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MACROECONOMIC TRENDS BY THE USE OF STRUCTURAL FUNDS

Abstract

The main goal of the European Union's regional policy is to reduce structural disparities between EU member states and regions. The balanced development throughout the EU can promote real equal opportunities for all. So the policy is based on the concept of solidarity and cohesion of economic and social conditions. It achieves this by means of a variety of financing operations, principally through the Structural Funds and the Cohesion Fund.

The policy focuses on three main objectives, convergence – solidarity, regional competitiveness and employment and European territorial cooperation. By these objectives the EU supported projects in a wide range of areas – at regional and national level – from business support to urban development. It is very important that, these themes reflect the objectives of the Europe 2020 strategy to promote smart, sustainable and inclusive growth.

Between 2007 and 2013 for the European Union's regional policy is allocated 347 billion euro, 35.7% of the total EU budget for that period, just over 49 billion euro a year. All programmes are co-financed by the member countries the total available funding is almost 700 billion euro, so the programmes and the results are and will be significant.

The main programmes, eligible areas, and the beneficiaries of the national programs can be summarized, but to measure the various programs effectiveness, in the different countries, are much more complicated. The results depend on a lot of variables, for example the managerial institutional system, the structure of the national programs, the habitat of the participant and many obvious and potential, external and internal economical and social conditions.

But despite of the dissimilarities, we try to collect, through some macroeconomical structural indicators, the main characteristic trends of the utilization EU sources. With various methods, we will characterize the coherence between gross domestic product, labour force statistics etc.

Because the analysis of the 27 EU countries could be voluminous, it will be focused on some countries of Central and Eastern Europe.

Keywords: EU supports, development, V4 countries, analyzes, convergence

Introduction

The regional policy of the European Union (EU) is a special policy targeting the differences between the regions of the Union. It serves the stimulation of social and economic cohesion at community level by supporting the integration of the regions. The regional policy, as the oldest form of internal development policy of the Community, appears as the most general internal development concept in the integration contacts.

Although the institutionalized form of regional policy was introduced only after the Single European Act in 1986, it had been drafted in the Treaty of Rome and the founders defined as on the key objectives of European integration that "(...) the disparities between the levels of development of the various regions and the backwardness of the least favoured regions or islands (including rural areas) shall be reduced" [EC Treaty, 1958].

The regional disparities, however, still cause problems and – in spite of the extension of special policy – the disparities remain significant. Not only the core and peripheral areas should be distinguished as considerable source of problems, but the increasing development gap between cities and rural areas which is heavily generated by the stronger and stronger demographic changes (e.g. migration). In addition to this, strong intensification of developmental differences can be observed in certain cases, in the Northern and Southern geographical aspects due to cultural and other social reasons, while after 2004, also in regard to the dividedness between West and East.¹ In connection with this, the existing differences have been further sharpened by the integration of the ten new countries in 2004, then the accession of Romania and Bulgaria in 2007.

It is obvious, that the disparities between some regions and countries can be led back to more and sometimes closely interrelated reasons. These include, among others, the role of permanent and unchangeable disadvantages and advantages coming from geographical conditions, the impact of social and economic changes which emerge increasingly stronger in some cases at global or only local level, the economic and political peculiarities which can be observed in the new member states as the tail effect of the former centralized economic administration, and finally the combination of these and some other considerable factors.

The impact of these unfavourable factors and consequences can be observed in many relations, for example the social situation, low level of education, tendencies of unemployment, outdated infrastructure, etc. The EU wants to improve

¹ The difficulties of the still heavily prevailing economic crisis which affected the state budget and the bank sector, concern mostly the countries of the Mediterranean.

just these areas and aims to harmonize the regional policy with the efforts of the Union to enhance economic growth and employment, in regards especially the strategic aims of European 2020. In order to achieve these targets, it is necessary to stimulate investment, especially in case of backwarded regions. The objectives can be reached only in indirect ways in many cases, therefore more elementary and simpler programs should be implemented. To this end the transportation, telecommunication and other infrastructural investments, as well as the preservation of environmental resources are supported. By developing information and communication technologies, the innovation, entrepreneurial activities and the expansion of knowledge-based society is stimulated.

