Government Office of the Slovak Republic

Assessment of Cohesion Policy Impacts on the Development of Slovakia Using a Suitable Econometric Model

Evaluation Report 2014

ORIGINAL

KPMG Slovensko spol. s r.o.
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Has the value added in sectors of national economy of the Slovak Republic changed or increased due to implementing SF and CF? If so, in which sectors in connection to individual regions.

What is the share of the added value of the business sector and of the private sector?

Based on the current implementation of SF and CF, to what extent has the strategic objective of the NSRF – “To significantly enhance the competitiveness and performance of the regions and of the Slovak economy until 2013, while respecting sustainable development” – been met?

Are the objectives of the Europe 2020 Strategy being met in individual areas of economy and are the disparities among individual regions of SR being diminished as a result?

What is the proportion of the total amount of implementation SF and CF within NSRF in the GDP?

To what extent was fulfilled long-term sustainability of existing and newly created jobs by SF and CF in selected sectors?

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1 Introduction

This document is the final report of the project “Assessment of Cohesion Policy Impacts on the Development of Slovakia using a Suitable Econometric Model”. The report represents the main outcome of the evaluation. It provides answers to the main evaluation questions related to impacts of Structural Funds (SF) and Cohesion Fund (CF) in the programme period of the years 2007 – 2013. In spite of complexity of developing a suitable model, able to capture the effects on national and regional level, the chosen econometric model enables quantification of impacts of Cohesion policy.

This report is the second outcome based on the Contract for Work (registration number of contract 1296/2013) dated 20 November 2013, in force as of 21 November 2013.

1.1 Subject and Aim of the Report

The aim of the evaluation report is to identify and quantify impacts of implementation of Cohesion policy on national and regional level by using a suitable econometric model. Results of evaluation served to formulate findings and recommendations to increase effectiveness of Cohesion policy resources to support economic and social growth in the Slovak Republic.

1.2 Structure of Report

The evaluation report consists of the following chapters:

1. Chapter 1 is the introduction to the Final Report dealing providing basic information about the subject and aims of the evaluation.

2. Chapter 2 offers the overall summary of evaluation, namely the main findings, conclusions and recommendations for general public.

3. Chapter 3 contains a description of the economic development in the Slovak Republic from 2006 until 2013 on national and regional level. It also includes basic information about Cohesion policy implementation in Slovakia during the programme period 2007-2013.

4. Chapter 4 serves primarily to present the basic results of assessment of SF and CF impact of SF and CF on the Slovak economy. The effects of Cohesion policy have been assessed separately on national and regional level. Outputs of the econometric model served as basis for answering the main evaluation questions.

5. Chapter 5 is structured according to individual evaluation questions. Each sub-chapter contains a description of the approach to evaluation, analysis results, a summary of the main findings and a summary of the answer to the evaluation question.

6. Chapter 6 provides the overview of the most important findings and conclusions of the evaluation of SF and CF impacts of SF and CF on the development of Slovakia.

7. Based on findings and conclusions, the expert team formulated strategic recommendations with the aim to increase the positive impact of Cohesion policy on the economic development on national and regional level. Specific recommendations are contained in the Chapter 7.
Annexes - Describe the econometric model itself and provide arguments for its selection, describe the methodology of disaggregation of data from ITMS and provide additional tables and charts.

1.3 Members of the Expert Team

Main authors:

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<thead>
<tr>
<th>Name of the author</th>
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<th>Name of the expert</th>
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2 Executive summary

Introduction

The purpose of the report is to quantify the impact of the implementation of Cohesion policy in the programming period 2007 – 2013 on the development of Slovakia with application of econometric model. This is the first ex-post analysis of impacts of the Structural Funds and the Cohesion Fund (SF and CF) regional and national impacts in the Slovak Republic. Results of the assessment can be used to increase the efficiency of Cohesion policy resources in support of economic and social development after 2014.

The first part of this evaluation is dedicated to macroeconomic situation in the programming period 2007 – 2013 at the national and regional level. At the same time, the attention is paid to the allocation of resources between Funds and operational programs (OPs). Subsequently, some of the assumptions and limitations of applied econometric HERMIN model are presented (for details see Annex A). The econometric model (HERMIN) was used for the assessment of Cohesion policy impacts on regional development in Slovakia. Using this model was necessary because it is impossible to quantify effects of SF and CF implementation only on the basis of analysis of raw macroeconomic variables development before, during and after the programming period. The statistics provide us with information on the level of observed variables (indicators) in different periods, but do not provide an alternative development of what would have happened if SF and CF had not been invested in the Slovak economy. The econometric model allows to quantify the impact of implementation of the SF and CF on macroeconomic indicators, and can simultaneously incorporate the impact of other factors, including those not directly observable, such as mutual influence of multipliers. With regards to the required outcomes of the analysis and availability of statistical data HERMIN model was selected as an appropriate instrument for assessment of effects of SF and CF implementation in Slovakia. This model is at the national level used for SF and CF Cohesion policy assessment since the late 1980s. Over the last decade its methodology was upgraded and the application at the regional level was introduced. The justification for selection of HERMIN model is presented in detail in the Annex A. For the needs of assessment, the economy was divided into 5 main sectors: agriculture, industry, construction, market services and non-market services.

Structure of SF and CF resources in the programming period 2007-2013

Programming period 2007 – 2013 was influenced by a significant delay in absorption of SF and CF as real spending started only after 2008. Looking at the share of SF and CF expenditure on GDP, there are significant differences between regions. SF and CF have the highest share SF and CF on the GDP, almost at 7%, in Trenčín and Prešov regions (2013). In the case of the Bratislava region, SF and CF share did not reach 1% in any year of programming period due to high level of regional GDP generated in the Bratislava region. In absolute terms, more than 6 billion EUR from EU sources were implemented in the Slovak Republic by the end of 2013. The expenditures in Trenčín, Prešov and Nitra region were approximately 1 billion EUR in each of these regions. At the same time, in these regions investments in infrastructure have the highest share on the overall SF and CF expenditures.
Costs incurred in SF and CF projects were reclassified into the following five categories: infrastructure (50.6% of total expenditure), human capital (6.9%), direct aid to industry (13.5%), direct aid to services (18.1%) and research and development (10.9%). In the case of infrastructure, the largest share, approximately 77%, was implemented in Trenčín region. On the other hand, in Bratislava region, the share of spending on infrastructure was less than 11% of total SF and CF spending in this region by the end of 2013. In the case of expenditure on human capital, the distribution of resources was more equal as the share in most of regions ranged from 3 to 6%. The only exception was the Bratislava region, in which almost one-fifth of Cohesion policy aid was spent on human capital. Expenditure on direct support for industry ranged from 8% (TT) to 18% (NR); in absolute terms, highest volume of funds to support the industry was allocated to Nitra region (about 140 million EUR). The highest share of expenditure to support services was recorded in Bratislava region, up to 27%, which is directly related to the type of projects implemented in the region. At the opposite end of the spectrum is Trenčín region with the expenditures for this purpose of less than 11%, which was determined by a high proportion of expenditures on infrastructure. In absolute terms, the expenditures on support of services were fairly evenly geographically allocated and ranged between 113 to 140 million EUR. Investment to research and development was concentrated mainly in three regions: Bratislava, Košice and Žilina, while in BA these expenses accounted for 30% of total expenditures. Absorption capacity and structure of expenditure greatly influenced the effects of Cohesion policy funding on functioning of regional economies. The analysis provides also alternative estimations of use of allocated financial resources till the end of the programming period (2015), including full absorption.

**Impact of SF and CF implementation on the Slovak economy**

Impact of implementation of SF and CF on economic development in individual regions of Slovakia was assessed on the basis of several indicators, such as: GDP, employment, convergence to the EU average etc. Impact of SF and CF implementation on regions was fairly similar and positive in most indicators assessed. SF and CF generated a significant additional cumulative GDP growth in Slovakia, which amounted up to 5% in 2013. Looking at each year with significant absorption (period 2009 – 2013), SF and CF investments generated an additional average annual GDP growth between 0.7 p.p. to 1.2 p.p.. The most significant additional growth was achieved in Trenčín, Žilina, Prešov and Košice region. The additional growth at 3.1 p.p. in 2013 confirmed positive effects of SF and CF implementation in Trenčín region, this was mainly due to the building of large infrastructure projects in this region.

Additional economic growth generated by EU funds contributed also to creation of new jobs. In 2013, the employment was higher by 80,000 jobs compared to the expected development without the use of SF and CF. From the sector point of view, it is possible to identify that the highest number of jobs was created in the market services sector (about 45,000 jobs). Implementation of SF and CF created more than 29,000 additional jobs in construction sector as result of construction and modernisation of infrastructure. The smallest but permanent growth has been recorded in the sector of industry, in which more than 7,000 additional jobs were created by the end of 2013.

Sustainability of created jobs is the important factor of efficiency of EU investments. At the national level, we expect the impact of SF and CF on employment to be approximately 110,000
additional jobs (compared to the situation without implementation) in 2015. From the additional jobs created approximately 40,000 represent sustainable jobs. In the market services sector, there might be created nearly 58,000 jobs in 2015, of which 24,000 jobs (42 %) are identified as sustainable. In the construction sector, there should be created around 37,000 jobs in 2015 through the SF and CF implementation. Given the nature of jobs in construction, the number of sustainable jobs compared with other sectors would be lowest (less than 20 %). The lowest number of jobs is expected to be created in the industry (around 10,000), however, in this sector there is the highest sustainability of jobs - almost 98 %.

The positive effect of SF and CF on job creation is naturally also reflected in unemployment rates in the regions. We can conclude that the implementation of Cohesion policy has contributed to reducing the unemployment rate in all regions. In the case of absence of EU funding, the estimated unemployment rate in 2013 for Trenčín region would be higher by 5.7 p.p., Prešov region by 4.5 p.p., Žilina region by 3.7 p.p., Košice region by 3.5 p.p., Banská Bystrica region by 3.3 p.p., Trnava region by 3.1 p.p., Nitra region by 2.4 p.p. and the Bratislava region by 1.2 p.p.

Direct impact of SF and CF support on the country's competitiveness measured by its position in the Global Competitiveness Report has not been confirmed. The reason is that implementation of SF and CF did not directly affect most criteria assessed in this report. At the regional level, there has been a slight positive impact of SF and CF implementation measured by unit labour costs on competitiveness in Trenčín, Košice, Prešov and Žilina regions. On the other hand, the effect of SF and CF implementation on unit labour costs was negative in Bratislava, Trnava, Trenčín and Banská Bystrica regions. However, SF and CF positively influenced the moderate growth in labour productivity in all regions of Slovakia.

When examining the impact of Cohesion policy on the process of real convergence of SR to the EU average, significant positive effect was identified. Without SF and CF funding, the convergence process would have been stopped in six of the eight Slovak regions. Bratislava region played the major role in securing the national convergence since without the contribution of the economically strongest region national economy would have diverged from the EU average.

Conclusions and recommendations

Use of resources of Cohesion policy in the programming period 2007 – 2013 had a significantly positive impact on the Slovak economy. Importance of Cohesion policy is fully demonstrated in mitigation of the negative impacts of the global economic and financial crisis on the Slovak economy. By the end of 2013, SF and CF expenditures generated additional cumulative economic growth of 5% of GDP, and in 2015 it should reach 7.5%.

The strategic objective of the NSRF “to significantly increase competitiveness of the regions and the Slovak economy and employment by 2013, while respecting sustainable development” was accomplished only partially. Therefore, it is necessary to concentrate SF and CF interventions to areas that have the potential to positively affect the current state (e.g. quality of public administration, science, research and innovation, education, quality of human resources). To effectively achieve this funding from national sources as well as the involvement of private actors need to be secured.

