.421	.256
mort Corr.	-.128	-.049	-.408	.518	1	.389	-.571*	.353	-.585*	-.682*
Sig.	.677	.874	.167	.070		.189	.041	.237	.036	.010
inf_mor Corr.	-.328	-.419	-.355	.466	.389	1	-.349	.617*	-.518	-.274
Sig.	.274	.154	.234	.108	.189		.243	.025	.070	.365
migr Corr.	.675*	.032	.492	.212	-.571*	-.349	1	-.760**	.920**	.472
Sig.	.011	.917	.087	.487	.041	.243		.003	.000	.103
unemp Corr.	-.635*	.109	-.286	-.045	.353	.617*	-.760**	1	-.881**	-.166
Sig.	.020	.723	.343	.885	.237	.025	.003		.000	.587
GDP Corr.	.637*	.048	.508	.244	-.585*	-.518	.920**	-.881**	1	.491
Sig.	.019	.877	.076	.421	.036	.070	.000	.000		.088
p_dens Corr.	-.088	.151	.542	.340	-.682*	-.274	.472	-.166	.491	1
Sig.	.776	.622	.056	.256	.010	.365	.103	.587	.088	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: author's calculations in SPSS based on the official data released by the Hungarian Central Statistical Office.

Conclusion

The rural development in Hungary is very important considering the fact that the country is almost at the top of the list of the most rural countries in the EU. After the country's accession in the EU in 2004, the EU and national public support for the further development of the predominantly rural regions was rich and dynamic. Starting with ARDOP and RDP Programmes (2004 and 2006) through Axes (1, 2, 3) and LEADER approach (2007-2013) to the current and perspective HRDP (2014-2020), both the EU and Hungarian government were financially and technically involved in the process. A large amount of public funding totalling €10,510,039,137 was spent or planned to be spent through 2020. In addition, the EU contribution in total public expenditure for rural development in Hungary is significant and equals to €8,156,343,392 or 77-78% of the total financial support. The analysis of the ten key socio-economic trends in predominantly rural regions in Hungary from 2004 until 2014 showed mixed results. There are evident disproportions regarding each trend between rural regions. The only difference is the size of disproportion.

Thus, according numbers to the numbers, the rural disproportions between predominantly rural regions are smaller according mortality rates, infant mortality rates, medical doctors and higher education students. On the other hand, according the other variables as GDP, unemployment, migrations, hospital beds, population density and roads there are larger disproportions. Next, the correlation analysis of the relationships between the variables, also, showed different results. There are positive as well as negative relationships. The relationship between '-medical doctors-' and '-migrations-' and 'GDP' is positive and strong to moderate. Also, a positive relationship exists between the '-infant mortality-' variable with the '-unemployment-' variable. Finally, the '-migrations-' variable is positively and strongly correlated with '-GDP-'.

On the other hand, the relationship between '-medical doctors-' and '-unemployment-' is negative and strong to moderate. Also, the relationship between '-mortality-' with '-migrations-', '-GDP-' and '-population density-' is negative (inverse) and moderate to strongly moderate. Finally, '-migrations-' are negatively and strongly related with the '-unemployment-' variable as well as the '-GDP-' variable with '-unemployment-'. For the rest of the relationships, the Pearson correlation in the Correlation Matrix pointed to them not being statistically significant.

The conclusions point that there are different disproportions between the variables. In addition, according the tested relationships, the rural trends are mutually dependent and show different results.

The research challenge in this article was to explore some of the key long-term socio-economic trends in predominantly rural regions in Hungary after the country's accession to EU in May, 2004. Besides the strong rural development policy involving significant financial and human resources, the

predominantly rural regions in Hungary are still facing the well-known rural problems that are widely recognized in today's modern societies, such as: out-migration, high unemployment rates, and an absence of good infrastructure. Similar to other Member States, the strong EU support to rural development in the country will continue with even greater financial and technical input. Improving the rural life by eliminating rural socio-economic imbalances will remain as one of the greatest EU and national developmental challenges for Hungary in the future.

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