In case of the individual member countries, the ratio of sources distributed on the basis of priorities among member states is changed according to the economic and social capabilities, priorities reacting to the actual challenges and measurements made in response to union-level efforts (Figure 1). Thus the member states integrated after 2004 could access to significant structural sources besides the increasing allocation of funds.



Figure 1. Structural funds per head in the European Union (euro/head 2004, 2010) Source: own calculation based on EC 2010.

Due to the wide variety of required priorities and implemented actions, it is rather difficult to quantify the impacts of EU regional policy and to measure outputs precisely. On the one hand, the implementation of regional policy has not only quantitave but also some hardly quantifiable or measurable effects. On the other hand – owing to the principle of additionality – the realization of common policy is carried out not only by itself, but as a part of complex national development programs and action plans [Kende, Szűcs, 2011]. It should also be noted that some measures imply direct impacts within different geographical boundaries.²

² For example the impact of constructing a motorway concerns not only for the given region or country but also some more distant areas.

Another difficulty is that the currently known evaluation methods are sometimes very different and their harmonization may cause distortions in regard to quantifiable outputs. Thus the comparison of evaluation methods is limited.

Parallel with this, in the course of mapping of impacts in the individual member states different utilization results can be presumed on the basis of development discrepancies. It is, however, the consequence of the principles of the system that in case of member states with specifically low GDP values, the funds – due to their significance – considerably contribute to the growth of the economy (Figure 2).



Figure 2. Structural funds per head and GDP/head in the Euroepan Union (euro, 2010) Source: own calculation based on EC 2010.

Material and method

In case of regional policy, only the budget allocation and resource allocation tendencies can provide important information. As regards budget data, the expenditure items of pre-accession funds should also be calculated because these are closely connected concerning their aims and intents. Since the report about the financial year of 2010 of EU published in 2011 was the latest one issued by the European Committee (EC), we should base our statements on this report.

In case of cohesion policy, before reviewing the macro-level processes, appropriate information can be collected basically during the implementation of activities and the necessary follow-up. The tools for achieving the objectives and measuring the efficiency are: monitoring, evaluation and supervision [NFÜ – National Development Agency, 2012]. Although, however, these examinations

have considerable information content and relevance in regards to the given member state or region, they are often hardly comparable owing to the institutional and programming peculiarities of the member states.

The analyzis is focusing on the processes of the Visegrad Countries (V4)³. These Countries has got common historical, economical and social conditions and the process of the structural development should be measured, because of the common conditions, among each other.

The present research is planned to be realized at international level, by comparing the special features of more member states. Interrelations between some indicators and cohesion funds are explored by utilizing EUROSTAT and EC data. The research is made by the use of indicators of structural (Lisbon) indicators⁴ set by EC. These data in the EUROSTAT database are available from 2000 to 2010 adjusted to the available budget data. The data deficiencies observed in some cases were corrected by estimations. Out of indicators those were examined which, on the one hand, have appropriate information content in the examined period, and have, on the other hand, relevance regarding the structural policy. It is important to note that in case of structural indicators, the general macroeconomic and sectoral factors, as well as wide range of social processes also have impact, but the impact of sectoral policy as well as the presumed consequences of actions can clearly be detected in case of the examined indicators.

The classification of indicators and the listing of selected indicators is drafted in the following table (Table 1). It should be added to the review of indicators, that there are no data available for the whole period in a few cases.

During the research we have faced several deterministic factors affecting the outputs:

- In the review of budget data, only the size of the available funds was regarded as a starting point. The additional and long-term consequences of investments realized from the funds were not quantified;
- In case of indicators, in spite of the unified regulations of EUROSTAT concerning data-collection, there can be even considerable deviations at the level of member states;
- Since the cohesion policy appears mostly at regional level, in some cases the actual impact is not or only partly observable at national level.