Process of real convergence to the EU 28 average was positively supported by SF and CF in all regions of Slovakia, except of Banská Bystrica region. Development at the national level
confirms that over the period 2007 – 2013, there was a convergence to the EU 28 average. This development is also expected to continue in the years 2014 and 2015, when the level of convergence should achieve 77% of the EU 28 average (measured by GDP per capita in PPP). On the other hand, during the programming period no regional convergence occurred, and inter-regional differences even slightly increased. However, without the use of Cohesion policy resources, the regional disparities would be even more significant.

Impact of Cohesion policy on employment at national and regional level can be considered as significant. The global economic and financial crisis has deepened the problems on the labour market. Negative effects of the crisis hit the Slovak labour market (employment and unemployment) with a certain time lag, but more intensely. Based on the estimates of the econometric model, SF and CF contributed to creation of around 80,000 additional jobs until 2013. Infrastructural projects financed from SF and CF resources were able to create short-term jobs and mitigate negative impacts of global downturn. In pursuing the employment objective, it would be therefore more advisable to target the financial resources primarily to industry and services, where the sustainability of jobs is higher. However, it is necessary to support the schemes, which do not significantly distort the market competition in industries, sectors or regions.

CSF multiplier is a comprehensive indicator measuring the efficiency of SF and CF and it is a representation of additional effect of each Euro invested on GDP in EUR. Bratislava region has achieved the highest value of CSF multiplier throughout the period. This was primarily determined by the level and structure of funding in this region. Compared with other regions, it had the smallest share on total expenditure, while infrastructure investments had the lowest share on the total spending from all regions. Increased investment in research and development in this region also created conditions for higher growth potential, making use of EU funds more efficient. High value of CSF multiplier was achieved also thanks to the development of the region, where even a modest amount of spending leads to a higher potential growth. On the contrary, the smallest CSF multiplier was recorded in Prešov region, which it will be 1.7 in 2015. In other regions, the value of CSF multiplier ranges between 1.76 to 2.47.

Implementation of SF and CF positively influenced the creation of gross value added in all sectors of the economy and in all regions of Slovakia. Implementation of EU funds has positively contributed to the growth of business sector and into some extent mitigated negative effects of the global economic and financial crisis. However, in the case of private sector, it is necessary to focus on support of projects creating appropriate conditions for majority of business entities without negative effects on competition.

In addition to the structure of SF and CF investment, a time dimension of the implementation has a significant impact on the ability to generate additional effects (benefits) in the economy. Delayed spending at the beginning of the programming period is one of main reasons of low absorption capacity and high probability that Slovakia will not be able to fully spend the allocation for 2017-2013 period. More equally distributed spending of SF and CF during the programming period would lead to increased cumulative effects on the Slovak economy, and would likely further contribute to the mitigation of impacts of global economic and financial crisis in Slovakia.
3 Description of the subject of evaluation

3.1 Economic development of the Slovak Republic from 2007 on the national level

From 2007 to 2013, the economic development in Slovakia was influenced mainly by the completion of the transition process, by participating in the processes of the European Union (EU) after joining it in 2004 (mainly by joining the Schengen Area at the end of 2007 and introducing euro as of January 2009). Since 2006, the Slovak economy was at the stage of economic growth which culminated in 2007 and since 2008 it was significantly influenced by the start of the global financial and economic crisis. After the recession in 2009, a slight revival followed in 2010 suppressed in the following area by insecure growth in the countries of the Euro Area due to the increasing problem in Europe, the so-called ‘debt crisis’. As of 2013, there has been a gradual recovery of the macroeconomic environment and slightly positive signals of accelerating growth of the economy in the coming years. At the same time, the Slovak economy almost reached its debt brake threshold (57% of GDP) with its level of public debt, restricting the options of fiscal policy to influence the economic policy of the Slovak Republic through increased expenditures.

In 2006, it was possible to see a positive trend on the labour market as well as when it comes to the economic growth stability (Morvay, Okáli, 2006). This trend also continued in 2007, when the Slovak economy achieved the historically highest annual growth 10.49%.

![Chart 1: The economic growth of the Slovak Republic in the years 2006 – 2013, actual GDP growth (the right axis) and nominal GDP in billion of EUR (the left axis)](chart)

Source: SUSR

From 2008, the economic growth slowed down to half compared to the year 2007 (by 5.8 p.p.), while slower growth of the economy due to the starting crisis was more significantly visible in the last quarter. The generation of new jobs in this period (2006 - 2008) had a stable positive tendency pulled by the production growth positively stimulated by foreign as well as domestic demand. On average per year, approximately 50 thousand new jobs were created, representing annual employment growth of 2 – 4%. The effects of global economic crisis started to be seen...
in Slovakia more intensely from 2009 and negatively influencing the convergence process. Slovakia as a small open economy responded to the decline in foreign demand mainly generated by the EU countries which was negatively reflected also on the number of employed apart from the decline of production. Almost two thirds of new jobs created in the economy during the years 2006 - 2008 were cancelled in the first two years of the crisis (2009-2010), followed by a period of stagnation until 2013. The slightly positive economic growth thus was not able to generate new jobs at this time. SF and CF implementation could thus rather have kept employment on a certain level and prevented deeper start of the crisis, influencing a structural shift of employees into supported industries.

Chart 2: Comparing employment (the left axis) and employment growth (the right axis) according to methodologies of the European System of National and Regional Accounts in the Community 95 and Selective Labour Force Survey, thousand persons

The statement about imbalanced growth from the aspect of individual sector performance can be illustrated on the development of Gross value added in individual sectors (aggregate display on Chart 3). The development in individual sectors was varied during the monitored years. The highest share on the overall Gross value added on average for the monitored period was recorded for the sector of market services equalling 43 % and the sector of industry with 31.2 %. Non-market services made up on average for 14.6 %, civil engineering for 7.7 % and agriculture 3.2 %.

The highest growth of Gross value added was reported in sectors of industry and market services. Other three analyzed sectors grew significantly more slowly than the previously mentioned two sectors. When it comes to the crisis period, it influenced significantly each one of the five sectors. Market services reported a slight decline in 2009, followed by slow onset of growth, lasting until the end of the analysed time period. The sector of industry responded most significantly to the decline in demand caused by the economic crisis. This decline was followed by repeated recovery of growth in 2010 and a part of manufacturing processes was restored at a lower employment level. A stable growth trend followed until presence. Non-market services were relatively resistant to external macro-economic shocks. The most significant decline in the level of Gross value added growth was recorded in this sector in years 2008, 2011 and 2013,
while it was determined mainly by saving measures of public administration. Building industry reports a slightly different development than the other sectors. During the period of years from 2006 to 2008, it was accompanied by high growth at the time of conjuncture, pulled by investment demand from other sectors of the economy.

Chart 3: Comparison of value added creation in sectors of economy in the years 2006 – 2013, mil. EUR r.p.

Source: SUSR.

In the period after the crisis year of 2009, the Gross value added in industry stabilised, while a slightly decreasing tendency could be seen in the actual values. This has been determined by the decrease in investment demand as well as by reduced activity on the real-estate market. The real-estate bubble was thus also seen in Slovakia, though in a smaller extent, because the period of crisis started at a time when a massive growth of production in this industry was only starting. This decline was slowed down by infrastructural investments financed from SF and CF. The last industry with the smallest share on the total Gross value added creation was agriculture. The average economic growth during the years 2006 - 2013 was at the level of 2.35 %. In this sector, the important factor is mainly price development and the gross value added creation was not significantly determined by SF and CF, but mostly by common agricultural policy of the EU.

3.2 The economic development of the Slovak Republic from 2007 on regional level

From the regional aspect on the level of EU, development on NUTS 2 level was monitored and evaluated, thus the level of four regions. Since NUTS 2 level is only statistically aggregated in Slovakia and regionally functional units are on the NUTS 3 level (higher territorial units), the analysis monitors the development on this level.

Regional development of the Slovak Republic is quite imbalanced and the level of disparities is significant in almost all indicators, while it is impossible to follow the convergence process mainly in connection with the strongest region. From the aspect of comparing the overall development of regions, it is important to point out the significantly limiting factor, namely publishing official statistical data for individual regions with a two-year delay. Considering this
limitation, missing regional data was added as part of evaluation, using the econometric-optimising methods. The econometric-optimising method consisted of determining the value of monitored parameter in the conditions of insecurity in 2012 and 2013 based on partial information consisting of actually observed value of indicator on the national level and monitoring of regional development of several factors, influencing the given parameter, and information about their development is already available on this level (e.g. statistics of the labour market published at the same time as the data on national level).

Figure 1. Time representation of data availability on regional level

![Figure 1. Time representation of data availability on regional level](image)

Source: Radvanský, 2014

When looking at the regional gross domestic product, we can see approximately a similar level of GDP in seven regions. On the other hand, the performance of the Bratislava region is more than double when compared to the average of other regions. In a more detailed view of the regional GDP, we can state that growth was recorded in all regions in the period from 2007 to 2013, even though this growth was not the same. Only the Bratislava region recorded growth in the crisis year of 2009. A drop in the gross domestic product was recorded in other regions in this year from the level of –6.3% in the Nitra region to the level of -10.66% in the Košice region. The highest average growth in the period of years 2007 - 2013 was recorded in the Prešov region which was growing on average at 5.5%. The Žilina region and the Bratislava region follow Prešov region. The smallest annual average growth was recorded by Trenčín region and Trnava region that grew by 3%.

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1 Time \( t \) has been expressed in years and illustrates the relationship to the last published data. The current time (year 2014) is labelled as \( t+dt \), the indicator \( t \) is the last period of published data on the national level, thus year 2013. The delay in publishing of data on the regional level occurs between the period of \( t-2 \) and \( t \). The period of \( t-2 \) is a period of the last reporting of regional accounts, thus the year 2011. From the aspect of analysis, this is the ex post period, but data on the regional level must partly be estimated. The period of \( t+n \) (analysis) is identical with \( n+2 \) (2015). See the annex.
Table 1: Year-on-year growth of the regional GDP

<table>
<thead>
<tr>
<th>Region</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012 (f)</th>
<th>2013 (f)</th>
<th>average growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bratislava region</td>
<td>13.9%</td>
<td>6.7%</td>
<td>0.3%</td>
<td>4.3%</td>
<td>4.0%</td>
<td>2.6%</td>
<td>0.8%</td>
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<td>Trnava region</td>
<td>10.3%</td>
<td>4.2%</td>
<td>-9.4%</td>
<td>6.4%</td>
<td>3.7%</td>
<td>4.3%</td>
<td>1.4%</td>
<td>3.0%</td>
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<tr>
<td>Trenčín region</td>
<td>10.1%</td>
<td>6.7%</td>
<td>-8.3%</td>
<td>4.4%</td>
<td>3.9%</td>
<td>3.1%</td>
<td>1.3%</td>
<td>3.0%</td>
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<td>Nitra region</td>
<td>8.4%</td>
<td>10.2%</td>
<td>-6.3%</td>
<td>2.0%</td>
<td>11.6%</td>
<td>1.5%</td>
<td>1.0%</td>
<td>4.0%</td>
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<tr>
<td>Žilina region</td>
<td>15.6%</td>
<td>12.9%</td>
<td>-6.8%</td>
<td>7.4%</td>
<td>1.3%</td>
<td>2.7%</td>
<td>1.7%</td>
<td>5.0%</td>
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<tr>
<td>Banská Bystrica region</td>
<td>11.9%</td>
<td>10.1%</td>
<td>-9.1%</td>
<td>6.1%</td>
<td>0.6%</td>
<td>4.5%</td>
<td>0.9%</td>
<td>3.6%</td>
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<tr>
<td>Prešov region</td>
<td>12.3%</td>
<td>16.2%</td>
<td>-7.4%</td>
<td>2.8%</td>
<td>9.7%</td>
<td>2.2%</td>
<td>2.7%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Košice region</td>
<td>9.0%</td>
<td>8.9%</td>
<td>-10.7%</td>
<td>6.7%</td>
<td>4.3%</td>
<td>4.5%</td>
<td>2.9%</td>
<td>3.7%</td>
</tr>
</tbody>
</table>

Source: SUSR and calculations of authors

Chart 4: Gross domestic product in individual regions, million EUR\(^2\), r.p.