³ The Visegrad Countries or Visegrad Group (also known as the "Visegrad Four" or simply "V4") reflects the efforts of the countries of the Central European region to work together in a number of fields of common interest within the all-European integration. The Czech Republic, Hungary, Poland and Slovakia have always been part of a single civilization sharing cultural and intellectual values and common roots in diverse religious traditions, which they wish to preserve and further strengthen [Visegrad Group, 2012].

⁴ The Structural Indicators represent a set of seventy nine indicators developed to measure the progress towards the objectives of the Lisbon Strategy. In line with the EUROSTAT's role to provide indicator sets linked to current policies and after the conclusion of the Lisbon process in year 2010 and the adoption of the Europe 2020 strategy the maintenance of this set is being progressively stopped [EC, 2012].

Table 1

| General economic background | Labour productivity per hour worked |
|-----------------------------|---|
| | Real GDP per capita |
| Employment | Employment rate |
| | Implicit tax rate on labour |
| | Life-long learning |
| Economic reform | Market integration by type of trade activities services |
| | Market integration by type of trade activities good |
| | Comparative price levels |
| Innovation and research | Level of Internet access – households |
| | Public expenditure on education |
| Social cohesion | Early leavers from education and training |
| | Long-term unemployment rate, by sex |
| Environment | Energy intensity of the economy |
| | Resource productivity |

List of structural indicators involved in research

Source: own selection based on EUROSTAT 2012.

Results

Special budget features

The success of EU cohesion policy was determined by the volume of allocated sources. The budget planning system changed within the examined period, but it did not actually concern the structure of funds.⁵ In the last ten years the cohesion funds – partly due to the expansion in 2004 – further increased (Figure 3). By the end of the examined period the ratio of these four member states from the total allocation reached 36%. This significant volume of share can be explained not only by the expanding funds but also by the changing group of beneficiaries.

Reviewing the distribution of funds among member states, an interesting tendency can be observed. The greatest beneficiaries in the examined period were Spain, Germany, Italy, and France. Following them there was Poland, which received almost the same amount as France and got into the group of the greatest beneficiaries. The Czech Republic was the next, then Hungary had the tenth place in the rank followed by Slovakia and Poland.

⁵ It is true that the number of Structural Funds decreased by the European Agricultural Fund and the Fishery Orientation Financial Means. In the meantime the budget position of sectoral policy and the areas of activities have mostly expanded or changed.



Source: EC 2010.





b) Total payment per citizens of member states (million euro/head)

Figure 4. Values of EU structural funds between 2000 and 2014 Source: own calculation based on EUROSTAT 2012.

If, however, the amount per head is examined, it is obvious that the Czech Republic is the first (1006 euro/head) among V4 countries, Hungary is the next (994 euro/head), then Slovakia (910 euro/head) and Poland (902 euro/head). Therefore on the basis of this not any considerable differences can be explored in the funds, because there is only a minimum deviation among the values per head.

Structural indicators

The analysis of structural indicators can basically be approached from two directions. On the one hand, the development of each indicator can be examined in itself, because the nominal change characterizes the degree and tendency of development. An excellent sample for this, the labour productivity per hour worked and the changes of employment rate.



Figure 5. Some general economic background indicators of the V4 countries (2000–2010) Source: own calculation based on EUROSTAT 2012.

By analyzing the data, it can be concluded that the V4 countries present improving and increasing tendencies in case of most of the indicators and, on the basis of this, the convergence is clear compared to EU27.

By examining the tendencies, however, the convergence to the target, that is the EU27 as reference level should also be analyzed on the basis of the dynamics of changes in the value of member state. It can be made on the basis of the data available in case of each indicator, by using the following formula:

$$I = \frac{ri_{t} - ci_{t}}{ri_{t-n} - ci_{t-n}}$$
(1)

Where:

I gives the size of change,

r is the value of reference country (in the current case it is EU27),

c is the value of the country compared,

i is the title of indicator, while *t* and *t*-*n* is the value of the period concerned.

The formula enables the consideration of periodical changes and the problems of moving target, so the value changes coming from the growth of EU27 can also be handled. The following results are given by the use of the formula.

If the value of index is positive and less than 1, the value of the examined country is closer to the reference level. If it is less than 1, it is moving away from the EU27 level. In some cases the index is in the negative range which means that the value of indicator regarding the examined country is better than in case of EU27, or there are completely opposite processes in regard to the values.

Table 2

| | CZ | HU | PL | SK |
|---|-------|-------|-------|-------|
| Labour productivity per hour worked | 0,97 | 1,04 | 1,04 | 0,96 |
| Real GDP per capita | 0,93 | 1,04 | 0,97 | 0,93 |
| Employment rate | 0,41 | 1,52 | 0,71 | 1,29 |
| Implicit tax rate on labour | 0,67 | 0,72 | 1,90 | 10,00 |
| Life-long learning* | 1,00 | 1,50 | 1,36 | -4,85 |
| Market integration by type of trade activities services | 0,77 | 1,17 | 1,09 | 0,48 |
| Market integration by type of trade activities good | 1,07 | 1,04 | 1,65 | 1,22 |
| Comparative price levels | 0,48 | 0,69 | 0,90 | 0,51 |
| Level of Internet access – households* | 0,00 | 0,30 | 0,40 | 0,11 |
| Public expenditure on education* | 1,18 | 0,71 | 7,75 | 1,57 |
| Early leavers from education and training* | 0,81 | 0,97 | 0,89 | 0,91 |
| Long-term unemployment rate, by sex | -9,00 | -1,60 | -0,27 | 0,87 |
| Energy intensity of the economy | 0,72 | 0,80 | 0,70 | 0,52 |
| Resource productivity* | 1,03 | 1,03 | 1,14 | 1,19 |
| index < 1 | 9 | 6 | 5 | 8 |
| index > 1 | 4 | 7 | 8 | 5 |
| index < 0 | 1 | 1 | 1 | 1 |

Pace of convergence in case of examined indicators (2000-2010)

Source: own calculation based on EUROSTAT 2012, EC 2010.

Note: * The examined period was modified in relation to the available data.

On the basis of the selected indicators, the Czech Republic was the most successful, because it could reach convergence in nine out of the examined indicators. Slovakia is the next.

Table 3

| | CZ | | HU | | PL | | SK | |
|---|--------|----------------|--------|-----------------------|--------|-----------------------|--------|-----------------------|
| | r | R ² | r | R ² | r | R ² | r | R ² |
| Labour productivity per hour worked | 0,820 | 0,673 | 0,762 | 0,580 | 0,911 | 0,829 | 0,912 | 0,832 |
| Real GDP per capita | 0,808 | 0,652 | 0,654 | 0,428 | 0,975 | 0,951 | 0,937 | 0,878 |
| Employment rate | 0,113 | 0,013 | -0,441 | 0,195 | 0,850 | 0,722 | 0,629 | 0,395 |
| Implicit tax rate on labour | -0,838 | 0,703 | 0,095 | 0,009 | -0,597 | 0,356 | -0,705 | 0,497 |
| Life-long learning | 0,897 | 0,805 | -0,350 | 0,123 | 0,733 | 0,538 | -0,713 | 0,508 |
| Market integration by type of trade activities services | 0,079 | 0,006 | 0,874 | 0,764 | 0,877 | 0,768 | -0,689 | 0,475 |
| Market integration by type of trade activities good | 0,028 | 0,001 | 0,603 | 0,364 | 0,775 | 0,601 | 0,644 | 0,415 |
| Comparative price levels | 0,949 | 0,900 | 0,671 | 0,451 | 0,270 | 0,073 | 0,915 | 0,837 |
| Level of Internet access – households | 0,930 | 0,865 | 0,933 | 0,870 | 0,924 | 0,853 | 0,902 | 0,814 |
| Public expenditure on education | 0,321 | 0,103 | -0,155 | 0,024 | -0,466 | 0,217 | -0,472 | 0,223 |
| Early leavers from education and training | -0,616 | 0,379 | -0,822 | 0,676 | -0,692 | 0,479 | -0,617 | 0,381 |
| Long-term unemployment rate, by sex | -0,867 | 0,752 | 0,894 | 0,798 | -0,876 | 0,768 | -0,721 | 0,520 |
| Energy intensity of the economy | -0,910 | 0,828 | -0,786 | 0,617 | -0,953 | 0,907 | -0,916 | 0,840 |
| Resource productivity | 0,926 | 0,858 | 0,876 | 0,767 | 0,849 | 0,720 | 0,707 | 0,500 |

Correlation values in regard to structural funds and structural indicators (2000-2010)

Source: own calculation based on EUROSTAT 2012, EC 2010.