The convergence of regions in the Slovak Republic to the average in the EU 28 is measured by the development of GDP per capita in PPP. This indicator has got several limitations from the statistical aspect mainly on regional level and it slightly distorts this view (Chart 5).

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\(^2\) Data for years 2012 and 2013 calculated based on current national data using optimising methods.
Chart 5: Regional convergence (GDP per capital in PPP) considering the EU 28 average

The main sources of distortion are the manner of GDP reporting considering registered offices of statistical units (companies), number of workers in the region (a part of GDP mainly in the Bratislava Region is produced by workers commuting from other regions) and an absence of price indices (PPP) on regional level. The actual difference between regions can thus be lower by one third (Radvanský, 2014); however the level of disparities still remains on a significant level.

When looking at the convergence process of regions to the average of the EU 28, Slovakia as a while recorded approximation of economic performance to the average of the EU, while in the period of years 2007 – 2013, the convergence coefficient increased on the national level from 68 % to 75 %. From the regional aspect however, this process was not balanced out. While the Bratislava region reaches the level of more than 180 % of the average in the EU, it also records the highest actual dynamic of growth. Consequently on the regional level, the divergence process continues, since the positive deviation from the EU average increases. Considering more than doubled production of GDP in this region (Chart 4), this region can achieve increases of GDP like the other regions even with low levels of GDP growth, i.e. in spite of nominally lower levels of growth there is no actual convergence of regions. The Trnava and Nitra region recorded a similar level of convergence as recorded on the national level. Other regions achieved only very slight convergence, or stagnation considering the average in the EU. The Banská Bystrica region recorded an actual decline in the level of convergence with the EU average in the period of years 2008-2013. From the absolute comparison we can follow the problematic situation in the Prešov region that recorded the level of convergence at 44 % to the average of EU 28 in 2013 and was one of the worst ones in all of EU. Other regions exceeded the level of 50 % of the EU average, though Banská Bystrica region only very slightly with a level of 53 %. The convergence criteria apart from the Bratislava region were also exceeded by the Trnava region with the level of 84 % of the EU average. Other regions do not exceed, but reached in 2013 approximately the level of 65 % of the EU average.
The creation of gross value added develops in the same way as the recorded gross domestic product. We can divide Slovakia into two groups. The Bratislava region achieves more than the double level of the created gross value added when compared with the average of other regions. The remaining regions achieve the creation of gross value added from 5.6 billion EUR in the Banská Bystrica region to 7.7 billion EUR in the Košice region in 2013. The fastest paces of growth were achieved again in the Prešov, Žilina and Bratislava regions.

![Chart 6: Gross value added creation in individual regions in million EUR, r.p.](chart)

In case of regional employment, we were following up on the ESA95 (ESNÚ 95) methodology. The overall development can be divided into three periods. The increase in employment in the period of peeking conjuncture of the Slovak economy in the years 2007 and 2008, the period of sudden decrease in employment due to the economic crisis in 2009 and 2010 and the period of stagnation or slight recovery in 2011 to 2013. In case of overall regional employment, we recorded a decline in overall employment in the Bratislava, Trnava and Žilina regions in the period of years from 2007 to 2013. The decrease of employed in total of these regions involved 13 thousand people. In the Prešov region, a stable situation in the area of employment was recorded which was almost without any changes in the monitored period. In the Trenčín, Nitra, Banská Bystrica and mainly Košice region we can see the growth of the number of employed that cumulatively represented more than 28 thousand jobs.
3.3 Implementation of Cohesion Policy in the Slovak Republic in the Period of Years 2007 – 2013

Implementation of the cohesion policy of the EU in the programme period of 2007 - 2013 followed 3 basic aims: convergence, regional competitiveness and employment, and European territorial cooperation. To achieve the given aims, Member States and regions were eligible to use the resources of the following funds: the European Regional Development Fund (ERDF), Cohesion Fund (CF) and the European Social Fund (ESF).

In the programme period of years 2007 – 2013, almost 11.5 billion EUR was allocated for the Slovak Republic as part of the cohesion policy. The aims and ways of using the financial resources from SF and CF have been defined in the National Strategic Framework of Reference (NSFR). It consists of 11 operational programmes implemented as part of the aim convergence and regional competitiveness and employment (programmes of European Territorial Cooperation are not part of the NSFR). All operational programmes can be characterised as sector/thematic programmes that are controlled and implemented on the national level. As result of the start of the global economic crisis, slight changes in financial allocations for individual programmes occurred.
Table 2: Sources of funding for CF and SF, million EUR

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ERDF</td>
<td>6 099 989 765</td>
<td>5 810 638 569</td>
</tr>
<tr>
<td>Total CF</td>
<td>3 898 738 563</td>
<td>3 180 939 543</td>
</tr>
<tr>
<td>Total ESF</td>
<td>1 497 739 439</td>
<td>1 498 666 842</td>
</tr>
<tr>
<td>Total NSFR 2007 - 2013</td>
<td>11 496 467 767</td>
<td>10 490 244 954</td>
</tr>
</tbody>
</table>

Source: ITMS

Based on data from ITMS provided by the Central Coordination Body as of 31 December 2013, the level of contracting reached almost 91% of the total allocation for the programme period of 2007-2013.

Until the end of 2013 when realising SF and CF 7.85 billion EUR were drawn in relation with implementation of SF and CF SF and CF projects, including co-financing from the state budget and own sources of beneficiaries. This amount also includes resources classified as ineligible, i.e. expenditures paid from EU sources and state budget that were not used in line with valid legislation and payment of which is claimed from the beneficiary. From analytical aspect, discrepancies are implicitly contained in statistical data, since they represent actual investment in economy regardless of the sources of financing. The main part of used resources as of the end of 2013 are made up of contributions from EU funds, namely more than 6 billion EUR.

Table 3: Using of financial resources from SF and CF according to operation programmes as of 31 December 2013, million EUR

<table>
<thead>
<tr>
<th>OP</th>
<th>EU</th>
<th>SB</th>
<th>OR</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>211 - OPIS</td>
<td>389,68</td>
<td>121,02</td>
<td>1,06</td>
<td>511,76</td>
</tr>
<tr>
<td>221 - ROP</td>
<td>1 102,97</td>
<td>137,10</td>
<td>61,84</td>
<td>1 301,92</td>
</tr>
<tr>
<td>222 - OP TP</td>
<td>56,54</td>
<td>12,74</td>
<td>0,02</td>
<td>69,30</td>
</tr>
<tr>
<td>223 - OPBK</td>
<td>51,66</td>
<td>7,81</td>
<td>4,16</td>
<td>63,64</td>
</tr>
<tr>
<td>231 - OP D</td>
<td>1 565,95</td>
<td>349,24</td>
<td>10,36</td>
<td>1 925,55</td>
</tr>
<tr>
<td>241 - OP ŽP</td>
<td>849,58</td>
<td>123,80</td>
<td>120,74</td>
<td>1 094,12</td>
</tr>
<tr>
<td>251 - OP KaHR</td>
<td>471,59</td>
<td>79,32</td>
<td>435,37</td>
<td>986,28</td>
</tr>
<tr>
<td>261 - OP V</td>
<td>222,08</td>
<td>34,46</td>
<td>5,45</td>
<td>262,00</td>
</tr>
<tr>
<td>262 - OP VaV</td>
<td>552,67</td>
<td>79,55</td>
<td>35,11</td>
<td>667,33</td>
</tr>
<tr>
<td>271 - OP ZaSI</td>
<td>586,35</td>
<td>102,06</td>
<td>26,67</td>
<td>715,08</td>
</tr>
<tr>
<td>281 - OP Z</td>
<td>211,98</td>
<td>37,16</td>
<td>4,98</td>
<td>254,13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6 061,08</strong></td>
<td><strong>1 084,26</strong></td>
<td><strong>705,75</strong></td>
<td><strong>7 851,10</strong></td>
</tr>
</tbody>
</table>

Source: ITMS

The main part of resources was aimed at building of the infrastructure, while the majority of such projects was realised through OP Transport, OP Environment and Regional OP. A

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3 The presented table does not consider the return of financial resources by beneficiaries.
significant part of expenditures on science and research from the Operational Programme Science and Research was directed at building scientific and research infrastructure. Projects realised as part of OP Education and OP Employment and Social Inclusion focused on supporting the improvement of human capital. Further important priorities aimed at by implementing SF and CF in other operational programmes is the sustainable economic growth, employment and competitiveness. The effectiveness of incurred resources of SF and CF implemented to meet the followed aims shall be evaluated in further parts of this report.

3.4 Anticipation of the influence of Cohesion policy on the economic development

Prerequisites of the influence of cohesion policy have been summarised in the framework document “Ex-ante Evaluation of the National Strategic Framework of Reference” developed by the Economic Institute of the Slovak Academy of Sciences in 2006 (see Šikula et al., 2006). As part of the mentioned evaluation it states that a strategic part of the document dealing with expected influences of cohesion policy is focusing on national economy with the aim to achieve overall convergence of the Slovak Republic to countries of the EU without sufficient focus on the regional dimension that was to be achieved rather individually in plans of individual operational programmes. The summary of the evaluation, page 20, states: “The proposed context indicators that are to evaluate the realisation of support are often worded so as not to be able to be reported on the NUTS 2 level and bellow, thus it will not be possible to document regional dimension of these interventions.”

In assumptions of the implementation of operational programmes, there are two types of aims defined. The so-called “hard” indicators that can be measured in the course of the implementation process using selected indicators and so-called “soft” effects, leading mainly to more effective public administration and hard to be evaluated. It is also clear that in the period of planning and ex-ante evaluation (year 2006); the Slovak economy was at a stage of conjuncture. In this period, e.g. questions of qualification structure of population got in the foreground from the aspect of labour market when reducing the number of unemployed. The labour market started to lack potential employees with needed professional skills, mainly in industrial sectors and the sector of ICT. These problems were suppressed at the time of crisis and the main efforts focused rather on maintaining employment and supporting existing jobs.