Hungary and Poland presents much worse values because they could achieve improvement only in 6 and 5 indicators respectively, while they have declined in case of 7 and 8 indicators. On the basis of this, it can be concluded that Hungary and Poland could not exploit the advantages of EU membership as much as the other two countries. In other approach, by utilizing the possibilities offered by the union, they were not able – or only moderately – to change the structural conditions and peculiarities they had prior to their accession.

The above outlined issues raise the question whether interrelation could be found between the cohesion funds and the values of indicators. The correlation analysis proves that the Czech and Slovak values are higher as it is obvious from the previous comparison, too, and in most of the cases stronger correlation can be observed here.

Since in most of the cases, the macroeconomic impacts of utilizing the sources appear only later, it is worth examining the delayed consequences. In the frames Table 4

Degree of delayed impact of structural funds (B parameter) in case of examined indicators (2000-2010)

| itititititititititititititititLabour productivity per hour worked0,00140,00150,00160,00130,00030,00030,00030,00330,00330,00330,00340,0034Real GDP per capita0,01010,01030,00100,00130,00130,00130,00330,00330,00340,00340,0034Real GDP per capita0,00100,00040,00040,00040,00040,00040,00040,00340,00340,00340,0034Inplicitation tate0,00100,00010,00040,00040,00040,00040,00040,00040,00340,00340,0034Infielding tarrate on labour0,00100,00010,00040,00040,00040,00040,00040,00040,00340,0034Infielding tarrate on labour0,00100,00010,00040,00040,00040,00040,00040,00040,00340,0034Infielding tarrate on labour0,0010,00010,00040,00040,00040,00040,00040,00040,0004Infielding tarrate on labour0,0010,00010,00040,00040,00040,00040,00040,00040,0004Infielding tarrate on labour0,0010,00010,00040,00040,00040,00040,00040,00040,0004Infielding tarrate on labour0,0010,00140,00140,00 | | CZ | | | HU | | | PL | | | SK | | |
|---|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Labour productivity per hour worked0,00140,00150,00160,00130,00030,00030,00030,00030,003 | | t | t+1 | t+2 |
| Real GDP per capita 0,0128 0,0143 0,0055 0,0036 0,0036 0,0035 0,0037 0,0337 | Labour productivity per hour worked | 0,0014 | 0,0015 | 0,0016 | 0,0010 | 0,0012 | 0,0013 | 0,0003 | 0,0003 | 0,0003 | 0,0038 | 0,0036 | 0,0037 |
| Employment rate0,00010,00040,00050,00050,00010,00030,00010,00030,00030,0003Implicit tax rate on labour-0,0014-0,00100,00070,00030,00010,00010,0003-0,0003I.fe-long learning0,00100,00010,00010,00010,00030,00030,00030,0003-0,0003Market integration by type of trade0,00010,00010,00010,00010,00030,00030,00030,00030,0003Market integration by type of trade0,0001-0,00010,00130,00130,00130,00130,00130,00330,0033Market integration by type of trade0,0001-0,0010,00130,00130,00130,00130,00130,00330,0033Market integration by type of trade0,00110,01030,00130,00130,00130,00130,00330,0033Market integration by type of trade0,00110,01030,00130,00130,00130,00130,00330,00130,0033Level of Internet access-households0,01030,0 | Real GDP <i>per capita</i> | 0,0128 | 0,0140 | 0,0153 | 0,0065 | 0,0084 | 0,0100 | 0,0036 | 0,0033 | 0,0029 | 0,0347 | 0,0323 | 0,0325 |