The assumptions about the influence of using SF and CF through NSFR were also verified on models. The estimate of ex-ante influences was estimated not only on the national level by the recommended HERMIN model (see Kvetan et al., 2006).
When comparing results of ex-ante and ex-post analysis we can see certain connection. The ex-ante analysis was developed only for the period of implementation disregarding the period of completion of the implementation process (n+2). The basic difference in case of estimated impacts was the assumption about equal drawing throughout the programme period without the need for a more significant drawing after 2013. The estimated effects assumed the achievement of cumulative increment of GDP in 2013 above the level of 14%, achievement of the value of cumulative multiplies on the level of 1.94 and creating additional employment in the volume of 87 thousand jobs (with overall unemployment rate of 8.7%). When compared to the ex-ante analysis assumption, we could see two key changes in the real economy. The first one was the economic crisis causing a growth in the unemployment rate. The number of created jobs based on the implementation of SF and CF mitigated the negative impacts on the overall unemployment rate in the Slovak Republic. The other is the unequal allocation of resources in time. In the first two years of implementation, SF and CF were drawn only minimally with a sudden growth in the second half of the programme period and the need to complete using of a significant volume of resources in the period n+2. The use of such a large volume of resources reduces the overall effectiveness of their allocation (see Radvanský and Frank, 2009). The first mentioned factor, thus the decrease in the output of economy of the Slovak Republic caused a decrease in the costs and higher effectiveness of additional resources. In other words, the actual effect of CF and CF on the economy was significantly higher and more positive than expected at the time of drafting the NSFR. The expected structure of effects on individual sectors was confirmed, though their strength is weaker in 2013 due to higher unemployment and lower overall created GDP in 2013 when compared to ex-ante assumption as well as higher expected production in the following period (n+2).
The course of cohesion policy currently represents significant sources of support for economic development, mainly at a time of fiscal consolidation. The subject of this evaluation will be the quantification of the influence of SF and CF implementation on the Slovak economy in the current programme period.
4 Results of Evaluation on National and Regional Level

4.1 Assessment of Impacts of Cohesion Policy on Regional Level at 89 % Absorption

Description of model approach and its limitations

The assessment of the impact of SF and CF implementation on regional level was realised using the regional econometric structural model HERMIN initially developed at WARR. A more detailed description of this model is contained in Annex A. The structure of regional econometric model reflects the specific features of individual identified regions. In terms of the submitted analysis, we can talk about eight regional models that are mutually interlinked only on the level of summary statistical indicators. This is why the models lack a deeper simultaneous link between endogenous interregional connections. Considering this factor, the submitted model apparatus cannot fully reflect the spill-over effects between regions. Due to non-existence of link between regions we thus cannot examine mutual effects of growth of individual regions resulting from SF and CF implementation in a certain region. Such proposed models are however highly advantageous due to their relatively low statistical degree of difficulty that is even in case of a simplified approach in certain aspects higher than data published by the SUSR data. Regional disaggregation was performed on the NUTS 3 level. Missing current statistical data published with a two-year delay were supplemented using calibration conditioned by an econometric-statistical and optimising methods (see the Annex) with economic basic. Among further limitations of the model is the applied assumption of resource allocation based on specific priorities, enabling only indirect link to sector production. Moreover, the model calculates only direct effects on the efficiency in public sector, while not calculating the alternative of employment. Using statistical calibration of historical data in each region, the HERMIN model estimates the spill-over effects between individual sectors of the given region. Thanks to this assumption, the model is able to predict the development of the sector also in a situation when the given sector is not affected by any direct influences. In case of creating new jobs, the model assumes that all jobs are filled with labour force from the given region, thus the aspect of interregional labour migration is not depicted. It is however inevitable to realise that significant interregional labour migration occurs which is however not reflected in the model, for instance in the increased income of households and their consumption in another region.

Scenarios

The concept of the model is based on three scenarios. The basic one is the so-called benchmark scenario describing the development of economy based on historical economic reality. This assumption represents the main change of the ex-post analysis when compared with ex-ante, where the basic scenario is usually without implementation of SF and CF. The basic scenario is thus built on a real condition of the economic development of Slovak regions according to officially published statistical data supplemented by data upgrade performed using calibration. The alternative scenario (1) describes the economic development of individual regions that would occur in case of not using SF and CF. Implementation of SF and CF during the years

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4 The main sources of data were the databases of Eurostat, Statistical Office of SR and ITMS.
5 From Polish: Wroclawska Agencja Rozwoju Regionalnego
2007 - 2013 is defined as the actual drawing based on indicative disaggregation of data from ITMS. Drawing of SF and CF during the years 2014-2015 is based on the assumption of filling the drawing of allocated resources to 89% and gradual growth of the intensity of drawing. The alternative scenario No. 2 describes the potential development in the individual regions that would occur if SF and CF were drawn to 100%. In this case too, drawing for years 2007 - 2013 was based on the actual condition, while drawing of EU funds in 2014-2015 is calculated based on the assumption of 100% implementation. Therefore in case of comparing alternative scenarios, the difference in allocation can be seen only in actual effects on the period of years 2014 and 2015. The development in years 2007 through 2013 thus does not impact the type of an alternative scenario. The net influence of SF and CF implementation on the economic development of the individual regions of the Slovak Republic will be determined by comparing the economic development between the benchmark scenario and the alternative scenario No. 1 or 2. The difference in these scenarios quantifies the impacts on the development of regions in the Slovak Republic, if SF and CF were drawn to 89%, or 100%. In the following parts of the report, individual results of model apparatuses will be described in greater detail. In Chapter 4.1 and 4.2, equally as in the more detailed quantification of impacts (Chapter 5), results of the analysis will be presented to the scenario with 89% SF and CF that seems to be most likely. Alternative impacts of the effects related to 100% implementation are presented in Chapter 4.3. When coming up with the prognosis of the development in years 2014 to 2015, the input exogenous variables of the model were based on a conservative estimate which is identical for both alternative scenarios.

Results

Implementation of SF and CF in the amount of 89% in individual regions is depicted in Chart10. The highest drawing of EU funds was recorded in Trenčín, Prešov and Košice region. In the case of assumed 89% drawing of total allocations, we expect speeding up of the implementation process in 2014 and 2015.

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6 The applied growth rates of implementation: 111% in 2014 when compared to 2013 and 116.5 % in 2015 when compared to 2014.
7 While we assumed that 40% of not drawn resources allocated in the given region will be drawn in 2014 and the remaining part will be drawn in 2015.
As part of assessing the impacts of cohesion policy on regional level, one of the most important indicators is the CSF multiplier. This indicator quantifies the effectiveness of invested financial resources on GDP creation in the region. The higher the value of the multiplier, the higher the increase created by used resources (it can simply be read as an additional effect in EUR on GDP per one invested euro of SF and CF). The multiplier has been calculated as the ratio of cumulative increases of GDP to cumulative drawing of structural funds in the given region. On the following Chart 11 and Table 4 we can see the development of individual multipliers for the given regions in the alternative scenario 1. The highest cumulative multiplier was achieved in the Bratislava region where it reached value 2 already in 2008. This value increased to 2.8 in 2013 and to 3 in 2015. It means that one invested euro contributed to additional growth of GDP in the amount of 3 EUR. Trnava and Žilina region achieved in 2013 the value of multiplier 2.0, or 2.2. The lowest value of cumulative multiplier was achieved by Prešov region, namely 1.6 in 2013 and 1.7 in 2015.
Chart 11: The development of CSF multiplier for individual regions

Source: calculation of authors

<table>
<thead>
<tr>
<th></th>
<th>BB</th>
<th>BA</th>
<th>KE</th>
<th>NR</th>
<th>PO</th>
<th>TN</th>
<th>TT</th>
<th>ZA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>0.8</td>
<td>2.0</td>
<td>0.9</td>
<td>0.7</td>
<td>0.9</td>
<td>0.9</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>2009</td>
<td>1.0</td>
<td>2.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.1</td>
<td>1.2</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td>2010</td>
<td>1.1</td>
<td>2.4</td>
<td>1.2</td>
<td>1.1</td>
<td>1.2</td>
<td>1.3</td>
<td>1.3</td>
<td>1.7</td>
</tr>
<tr>
<td>2011</td>
<td>1.3</td>
<td>2.5</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
<td>1.4</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>2012</td>
<td>1.4</td>
<td>2.7</td>
<td>1.5</td>
<td>1.6</td>
<td>1.5</td>
<td>1.5</td>
<td>1.7</td>
<td>2.0</td>
</tr>
<tr>
<td>2013</td>
<td>1.5</td>
<td>2.8</td>
<td>1.6</td>
<td>1.8</td>
<td>1.6</td>
<td>1.6</td>
<td>2.0</td>
<td>2.2</td>
</tr>
<tr>
<td>2014</td>
<td>1.7</td>
<td>2.9</td>
<td>1.8</td>
<td>2.0</td>
<td>1.6</td>
<td>1.8</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>2015</td>
<td>1.8</td>
<td>3.0</td>
<td>1.9</td>
<td>2.2</td>
<td>1.7</td>
<td>1.9</td>
<td>2.5</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Source: calculation of authors

More than 110 thousand jobs could be created in Slovakia in 2015 with the SF and CF implementation, while in 2013 it was more than 80 thousand. The potential to create most jobs is in the Trenčín region where more than 25 thousand jobs would be created in 2015 as a result of implementing SF and CF. This increase can be created mainly by the fact that the SF and CF were most drawing in the Trenčín region from among individual regions. The given region recorded also the highest drawing of resources directed at creating physical infrastructure which is the most difficult sector considering the needs in terms of human capital. More than 15 thousand jobs could be created in Prešov, Košice and Žilina region. The least number of jobs can be created thanks to implementation of resources from the cohesion policy in the Bratislava region where model results in 2015 indicate creation of 7.5 thousand jobs.
Chart 12: The number of totally created new labour force, thousands of persons, 89% scenario.

Source: calculations of authors

Chart 13: The development of additional gross value added in construction of individual regions, million EUR.

Source: calculations of authors

The greatest additional increase in gross value added in construction was recorded in the Prešov region in which it reached 210 million EUR in 2013 and in 2015 it should reach as much as 315 million EUR. More than 150 million EUR of increase in construction in 2013 was recorded in Košice, Trenčín and Žilina region which will maintain their positions in the following years. The lowest increase of grow value added was recorded in the Bratislava region.

The most significant increase in gross value added in industry was recorded again in the Trenčín region. In this case, Trenčín region reached significantly higher growth of value added when
compared to other regions. The remaining regions achieved similar growth of value added, except for Banská Bystrica region where the value added in industry would increase by 68 million EUR in 2015, while it was by 46 million EUR in 2013. In case of the Bratislava region, we recorded even lower increase in the value added in industry where it increased by 11 million EUR in 2013 and in 2015 it is expected to be 18 million EUR.

Chart 14: The development of additional gross value added in industry in individual regions, million EUR

The most significant increase in gross value added in market services was recorded in the Trenčín, Bratislava, Košice and Žilina region. In these regions, we can expect an increase of gross value added in market services by more than 200 million EUR in 2013 and by 350 million EUR in 2015 in case of the alternative scenario 1.
4.2 Assessment of Impacts of Cohesion Policy on the National Level at 89% Absorption

The assessment of the effect of 89% SF and CF implementation on the national level was performed by using the regional econometric model of HERMIN. The detailed characteristics of this model are contained in the Annex of the submitted final report. National results have been estimated based on partial regional results. When analysing and interpreting results, we followed up on the outputs from the national HERMIN model, however we put increasingly great impact on the results of the regional model.
The total Gross value added shows a stable growing path in the analysed period, while the impact of investment resulting from cohesion policy has clearly an increasingly positive effect on the creation of value added. In 2013, this effect would be slightly higher than 4.6%, and should grow in 2015 up the level of 7.1% of the overall gross value added. Sectors of market services and civil engineering had the highest influence on this change and the sector of industry had the lowest influence. In the monitored period, the sector of market services participated in this change on average with 49%, the sector of construction with 34% and the sector of industry with 12%. The remaining share was made up by agriculture and non-market services.

Source: SUSR and calculations of authors.
Cohesion policy had the highest relative influence on construction and market services, the weakest in industry. Construction responds most sensibly, because a significant part of investments directed at other sectors were produced in the sector of construction. Building of transport infrastructure also led to a significant increase in production in this area. If this had not been realised, it would have let to a significant decrease in demand for production of this sector. Market services being the largest analysed sector reports the most significant direct and indirect influenced caused by IT modernisation, investments into innovative services etc. Indirect influences from other sectors also create a significant part of this change. In other words, the multiplication effect is shown in this sector the most from among other sectors. The sector of industry responded least intensley to simulated influences of SF and CR implementation in national economy from among the three main examined sectors. This was determined by the industry creating production which was sustainable, therefore less intensely responsive to changes in the investment demand and demand from other sectors. We can also expect that the indirect effects of implementation had and will have less significant impact on the height of production in industry than in construction and market services.

**Chart 18 Employment in the Slovak Republic, thousands of persons**

When examining the effect of SF and CF implementation on employment at the national level, a significant positive influence of cohesion policy was determined on the creation of jobs and the
number of employed persons. If implementation of sources from cohesion policy had not been realised, the number of employed would have recorded a significantly declining tendency when compared with reality. The overall number of workers would have been lower by almost 81.5 thousand persons in 2013 (which represents a more than 4% decrease in employment) than in the case of implementation and in 2015 lower by almost 116.3 thousand people (representing an almost 5.5% decrease in employment) than in case of SF and CF implementation.

Employment would probably have responded flexibly on the decrease of investment demand also due to global recession, which meant a significant decrease in foreign demand for the Slovak Republic being a small open economy. The decrease in demand affected directly mainly industry and especially the car industry that is the engine of the economic growth of the Slovak Republic. If implementation of cohesion policy resources had not been realised, the cumulative effect of crisis would probably have been demonstrated more intensely and the recovery of employment in 2010 would have been significantly slower and followed by a decreasing tendency in the number of employed instead of stable stagnating development on the labour market. These effects would have indirectly been reflected also in civil engineering where a significant part of investments realised in other sectors was produced. In general we can estimate that sustainability of jobs has been estimated to be approximately 40 - 50 %. Indirectly motivated demand for work represents approximately 50% of the overall demand.

Chart 19 Employment in sectors of civil engineering, industry and market services, thousand of persons
The view of employment development in individual economic sectors provides a more detailed overview of labour development in the Slovak Republic. If SF and CF implementation had not been realised, the sector of industry would have responded the least intensely on the decrease in investment from the point of view of demand for work. In 2013, the number of employees would have decreased in this sector by almost 9% and in 2015 by more than 11%. Employment in this sector is generated by production that is long sustainable and that responds weaker on changes in the investment demand. Production in this section is also more capital intensive than labour intensive. Employment in the sector of civil engineering profited the most from SF and CF implementation from among all three analysed sectors (in relative terms). The overall number of employed would have been lower almost by 18% in 2013 and lower by slightly more than 23% in 2015, had cohesion policy not been realised. Demand for work in case of market services would have decreased as well, if implementation has not been realised. The number of workers in this sector would have been lower in 2013 by almost 5% and in 2015 it would have been lower by slightly less than 6%. This significant positive effect of cohesion policy was determined in these two sectors by direct and indirect influences.

4.3 **Evaluating Impacts of Cohesion policy at 100% Absorption**

Implementation of SF and CF in case of the alternative scenario 2 in which 100% of resources allocated in individual region would have been fully drawn is depicted in the following chart. In case of the assumed 100% implementation of the total allocations, it would however be necessary to strictly speed up the current level of implementation in 2014 and 2015. Absorption of such a large volume of financial resources, mainly in 2015 when the actual start of implementation from the new programme period 2014 - 2020 can realistically be expected, is highly improbable. In 2015, implementation of funds only from the current period of 2007 – 2013 would have to double the average level of SF and CF for the period of years 2010 through 2013. Therefore, it is very unlikely that this scenario would be fulfilled.
Since the alternative scenario 1 (89%) and the alternative scenario 2 (100%) differ only in the assumed volume of implemented resources in case of 2014 and 2015, we will deal in the next part of this chapter only with the analysis of differences between effects of these scenarios in 2014 and 2015. To start with, it is necessary to have a look at the differences in the overall implementation which will be helpful to us in further analysis. As we can see from the following table, the assumptions of the alternative scenario 1 about speeding up of the rate of implementation in the following years and the alternative scenario 2 about completion of implementation of 40% allocated resources in 2014 and the rest in 2015 would lead to a lower level of implementation in Košice, Prešov and Trenčín Region in 2014. Overall, almost 330 million EUR would be implemented this year additionally. In case of 2015, the volume of implemented SF and CF resources in all regions would increase and almost 1.3 billion additional EUR would flow into the economy. The highest aggregate difference between the alternative scenarios on the level of regions is the Bratislava Region where approximately 425 million EUR would be used in case of 100% completion of implementation. On the other hand, there is the Trenčín and Košice Region where the difference is approximately 25 million EUR, indicating that in case of the alternative scenario 1, the expected implementation in these regions is near 100%.

Table 5: Difference in implementation of EU funds in case of alternative scenarios 1 and 2, million EUR

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<tbody>
<tr>
<td>2014</td>
<td>89.9</td>
<td>145.3</td>
<td>-39.4</td>
<td>62.3</td>
<td>-26.3</td>
<td>-52.3</td>
<td>56.9</td>
<td>91.3</td>
<td>327.9</td>
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<tr>
<td>2015</td>
<td>216.3</td>
<td>280.1</td>
<td>67.9</td>
<td>156.2</td>
<td>98.5</td>
<td>75.5</td>
<td>143.6</td>
<td>229.7</td>
<td>1267.8</td>
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Source: calculation of authors
The implementation of additional resources from structural funds in economy in the alternative scenario 2 when compared to the scenario 1 will also be accompanied with increase in the creation of gross value added, thus also GDP in all regions. In 2014, we can expect in case of the Trenčín, Košice and Prešov Region also lower volume of created gross value added considering the expected volumes of implementation. Additional resources implemented in the alternative scenario 2 are able to generate additional value added.

Table 6: Differences in gross value added in case of alternative scenarios, millions of EUR, r.p. (cumulated in all sectors)

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<tr>
<td>2014</td>
<td>63.3</td>
<td>205.9</td>
<td>-38.6</td>
<td>53.3</td>
<td>-23.0</td>
<td>-49.6</td>
<td>57.0</td>
<td>102.5</td>
<td>370.7</td>
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<tr>
<td>2015</td>
<td>172.6</td>
<td>438.5</td>
<td>62.2</td>
<td>154.7</td>
<td>87.0</td>
<td>62.3</td>
<td>168.0</td>
<td>294.6</td>
<td>1439.9</td>
</tr>
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</table>

Source: calculation of authors

It is however necessary to take a closer look at the ratio of the additional GDP generated and the volume of invested SF and CF resources. When looking at the effectiveness of additional resources of the alternative scenario 2 we can state that their implementation would not be effective in case of Banská Bystrica, Košice, Nitra, Prešov and Trenčín Regions where the additional value added would be lower than the invested resources of SF and CF. In case of additional regions, the volume of additional GDP produced by implementation would be higher than the volume of EU funds, however their effectiveness would be lower than the effectiveness of resources invested until end of 2013. When comparing CSF multipliers within the alternative scenarios of implementation, the higher volume of invested resources would contribute to greater GDP growth in all regions. However, on the other hand, values of CSF multipliers in case of the alternative scenario 2 are lower for the individual regions which are a result of lower effectiveness or non-effectiveness of implementing additional resources. An exception is the CSF multiplier values in 2014 in the Trenčín, Prešov and Košice Region where in case of the alternative scenario 2 implementation levels would decrease. This suggests that in case of the alternative scenario 2 the effectiveness of invested resources would be lower than in case of the scenario 1.

Table 7: Differences of CSF multipliers in results of alternative scenarios

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<tbody>
<tr>
<td>2014</td>
<td>-0.04</td>
<td>-0.13</td>
<td>0.01</td>
<td>-0.04</td>
<td>0.00</td>
<td>0.01</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.01</td>
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<tr>
<td>2015</td>
<td>-0.08</td>
<td>-0.22</td>
<td>-0.01</td>
<td>-0.09</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.11</td>
<td>-0.10</td>
<td>-0.04</td>
</tr>
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Source: calculation of authors

In case assumptions of the alternative scenario 2 are fulfilled when compared to the scenario 1, the model estimates have shown an overall more positive impact of implementation on employment. In 2015, more than 40 thousand additional jobs would be created. The greatest increase in employment would be achieved in Žilina and Bratislava Regions. The smallest increase in employment would be achieved in Košice and Trenčín regions where only slightly more than 2 thousand jobs would be created, but 1,200 or 1,700 jobs would not be created in 2014.
Table 8: Differences in employment between alternative scenarios, thousand of persons

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</thead>
<tbody>
<tr>
<td>2014</td>
<td>2.4</td>
<td>3.8</td>
<td>-1.2</td>
<td>1.9</td>
<td>-0.8</td>
<td>-1.7</td>
<td>1.8</td>
<td>3.1</td>
<td>9.3</td>
</tr>
<tr>
<td>2015</td>
<td>6.3</td>
<td>7.8</td>
<td>2.0</td>
<td>5.3</td>
<td>3.0</td>
<td>2.3</td>
<td>4.9</td>
<td>8.4</td>
<td>40.1</td>
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Source: calculation of authors

In the following tables (Table 9, 10, a 11), we offer additional results of the alternative scenario 2 compared to the alternative scenario 1, while in the given tables, there are additional gross values added according to individual sectors. The gross value added in construction would grow most significantly in case of Žilina Region where in the alternative scenario 1 relatively lower drawing level of implementation of resources to build infrastructure is expected. On the other end of the scale there is the development in the sector of construction in Trenčín Region where we could expect only a slight increase in gross value added in construction by 31 million EUR. In the sector of manufacturing, the value added would grow most significantly in Žilina, Trenčín, Nitra and Banská Bystrica Region. However, in case of the sector of manufacturing, considering its size, these are rather marginal effects. Remaining regions would record only a slight increase. In the sector of market services in Bratislava Region, the gross value added would grow in total by more than 500 million EUR, representing an increase by approximately 2.5 times compared to the region with second highest recorded impact – Žilina Region.

Table 9: Difference in gross value added in civil engineering between alternative scenarios, million EUR r.p.

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<tbody>
<tr>
<td>2015</td>
<td>67</td>
<td>51</td>
<td>36</td>
<td>65</td>
<td>61</td>
<td>31</td>
<td>58</td>
<td>131</td>
<td>500</td>
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Table 10: Difference in gross value added in industry between alternative scenarios, million EUR, r.p.

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<tr>
<td>2014</td>
<td>5</td>
<td>3</td>
<td>-3</td>
<td>6</td>
<td>-2</td>
<td>-7</td>
<td>8</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>2015</td>
<td>18</td>
<td>9</td>
<td>2</td>
<td>21</td>
<td>5</td>
<td>4</td>
<td>31</td>
<td>32</td>
<td>122</td>
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Table 11: Difference in gross value added in market services between alternative scenarios, million EUR, r.p.

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<tr>
<td>2014</td>
<td>40</td>
<td>164</td>
<td>-21</td>
<td>29</td>
<td>-9</td>
<td>-24</td>
<td>32</td>
<td>50</td>
<td>261</td>
</tr>
<tr>
<td>2015</td>
<td>117</td>
<td>366</td>
<td>33</td>
<td>88</td>
<td>34</td>
<td>31</td>
<td>96</td>
<td>146</td>
<td>911</td>
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Source: calculation of authors
5 Answers to evaluating questions

5.1 What is the quantification of impacts of SF and CF implementation on the overall performance of the Slovak economy on national and on regional level?

Approach to evaluation

As part of determining the impact of cohesion policy on the overall performance of the economy, attention was paid mainly to the analysis and comparison of basic economic indicators consisting of individual outputs of the regional econometric model HERMIN. Results were then supplemented with facts acquired from the national econometric model HERMIN. It involves mainly GDP in real and market prices, overall employment, wages and consumption of households. Individual parameters were analysed and compared on national and regional level.

In order to formulate answers to the question, a comparison of the two scenarios of econometric model were realised. The first one, the basic scenario, is based on the current situation where Slovakia was implementing structural funds during the period of years 2007 - 2013. In the years 2014 and 2015 we assumed in all of Chapter 5 an increase in implementation leading to overall implementation of SF and CF at 89% of the original allocation. The alternative scenario represents a situation describing the development of economy in individual regions of Slovakia without implementation of SF and CF. The difference between these two scenarios is the net effect of SF and CF implementation.