| Implicit ax rate on labour-0,0014-0,0010-0,00030,0003-0,0033-0,0033 | Employment rate | 0,0001 | 0,0004 | 0,0006 | -0,0005 | 0,0000 | 0,0005 | 0,0010 | 0,0009 | 0,0007 | 0,0032 | 0,0041 | 0,0049 |
| Life-long learning0,00100,00010,00010,00010,00010,00010,00010,00010,00010,00030,00010,00030,0033 </td <td>Implicit tax rate on labour</td> <td>-0,0014</td> <td>-0,0010</td> <td>-0,0003</td> <td>0,0002</td> <td>0,0004</td> <td>0,0002</td> <td>-0,0003</td> <td>-0,0001</td> <td>0,0001</td> <td>-0,0050</td> <td>-0,0063</td> <td>-0,0058</td> | Implicit tax rate on labour | -0,0014 | -0,0010 | -0,0003 | 0,0002 | 0,0004 | 0,0002 | -0,0003 | -0,0001 | 0,0001 | -0,0050 | -0,0063 | -0,0058 |
| Market integration by type of trade ctivities services0,00010,00010,00020,00020,00020,00020,00020,00020,00010,0002Market integration by type of trade ctivities good0,00010,00010,00140,00480,00460,00150,00170,01180,00284Market integration by type of trade ctivities good0,01180,01060,00190,00120,00220,00150,00150,00110,02240,0056Level of Internet evels0,01180,01060,00020,00220,00240,00250,00750,00750,00760,00260,0026Level of Internet evels0,01010,00010,00000,00000,00000,00000,00030,00030,00260,0056Level of Internet access - households0,01010,00010,00010,00010,00010,00030,00030,00030,00030,0003Public expenditure on education and training0,00010,00010,00010,00010,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,00030,0013 <td>Life-long learning</td> <td>0,0010</td> <td>0,0007</td> <td>0,0006</td> <td>-0,0003</td> <td>-0,0001</td> <td>0,0002</td> <td>0,0001</td> <td>0,0001</td> <td>0,0001</td> <td>-0,0048</td> <td>-0,0052</td> <td>-0,0051</td> | Life-long learning | 0,0010 | 0,0007 | 0,0006 | -0,0003 | -0,0001 | 0,0002 | 0,0001 | 0,0001 | 0,0001 | -0,0048 | -0,0052 | -0,0051 |
| Market integration by type of trade 0,0001 -0,0001 0,0014 0,0046 0,0015 0,0017 0,0118 0,0018 0,0036 ctivities good 0,0118 0,0106 0,0012 0,0015 0,0011 0,0222 0,0284 Comparative price levels 0,0118 0,0106 0,0022 0,0022 0,0076 0,0005 0,0011 0,0224 0,0284 Level of Internet access - households 0,0213 0,0223 0,0227 0,0073 0,0073 0,0070 0,0069 0,00264 0,00564 Public expenditure on education 0,0010 0,0001 0,0001 0,0007 0,0003 0,0013 0,0033 <td>Market integration by type of trade activities services</td> <td>0,0001</td> <td>-0,0001</td> <td>-0,0002</td> <td>0,0012</td> <td>0,0008</td> <td>0,0004</td> <td>0,0002</td> <td>0,0002</td> <td>0,0002</td> <td>-0,0021</td> <td>-0,0020</td> <td>-0,0010</td> | Market integration by type of trade activities services | 0,0001 | -0,0001 | -0,0002 | 0,0012 | 0,0008 | 0,0004 | 0,0002 | 0,0002 | 0,0002 | -0,0021 | -0,0020 | -0,0010 |