Analysis and results

The results of the econometric model point out the fact that implementation of SF and CF has a significantly positive impact on the development of economy throughout the period of implementation. The additional growth of GDP in Slovakia starts to be shown from 2009, while the expected cumulative growth of GDP in regular prices represents 5.3% in 2013 and 7.5% in 2015 (Chart 21). Additional cumulative creation of GDP in regular prices in 2015 resulting from implementation is expected to be at 30% GDP (16.4% in 2013), while this represents the sum of the additional contribution to GDP from all periods of implementation. The year-on-year real growth of GDP in the period of years 2009 through 2015 is higher thanks to SF and CF implementation on average by 0.9 of percentage point. In 2015, the difference in GDP in r.p. between the basic and alternative scenario is more than 5.5 billion EUR.
In Table 12, the effect of additional real growth of GDP is expressed on the regional level by the level of SF and CF implementation based on the results of regional econometric models HERMIN. In the period of years 2007 and 2008, we did not record a significant increase in GDP, mainly due to minimal implementation of SF and CF. A more significant increase in drawing occurred in 2009, when the implementation of SF and CF itself was of a more dynamic nature. In the period of years 2009 through 2013, the most significant increase in implementation was achieved in Trenčín, Žilina, Prešov and Košice region. Trenčín region increased the most and grew by as much as 3.1% in 2013, namely due to infrastructural projects. In case of Slovakia, we recorded a year-on-year increase from 0.7 p.p. to 1.2 p.p. from 2009 to 2013.
When looking at individual regions, it is clear that the greatest additional cumulative growth of GDP was recorded by Trenčín (16%) and Prešov region (12.5%). More than 10% cumulative growth was recorded also in Žilina and Košice region. On the other hand, Bratislava region records the additional cumulative growth in the period of years 2007 - 2015 only by 2.5% which however is influenced to a large degree by the size of regional GDP of the region and the volume of drawn resources of SF and CF.

Chart 22: Additional cumulative growth of GDP due to SF and CF implementation in percentage, r.p.

Source: calculation of authors

Thanks to implementation of SF and CF, higher growth of GDP was recorded every year when compared to the estimated development without implementation of SF and CF. In the period of the crisis year 2009, Slovakia would have experienced a drop in GDP by additional 0.8 of percentage point and would have reached a year-on-year decrease in GDP at 6%. In 2010, Slovakia recorded a growth at the level of 4.1%, while the contribution of SF and CF implementation was at 1.2 percentage point.
Chart 23: Estimated growth of GDP with and without implementation of SF and CF in percentage

Source: calculation of authors

Chart 24 shows additional employment of Slovakia in individual sectors created due to SF and CF implementation. The total additional employment represents in 2013 more than 81 thousand jobs, in 2015 it should reach more than 110 thousand jobs, while the sector of services participates in additional employment the most. The sector of construction reached equal growth with services up to 2010. Afterwards additional employment in construction grew more slowly. In 2013, more than 29 thousand jobs were created in the sector of construction which is a result of the increased implementation of SF and CF in the sector of infrastructure. In 2015, a total of 40 thousand jobs are to originate in the sector of construction thanks to implementation of structural funds. The sector of industry shows the slowest growth in creation of new jobs, it is however stable. In 2013, more than 7 thousand jobs were created in this sector. These were created based on SF and CF implementation. In 2015, it is supposed to be 10 thousand jobs. Slower growth is caused by lower direct link between these sectors and implementation of SF and CF. The sector of market services shows the highest additional employment due to the spillover effect between sectors and a strong link of this sector to other manufacturing sectors. As a result of this, market services grow indirectly together with all sectors. In 2013, additional 44 thousand jobs originated in the sector of market services, that were created based on SF and CF implementation. In 2015, additional 63 thousand people are supposed to work in this sector when compared with the situation without SF and CF implementation.
From the regional aspect, we expect the creation of the highest number of jobs in Trenčín region where more than 25 thousand jobs can originate in 2015. In Prešov region we expect 18 thousand jobs originating due to SF and CF implementation. Košice and Žilina region follow where we expect more than 16 thousand jobs created. More than 10 thousand jobs will originate in Banská Bystrica, Nitra and Trnava regions. In Bratislava region, we expect almost 7 thousand jobs created.

One of the limitations of the HERMIN model is that it does not contain the spill-over effects among individual regions. It means that the model does not reflect effects of additional employment among individual regions. The model also does not expect filling a job by an employee coming from another region. We must therefore consider e.g. the possibility to fill in a job position in construction in Trenčín region by labour force coming from another region of Slovakia. This possibility is not included in the HERMIN econometric model.

Source: calculation of authors
The consumption of households indirectly expresses the influence of SF and CF on the standard of living of households that can differ from the created GDP per capita. Monitoring this indicator should therefore be a priority from the aspect of cohesion and economic policy. Increased consumption of households which is a result of the net effect of SF and CF implementation was recorded only in 2009. Consequently in 2010, additional consumption of households increased in all regions by several times also thanks to higher SF and CF implementation and the origin of new jobs. In the following period, we can see a growth in the consumption of households, but almost in all regions the rates are slighter. Increased consumption of households has been caused mainly by the growth of employment which occurred in almost all regions. The greatest additional consumption of households in the period of years 2007 to 2013 was detected in Trenčín region, Košice and Žilina region. The smallest increase in consumption of households due to implementation of SF and CF was recorded in Nitra and Bratislava region. As a result of increased level of implementation, we expect increased dynamics of consumption at the end of 2015.
As a result of SF and CF implementation, the cumulative consumption of households for the years 2007 - 2015 increased in the Slovak Republic by 7%. This increased consumption is stirred mainly by growth of employment, however the growth of average salary contributed positively too to the given phenomenon. On regional level, the development of consumption in households is differentiated. The most significant cumulative increase in the consumption of households was recorded in Trenčín region that reached the cumulative value of 14%. The second highest cumulative consumption of households was recorded in Žilina region. The lowest cumulative consumption of households was in Bratislava and Nitra region where the given value did not reach even 5%. Due to implementation of SF and CF, the consumption of households increased in the individual regions, thus repeatedly mitigating the impacts of the economic crisis on the economic growth.

Table 13: Increase in consumption of households due to SF and CF and CF – cumulatively for 2015

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<tbody>
<tr>
<td>2015</td>
<td>5.4%</td>
<td>4.2%</td>
<td>7.6%</td>
<td>4.9%</td>
<td>7.0%</td>
<td>14.0%</td>
<td>6.5%</td>
<td>8.6%</td>
<td>7.0%</td>
</tr>
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</table>

Source: calculation of authors

The effect of implementation of SF and CF on the average salary was positive mainly in the period of years 2011 through 2015. The average salary in Slovakia increased in 2015 by 14 EUR when compared to the scenario without implementation of SF and CF, which would represent an increase by 1.2 p.p. The highest increase was recorded in Trenčín region where the average salary was higher by almost 35 EUR, representing 3.6 p.p. The average salary increased by more than 25 EUR also in Banská Bystrica region. Lower growth than the average for Slovakia was achieved in Trnava, Prešov and Nitra region where the average salary was higher by 10 EUR, representing 1 p.p.
Key findings

- The effects of SF and CF implementation in the period of years 2007 - 2015 were analysed using the regional econometric model of HERMIN. The difference between the two scenarios was identified as the net influence of implementation financial aid.

- Implementation of SF and CF increased GDP mainly in the years 2009 - 2013, thus helping to mitigate the effects of the crisis on the Slovak economy.

- With the help of using SF and CF, we expect a significant additional cumulative increase of GDP that will represent 7.5% in 2015. This growth is supposed to be supported in 2015 by creating more than 110 thousand of jobs, mainly in market services and construction. The sector of industry played a support role within the structure of economy. The growth of construction was mainly caused by significant financial allocations on the physical infrastructure. The sector of market services recorded the highest increase in all regions.

- Additional differences in the growth of GDP can be seen in all regions. The most significant growth was achieved in Trenčín region where the most financial resources were allocated for infrastructure. The lowest additional cumulative growth was recorded in the Bratislava region, namely 3%. Thanks to increased employment and growth of average salary, the consumption of households had a growing tendency.

- As a result of SF and CF implementation, the consumption of households in individual regions grew, thus repeatedly mitigating the impacts of the economic crisis on the economic growth.

Answer to the question

What is the quantification of impacts of SF and CF implementation on the overall performance of the economy of the Slovak Republic on the national and regional level?
Due to SF and CF implementation, Slovakia recorded in the period of years 2007 - 2015 an average annual real growth of GDP higher by 0.9 p.p. than in the scenario without implementation. The cumulative real growth of GDP is expected to be 7.5% (amount of GDP growth in individual years) in 2015. Thanks to this increase in the period of years 2007 - 2013, additional 81 thousand jobs were created when compared to the scenario without SF and CF implementation, allocated mainly in market services and in construction. In 2015 we expect that implementation of the cohesion policy resources can help create more than 110 thousand work positions. As a result of SF and CF implementation, Trenčín region recorded the most significant growth where the most financial resources from SF and CF were used. The smallest increase was recorded in Bratislava region. Implementation of SF and CF had a positive influence on the overall development of the economy as well as on the individual parts of the economy.

5.2 What are the effects of implementing SF and CF on the competitiveness of regions of the Slovak Republic in the monitored period?

See Chapter 5.4.

5.3 What factors determine and increase competitiveness in individual regions of the Slovak Republic?

See Chapter 5.4.

5.4 What is the share of SF and CF on increasing competitiveness of regions in the Slovak Republic?

Approach to evaluation

The concept and definition of competitiveness itself are subject to extensive discussion in the professional literature. Dijkstra (2011) defines regional competitiveness as the ability to offer attractive and sustainable environment for companies and citizens for living and working. Filó (2007) defines competitiveness as the ability to win and keep the position on the market, to increase market shares and profitability as well as to consolidate commercially successful activities. The World Economic Forum defines competitiveness as a set of institutions, policies and factors determining the level of productivity of the given country (Schwab and Sala-I-Martin, 2012; Schwab and Porter, 2007). Meyer-Stamer (2008) defines competitiveness of a region as the ability of the given region to generate high and growing income and improve living conditions of inhabitants.

The indicator of unit costs of labour per one employee in EUR will be used to evaluate effects of cohesion policy on the competitiveness of Slovakia using the macroeconomic model.

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8 For the needs of evaluation, the question also covers the issue of competitiveness in connection with questions 5.2 and 5.3.
Since outputs of the model enable to use this indicator only, it is necessary to use also further available data relevant for the assessment of competitiveness on national and regional level. For the needs of evaluating the development of competitiveness on the national level, information from the World Bank’s publication Doing Business (evaluating the quality of business environment as an important factor of competitiveness) and the World Economic Forum’s Global Index of Competitiveness were used.

The evaluation of competitiveness on regional level will be supported apart from outcomes of the model also by the Index of Regional Competitiveness published by the European Commission (EC). The index represents a relatively new tool of evaluating regional competitiveness, it has been published since 2010 every second year. The Index of Regional Competitiveness determines the order of NUTS 2 regions of EU 28.

The set of used indicators represents a combination of model estimates (hard data) and data in form of global messages of competitiveness that provide an overview on the placement of Slovakia in the lists of competitiveness and its development in time. It is inevitable to use these resources too, since statistical indicators themselves do not provide a complex view of the changes in competitiveness. Competitiveness is not influenced by changes in the structure of individual sectors, labour market, science, research and innovation themselves, but also by extra-economic factors such as the quality of regulation, of business environment, legislation, law enforcement, quality of institutions etc.

Analysis and results

Based on the data of the World Bank and the World Economic Forum, we can state that placement of Slovakia has continually been deteriorating since 2007 (Chart 28) in both monitored indicators.

Chart 28: Development of placement of Slovakia in the list of the global competitiveness and quality of business environment from 2007 to 2013

According to the last report of the World Economic Forum Global Competitiveness Report 2013 -2014, Slovakia placed 78th out of 144 evaluated countries. In the last three years, the position of the Slovak Republic worsened by 9 places and since 2007 Slovakia fell down the list by 42 places. The decline was recorded in all partial indicators of the index with the exception of...
health and basic education (Chart 29)\textsuperscript{9}. The most significant drop in the global placement of the Slovak economy was recorded mainly in the area of quality of institutions, labour market, innovation, macroeconomic environment, and sophistication of companies, higher and vocational education and infrastructure. Based on the placement of the Slovak Republic in this list we can state that when compared with other countries of the world, Slovakia lost the dynamics of developing factors of competitiveness.

In regular evaluation of the World Bank \textit{Doing Business 2014}, the Slovak Republic took the 49\textsuperscript{th} place\textsuperscript{10} and thus reached the lowest position in history. When compared to the year 2007, the Slovak Republic placed worse by 23 slots. The most significant year-on-year drop was identified by the \textit{Doing Business 2012} report based on which the Slovak Republic worsened its position on the year-on-year basis by 7 slots. Among the most significant factors negatively influencing the position of the Slovak Republic in the evaluation is the time for a company’s establishment, loan availability, cross-border trade, tax system and law enforcement.

\textit{Source: World Economic Forum (2014), calculation of authors}

\textsuperscript{9} Detailed statistics of the development of index are available in Annex C.

\textsuperscript{10} During the monitored period, the methodology and individual indicators creating the Doing Business Index partly changed. We can state that a significant drop of the Slovak Republic in this list is not caused by changed methodology of calculating the index. Countries keeping the top positions have long been able to ensure suitable quality of business environment and respond flexibly on changing external influences.
For the needs of identifying regional competitiveness, EC (DG JRC and DG Regio) developed in 2010 a 2013 the Index of Regional Competitiveness. This composite index maps the economic performance and competitiveness of individual NUTS 2 regions within the EU. The final order of regions is determined by their placement within individual parts of the composite index. The indicator consists of several partial indicators evaluating individual aspects of competitiveness of 262 NUTS 2 regions.

In the report evaluating competitiveness for 2013, Bratislava Region placed on 78th place, followed by the Western Slovakia on 191st place, Central Slovakia on 216th place and Eastern Slovakia on 229th place. Placement of individual NUTS 2 regions clearly confirms the dominant role of Bratislava Region as the most competitive region of the Slovak Republic (even though within other regions of the EU we cannot consider this position as satisfactory). Other regions of the Slovak Republic placed on the bottom part of the list.

The effect of SF and CF implementation on the competitiveness is limited considering the structure and volume of expenditures in areas that are the main engine of increased competitiveness (science and research, innovation, education, infrastructure). Implementation of SF and CF contributes to elimination of infrastructural debt in the Slovak economy, creates prerequisites for developing science, research and innovation, however effects of these investments are shown in long-term horizon. The limiting factor of a more dynamic development of competitiveness are mainly the deteriorating quality of domestic business environment, functioning of institutions, existing system of education, macro-economic environment and other factors that cannot be directly influenced by interventions of cohesion policy and that require a conceptual and long-term approach on the part of economic policy.

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11 More details on the methodology at http://publications.jrc.ec.europa.eu/repository/handle/111111111/13666
12 The index represents a relatively new tool for comparing performance of regions in the EU. Therefore, complex time series of the index are not available.
**The development of unit costs of labour in connection to the competitiveness on the national and regional level**

Unit labour costs are expressed as the ratio of costs per one unit of production, i.e. what is the labour cost per one produced euro in national economy. If nominal salaries grow faster than production, unit costs increase, which leads to a decrease in competitiveness due to increased prices of input factors of production. Since the price of labour is a significant determinant of production, the so-called ‘golden rule’ is often mentioned in the euro area, saying that unit labour costs should not grow faster than the inflation target of two percents set by the European Central Bank (Collignon, 2012). It is important to note that Slovakia being a small open economy was interesting for foreign investors in the last decade mostly due to low price of labour and relatively qualified labour force. If unit costs of labour in the Slovak Republic grew significantly, it could worsen its position in the eyes of investors which would lead to a decrease in direct foreign investment.

*Chart 31: Unit costs of labour with SF and CF implementation and without SF and CF implementation*

Unit labour costs in the Slovak Republic reported a suddenly growing trend at the beginning of the monitored period up to 2009. It was caused by high economic growth that significantly pulled the growth of nominal wages during conjunction. As a result of the influence of the global economic recession, unit costs of labour in 2010 slightly decreased, however this decrease did not last long and increased already in the next year to the level reported in 2009 (approximately 45 cents of labour costs per euro of production). The time from 2009 until the end of the monitored period was typical of no significant shifts. Implementation of SF and CF had almost a neutral influence on the national level on the competitiveness from the aspect of labour costs. The impacts of implementation oscillated in an interval - 0.12 % to 0.11%.

*Source: SUSR a calculation of authors.*

Unit labour costs in the Slovak Republic reported a suddenly growing trend at the beginning of the monitored period up to 2009. It was caused by high economic growth that significantly pulled the growth of nominal wages during conjunction. As a result of the influence of the global economic recession, unit costs of labour in 2010 slightly decreased, however this decrease did not last long and increased already in the next year to the level reported in 2009 (approximately 45 cents of labour costs per euro of production). The time from 2009 until the end of the monitored period was typical of no significant shifts. Implementation of SF and CF had almost a neutral influence on the national level on the competitiveness from the aspect of labour costs. The impacts of implementation oscillated in an interval - 0.12 % to 0.11%.
The development of regional competitiveness was different compared with the national level. Implementation of SF and CF in Bratislava, Trnava, Trenčín and Banská Bystrica region had a slightly negative effect (measured by unit labour costs) on the competitiveness. In all four mentioned regions, unit costs of labour grew in the monitored period. The most visible growth could be seen in the years 2007 - 2009. In the remaining years, the growth of unit costs of labour settled on almost the same level in all regions, with the exception of Banská Bystrica region where unit costs of labour grew from 2007 to 2012. A slight decrease of competitiveness (measured by unit labour costs) was caused by a more sudden growth of wages of production due to implementation of SF and CF.

Source: SUSR and calculation of authors.

Chart 32: Unit costs on the NUTS 3 level with implementation of SF and CF and without implementation of SF and CF.
Implementation of SF and CF in Trenčín, Košice, Prešov and Žilina region had a slightly positive impact on the price competitiveness (measured by the unit labour costs). This positive effect was most visible in Prešov Region where the influence of implementation on the growth of price competitiveness has been within the range of 1.5% - 2.11% since 2013. Similar, but weaker effect was reported in Žilina Region where the growth of price competitiveness due to implementation was within the range of 0.47% - 0.85%. The influence of implementation in Trenčín Region was around 0 to -0.39% and in Košice Region at 0 to -0.18%.

Source: SUSR and calculation of authors
Labour productivity

Another indicator of competitiveness of the region is labour. Labour productivity is a standard indicator of competitiveness and supplements the indicator of unit labour costs. It is expressed as the produced gross value added in a certain region per employee.

Labour productivity grew in all regions of the Slovak Republic due to the influence of SF and CF implementation. The highest labour productivity is achieved by Bratislava region as well as the lowest influence of SF and CF implementation on labour productivity. It is caused mainly by the existing high level of productivity, but also relatively small volume of resources drawn in this region (Chart 45).

Implementation of SF and CF was most seen in labour productivity in Trenčín, Prešov, Žilina and Košice Region. The lowest effect on labour productivity was in Nitra, Trnava and Banská Bystrica Regions. The trend in the effect of implementation is of stably growing nature in all eight regions of the Slovak Republic. Therefore we can expect positive growth of labour productivity in the coming years, increasing competitiveness of individual regions as well as the whole Slovak economy. Effects of SF and CF implementation on work productivity in regions are depicted in Chart 31.

Chart 34: Work productivity in individual regions with implementation of SF and CF and without implementation of SF and CF, thousand of EUR, r.p.

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Assessment of Cohesion Policy Impacts on the Development of Slovakia using a Suitable Econometric Model

Evaluation report 2014

June 2014

Labour Productivity, TT, thousand euros, market prices, scenario with SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Labour Productivity, TT, thousand euros, market prices, scenario without SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Difference (right axis)

Labour Productivity, TN, thousand euros, market prices, scenario with SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Labour Productivity, TN, thousand euros, market prices, scenario without SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Difference (right axis)

Labour Productivity, NR, thousand euros, market prices, scenario with SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Labour Productivity, NR, thousand euros, market prices, scenario without SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Difference (right axis)

Labour Productivity, PO, thousand euros, market prices, scenario with SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Labour Productivity, PO, thousand euros, market prices, scenario without SF and CF, (2014-2015 estimation with 89 % total financial implementation)

Difference (right axis)
Key findings

- Based on the placement in the list of the Global Competitiveness of the Work Economic Forum we can state that the Slovak Republic recorded a significant drop in the evaluation of competitiveness since 2007 in most key aspects of competitiveness.
- The unsatisfactory development in the area of quality and functioning of institutions, labour market, low innovation performance, insufficient and unfinished infrastructure, macro-economic environment and the system of education contributed significantly to this.
- The influence of cohesion policy on increased competitiveness was thus to a great degree suppressed by the development of other factors that is influenced by SF and CF implementation only to a limited degree.
- Considering the structure of expenditures (answer to question 5.8), where the highest share of expenditures was directed at infrastructure in the majority of Slovak regions we can state that in spite of other positive influences of implementation, the effect on the national competitiveness is limited due to the following reasons:
  - Long-term underfunded sector of science, research and innovation uses current programme period mainly to complete the building and modernise scientific research infrastructure. Positive effects of implementation resources of SF on competitiveness in this sector can be expected only in the long run.
  - Expenditures into transport infrastructure create conditions for improved intra-regional and inter-regional mobility. Considering the extremely slow rate of construction, this effect is limited only to certain regions of the Slovak Republic.
- Unit costs of labour did not represent a significant factor in changing the competitiveness mainly on the national level in the monitored period. Implementation of SF and CF in Trenčín, Košice, Prešov and Žilina Region had a slightly positive
influence on the competitiveness. Implementation in Bratislava, Trenčín, Banská Bystrica Regions had a negative effect on the competitiveness.

- Implementation of SF and CF positively affected the growth of work productivity in all regions of Slovakia. This was most visible in Trenčín Region and less in Bratislava Region.

**Answer to the evaluating question**

*What are the influences of SF and CF implementation on the competitiveness of regions in the Slovak Republic in the monitored period?*

From the aspect of competitiveness we can state that implementation of SF and CF contributed to the growth of work productivity in all regions. It influenced the most Trenčín Region and the least Bratislava Region where implementation was realised in a limited degree. Implementation of SF and CF resources on national level had almost neutral influence on the competitiveness from the aspect of unit costs of labour. Impacts of implementation structural funds oscillated in the evaluated period from – 0.12% to 0.11%.

Factors influencing negatively ranking of Slovakia in terms of competitiveness are mainly areas that are to a large degree influenced by cohesion policy interventions only partially. They thus depend on the national economic policy as well as on measures on the level of territorial municipality.

*Which factors determine and increase competitiveness in individual regions of SR?*

Among the main factors increasing competitiveness in individual regions are:

- Quality of institutions providing public services to population and business sector (law enforcement and length of court proceedings, trust in the political system, protection of ownership rights and copyrights, degree of corruption, independence of courts, effectiveness of public expenditures);
- Developed transport infrastructure (road, railway, water, air);
- Suitable macroeconomic environment (stable price level, level of public debt);
- Quality of individual degrees of the educational system;
- Extent of provided electronic services and access to internet connection;
- Costs of labour (cost or price competitiveness);
- Quality and clarity of tax system;
- Effectiveness and flexibility of the labour market;
- Localisation of sectors with high value added and related attractiveness of the region for attracting highly qualified labour force.