| Comparative price levels 0,0118 0,0106 0,0032 0,0056 0,0065 0,0005 0,0011 0,0232 0,0234 Level of Internet access - households 0,0213 0,0214 0,0252 0,0243 0,027 0,0069 0,0569 0,0554 0,0550 Public expenditure on education 0,001 0,0000 0,0001 0,0000 0,0001 0,0003 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 0,0013 | Market integration by type of trade activities good | 0,0001 | -0,0001 | 0,0019 | 0,0048 | 0,0044 | 0,0046 | 0,0015 | 0,0015 | 0,0017 | 0,0118 | 0,0086 | 0,0170 |
| Level of Internet access - households 0,0234 0,0254 0,0257 0,0073 0,0073 0,0059 0,0554 0,0550 Public expenditure on education 0,0001 0,0000 0,0001 0,0001 0,0001 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0004 0,0003 0,0004 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0003 0,0004 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0016 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0014 0,0016 0,0014 0,00 | Comparative price levels | 0,0118 | 0,0106 | 0,0092 | 0,0052 | 0,0062 | 0,0076 | 0,0005 | 0,0005 | 0,0011 | 0,0292 | 0,0284 | 0,0245 |
| Public expenditure on education 0,0001 0,0000 0,0001 | Level of Internet access – households | 0,0243 | 0,0236 | 0,0214 | 0,0252 | 0,0248 | 0,0227 | 0,0073 | 0,0072 | 0,0069 | 0,0554 | 0,0550 | 0,0519 |
| Early leavers from education and training-0,0004-0,0003-0,0003-0,0003-0,0003-0,0014-0,0014Long-term unemployment rate, by sex-0,0009-0,00100,00010,00060,0004-0,0011-0,0013-0,0013-0,0013-0,0014-0,0014Resource productivity0,00010,000 | Public expenditure on education | 0,0001 | 0,0000 | 0,0000 | -0,0001 | 0,0000 | 0,0001 | 0,0000 | 0,0000 | 0,0000 | -0,0003 | -0,0004 | -0,0006 |
| Long-term unemployment rate, -0,0009 -0,0010 -0,0006 0,0006 -0,0012 -0,0019 -0,0043 -0,0051 -0,0013 -0,0013 -0,0013 -0,0013 -0,0013 -0,0013 -0,0011 -0,0011 -0,0011 0,0001 | Early leavers from education and training | -0,0004 | -0,0003 | -0,0004 | -0,0010 | -0,0007 | -0,0007 | -0,0003 | -0,0003 | -0,0003 | -0,0014 | -0,0010 | -0,0004 |
| Energy intensity of the economy $-0,0549$ $-0,0568$ $-0,0526$ $-0,0257$ $-0,0268$ $-0,0141$ $-0,0121$ $-0,0121$ $-0,2481$ $-0,2499$ Resource productivity $0,0001$ | Long-term unemployment rate, by sex | -0,0009 | -0,0010 | -0,0007 | 0,0010 | 0,0006 | 0,0004 | -0,0012 | -0,0011 | -0,0009 | -0,0043 | -0,0051 | -0,0038 |
| Resource productivity 0,0001 0,0001 0,0001 0,0001 0,0001 0,0001 0,0000 0,0000 0,0000 0,0000 0,0001 0,0001 | Energy intensity of the economy | -0,0549 | -0,0568 | -0,0520 | -0,0226 | -0,0257 | -0,0268 | -0,0141 | -0,0137 | -0,0121 | -0,2481 | -0,2499 | -0,2242 |
| | Resource productivity | 0,0001 | 0,0001 | 0,0001 | 0,0001 | 0,0001 | 0,0001 | 0,0000 | 0,0000 | 0,0000 | 0,0001 | 0,0001 | 0,0000 |

Source: own calculation based on EUROSTAT 2012, EC 2010.

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Table 5

Percentage value of delayed impact of structural funds

| | CZ | | НU | | PL | | SK | |
|---|----------|------------|---------|------------|---------|---------|---------|---------|
| | t+1 | t+2 | t+1 | t+2 | t+1 | t+2 | t+1 | t+2 |
| Labour productivity per hour worked | 104,67% | 105,26% | 114,07% | 108,61% | 91,69% | 97,89% | 94,19% | 101,73% |
| Real GDP per capita | 109,36% | 109,36% | 128,90% | 119,16% | 91,11% | 90,26% | 93,26% | 100,48% |
| Employment rate | 446,41% | 135,25% | 5,87% | -1 765,58% | 92,01% | 78,09% | 129,07% | 120,72% |
| Implicit tax rate on labour | 77,21% | 23,99% | 238,84% | 40,49% | 34,29% | -72,34% | 127,92% | 90,77% |
| Life-long learning | 74,38% | 82,69% | 34,05% | -196,81% | 61,31% | 138,62% | 108,74% | 98,05% |
| Market integration by type of trade activities services | -174,69% | 145,16% | 69,17% | 47,31% | 83,98% | 92,62% | 95,41% | 50,78% |
| Market integration by type of trade activities good | -132,39% | -1 260,67% | 90,53% | 104,70% | 101,34% | 118,06% | 72,41% | 198,32% |
| Comparative price levels | 89,72% | 86,96% | 119,07% | 123,53% | 116,13% | 203,28% | 97,04% | 86,35% |
| Level of Internet access – households | 97,05% | 90,72% | 98,16% | 91,61% | 99,47% | 95,54% | 99,31% | 94,27% |
| Public expenditure on education | 28,17% | -86,35% | 24,51% | -486,53% | 90,16% | 78,83% | 115,80% | 161,41% |
| Early leavers from education and training | 81,63% | 111,01% | 70,92% | 101,18% | 117,50% | 115,46% | 74,26% | 37,51% |
| Long-term unemployment rate, by sex | 111,71% | 70,14% | 62,01% | 68,89% | 93,48% | 78,60% | 119,06% | 74,92% |
| Energy intensity of the economy | 103,51% | 91,49% | 113,69% | 104,34% | 97,67% | 87,95% | 100,72% | 89,74% |
| Resource productivity | 95,39% | 85,95% | 72,91% | 76,81% | 95,15% | 76,01% | 100,18% | 42,19% |
| (previous year = 100% 2000–2010) | | | | | | | | |
| Source: own calculation based on EUROSTAT 2012, EC 2 | 010. | | | | | | | |

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of delayed data analysis, only the values of B parameter are listed, in order to quantify the shift in case of each indicator (Table 4). In some cases, the impact is lower but it is due to the fact that these indicators are affected by many complex factors because the macroeconomic processes are very complicated. In the average of V4, the most significant impact can be observed in the decline of energy intensity of the economy. In addition to this, stronger impact can be seen between the internet access of households, comparison of price levels and the changes of GDP/head. As regards for example the labour productivity, it is clear that in case of the Czech Republic, a structural fund of one million euro results 0,0014 euro improvement in labour productivity in the first year. As regards the delayed effect of the process, the values are 0,0015 and 0,0016, so the impact is increasing year by year. The tendency is similar in case of Hungary. In contrary to this, the Polish value of 0,0003 shows stagnation, while the values in case of Slovakia fluctuated. Although at a much higher value than in the other countries: the cohesion funds resulted an improvement of 0,0038–0,0036 euro in case of labour productivity.

Table 5 prove that in case of t+1 or t+2 time period, compared to the values of the previous year, further positive interrelation can be observed in most of the indicators in the second year in the Czech Republic and Slovakia. As regards Hungary and Poland, however, a stronger decline and decreasing pace of delayed impact can be quantified. It refers to the fact that the structural funds could not exert any considerable impact due probably to economic policy and other macro-economic determinations.

Conclusions

The impact and significance of cohesion policy was determinant in the economy and economic growth of Visegrad countries. The measurement of this, however, is a very complex process. The value of structural indicators and the utilization of structural funds have a key role in the mapping of impacts. The examination of the complex impacts of the former ones can offer more detailed explanation. Our research, considering also its limits, leads to the conclusion that out of the V4 countries, basically the Czech Republic and Slovakia were able to show any substantive development and convergence by utilizing union sources and adapting to the general macroeconomic processes. By reviewing the values in regards to the Czech Republic and Slovakia, it can be confirmed in case of more indicators that the funds have detectable impact even in the second year after the transfer.

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