*What is the share of SF and CF on increased competitiveness of regions in the Slovak Republic?*

Based on the achieved results it is possible to state that SF and CF implementation contributed positively to increased competitiveness in certain aspects. However with regards to a large number of factors influencing competitiveness in international comparison, the position of Slovak regions was rather deteriorating and at the same time it is impossible to quantify exactly the share of structural funds on the development of competitiveness.
5.5 What are the impacts of implementing SF and CF on real convergence of the Slovak Republic to the average of EU countries?

See Chapter 5.6.

5.6 What is the outlook of the real convergence rate of the Slovak economy until the end of the programme period 2007 – 2013 (considering n+2) i.e. until the end of 2015?

Approach to evaluation

The economic level is compared usually with a ratio indicator of performance and price level of the country per number of inhabitants, thus GDP in the purchasing power parity (PPP) per capita. The comparison of the development of GDP in PPP per capita when compared to the average development in the EU 28 Member States thus describes the level of achieving the real convergence to the average of the EU countries. Real convergence was related to the current number of EU Member States. Up to the enlargement in 2004, it applied to EU 15, after the enlargement in 2004 to EU 25, in 2007 to EU 27 and indicators were last retrospectively recalculated in 2013 as of the last EU 28 enlargement. Two scenarios of development are to be compared (with implementation – 89% and without implementation of SF and CF). Insecurity in the economic development and delay in publishing indicators in PPP (the last published data is from 2011) led to the situation that calculations up to 2013 are labelled as a prognosis and data for the years 2014 and 2015 as outlook where smaller degree of exactness can be expected.

This average value is applied also to regional convergence on regional level. The regional and cohesion policy of EU is applied on the NUTS 2 level (in Slovakia represented by 4 regions), while the limits of support for regions within the EU are set at the achievement of 75% level of the EU average. It is clear that with each enlargement, this limit was slightly moved down, because new Member States usually do not achieve the value level of the average. From the aspect of responding to the question of convergence (subchapters 5.5 and 5.6), the chapter will contain influence of SF and CF on the convergence on the national and regional level divided into NUTS 2 and NUTS 3 (municipal regions).

To measure the speed and intensity of convergence, several approaches can be used. The most suitable ones are beta and sigma convergence. Beta convergence is suitable for estimates of the time period of convergence among regions, while it occurs only under the condition that a delayed region grows faster in the long run than a stronger region. Nevertheless, real convergence does not have to occur. Sigma convergence is based on the analysis of the development of dispersion among individual regions. If this indicator diminishes, convergence grows. This approach usually considers several factors, while their number depends on the degree of freedom (number of regions). Considering the insufficient number of regions in the Slovak Republic (8), the influence on the regional convergence will be measured by sigma coefficient (by measuring the change in dispersion).\(^\text{13}\)

\[^{13}\text{Methodological approaches to measuring convergence are described in a greater detail e.g. in the work of Buček et al., 2011.}\]
Analysis and results

The Slovak economy underwent economic transformation in the course of the past two decades, whiles from one-third loss of economic performance at the beginning of 1990’s it tried to achieve the average level of developed economies of the EU. In 2000, the Slovak economy reached the share only slightly above 50% of the EU 28 average. After joining the EU, the Slovak Republic reached in the period of conjuncture (2004-2008) a sudden rise of real convergence from 57 to 72% of the EU average. Considering the significance of the value of implementation only after 2009, implementation of SF and CF affected the real convergence in the period of the economic crisis.

The real convergence of Slovakia to the average of the EU countries was not in the basic scenario (reality) set at this period either, though when compared with previous development it was only a slight shift. Higher increase in convergence in the period of years 2008 to 2015 was achieved only in 2011, namely due to stagnation of other EU countries, not due to higher economic growth of the Slovak Republic. In the period after joining the EU in 2004 – 2008, Slovakia reached year-on-year average growth of convergence at the level 4 p.p. In the years 2008 – 2015, the average year-on-year growth of convergence in the Slovak Republic is estimated in the basic scenario at the level of 0.8 p.p, thus at this period, very slight achievement of convergence occurs. In an alternative scenario without implementation of SF and CF, zero growth of real convergence of the Slovak Republic to the average of the EU countries is estimated, while negative growth of convergence was achieved in several periods (see Chart 35).

Chart 35: Model comparison of the development of GDP in PPP per capital to the average of the EU 28 countries in scenarios with implementation and without implementation of SF and CF (2012-2013 prognosis, 2014-2015 outlook)

Source: Calculation of authors

In case of the regional view of convergence to the average in the EU, we can see significant regional disparities measured by GDP in PPP per capita. In case of both scenarios (Table 14 and 15), significant imbalance in the intensity of convergence of individual regions occurs. Bratislava Region achieves significant growth of GDP in PPP per capital in both scenarios and...
creates the main convergence potential of the Slovak Republic (it is among the ten strongest NUTS 2 regions of the EU). It is caused by the economic strength of the metropolitan region of the Slovak Republic able to generate more significantly development investments also to other regions of the Slovak Republic, stagnation of population and the fact that a part of production in Bratislava Region is created by people commuting to work from other regions that make up for one fourth of workers. Thus a part of GDP per capital is created by workers not calculated in the population of Bratislava Region, which positively distorts this indicator in this region. Only Trnava and Nitra Regions managed to contribute to the regional convergence during this period more significantly (above the average of SR). In the basic scenario, we can also see a slightly positive growth of convergence in Žilina, Prešov and Košice Regions. In Trenčín and Košice Regions, it is rather stagnation in the convergence process and Banská Bystrica Region achieved at this time a decrease in the real convergence also in the scenario with implementation of SF and CF.

Table 14: Development of GDP in PPP per capital to the average of EU 28 countries on the national and regional level – scenario with implementation of SF and CF.

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Source: Calculation of authors

When comparing the development of convergence in the scenario without implementation of SF and CF (Table 15) we can state that the real convergence would have been achieved only in three countries of the Slovak Republic (Bratislava, Trnava and Nitra Regions). In other regions of the Slovak Republic, a significant decrease of this indicator would have been achieved.
Table 15: Development of GDP in PPP per capital to the average of the EU 28 countries on national and regional level – scenario without implementation of SF and CF

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Source: Calculation of authors

When comparing estimates of the contribution of SF and CF to the convergence process in regions of the Slovak Republic (Chart 36), we can see a positive correlation with the volume of provided resources. The highest influence of SF and CF on the real convergence (increase by more than 8 p.p.) was seen in Trenčín Region and a significantly above-average influence was also identified in Žilina Region. In spite of a relatively positive development of convergence in Nitra Region, it was possible to identify that implementation of SF and CF in this region had only a below-average influence on its convergence. An important factor is in these cases the initial situation, demographic development and share of SF and CF on the GDP of the region.
Chart 36: Estimate of the contribution of SF and CF implementation to the indicator of convergence - GDP in PPP per capita (2012 - 2013 prognosis, 2014-2015 outlook), percentage points

Source: Calculation of authors

A model view of the convergence of NUTS 2 regions to the average of EU 28 is depicted in Chart 37. A clearly positive influence of SF and CF implementation on the convergence process can be seen in all scenarios. Real convergence to the EU average takes place in all regions except Central Slovakia where it is rather stagnation. Without implementation SF and CF, the convergence process would develop negatively in two regions, Western Slovakia would rather stagnate and only the Bratislava Region would record a clearly positive development.

Chart 37: Model comparison of the development of GDP in PPP per capital to the average of EU 28 countries with the scenario with implementation and without implementation of SF and CF at the NUTS 2 level without Bratislava Region (2012-2013 prognosis, 2014-2015 outlook)

Source: Calculations of authors
During the monitored period, no real convergence among regions of SR occurred in Slovakia. To the contrary, the process of divergence was rather deepening. When analysing the influence of SF and CF on the regional convergence of the Slovak Republic, we can state that sigma coefficient was lower due to implementation than in the scenario without implementation. It means that in spite of continued real divergence of regions of the Slovak Republic, this process was significantly slower thanks to implementation of SF and CF. From the aspect of SF and CF allocation into regions of the Slovak Republic, it is however also necessary to point out that the convergence process was not a clear priority of the NSFR, since a significant part of resources (namely in an effort to deal with the infrastructural debt) was directed at relatively strong regions of the Slovak Republic.

Implementation of resources of the cohesion policy contributed to the convergence of Slovakia to the EU countries. This cohesion would not have taken place without implementation. The process of convergence of Slovakia to countries of EU 28 would have developed differently without the start of the crisis. The Slovak economy experienced the peak of conjuncture before the start of the crisis, while the convergence process was significant in all regions. Pre-crisis prognosis suggested a significant macroeconomic growth also for the period of years 2008-13, when the developed economies were to experience growth of GDP only on levels near to 2%. Therefore we can assume that the convergence process would be more dynamic and more equal in all regions without the onset of the crisis (while especially in weaker regions, the convergence process was weakened due to the crisis in spite of SF and CF implementation). On the other hand, created GDP of Slovakia was lower than expected considering the crisis. Therefore, the share and contribution of SF and CF to the convergence process was overall higher than expected.
Key findings

- Implementation of SF and CF contributed positively to continued convergence process to the average of the EU countries on the national level in spite of the crisis development at this time.\textsuperscript{14}
- Without SF and CF implementation, the convergence process would have been reversed in the majority of regions.
- Bratislava Region is able to grow significantly even without the support of SF and CF due to its strength and demographic development. In spite of this fact, supporting Bratislava Region is important considering its specific position and significance in supporting the economic growth of the other regions.
- From the aspect of NUTS II, convergence of Western Slovakia is assumed to be in the upcoming period near 75% of the EU average. Without the influence of SF and CF, this region would have stayed below 70% in the convergence process.
- In case of not implementation SF and CF, the differences (measured by GDP per capita in PPP) between regions in SR would be more significant (greater).
- The onset of the crisis slowed down the expected process of convergence and at the same time the contribution of SF and CF was greater than expected.
- The effects of SF and CF implementation on the state of convergence of Slovakia are permanent and significant. However they only have a slightly positive influence on the convergence process in the future.

Answer to the question
What are the impacts of SF and CF implementation on the real convergence of the Slovak Republic to the average of the EU countries?

The process of real convergence of SR to the average of EU 28 was significantly positively supported by implementation of SF and CF. Without this contribution, the process would highly probably have been stopped and convergence in six out of eight regions of SR would have declined. A significant influence on maintaining this level however has the strongest Bratislava metropolitan region without which the convergence process would have developed negatively.

From the regional aspect, the contribution of SF and CF to the convergence process correlate positively with the ratio of expenditures on GDP of the region. This factor can however be slightly exaggerated mainly due to high volume of infrastructural investment that can have a higher spatial effect on the surrounding regions that cannot be reflected by the model. From the aspect of outlook of the real convergence rate until the end of 2015, the most important factor is the possible approximation of the Western Slovak region to 75% average of EU 28 which can partially limit potential allocations of SF and CF resources in the programme period of years 2014 - 2020.

The contribution of structural funds had a positive impact on mitigating the divergence process among regions of the Slovak Republic, though it was unable to reverse this tendency. As stated
in Chapter 5.7., regional allocations of structural funds were not of a clear cohesion nature. Supporting of the economic growth and infrastructure can however have a long-term positive effect also on other regions and we therefore recommend restricting the growth and cohesion priorities when preparing for the upcoming period so that it was possible to define more clearly the expected effects of implementing structural funds.

5.7 To what degree was the geographical distribution of financial resources from EU funds on the level of NUTS 3 effective?

**Approach to evaluation**

The analysis of the value of CSF multiplier for the individual regions considering aims followed by NSFR was used to evaluate effectiveness of the geographical distribution of financial resources from the EU funds on the NUTS 3 level. It is necessary to emphasise that values of implementation on the level of regions represents indicative amounts calculated by disaggregation of data about implemented resources using the methodology described in the Annex B. The CSF multiplier was used as an indicator of the efficiency of implementation financial resources implementation from the EU funds, expressing the relationship between cumulative implementation of SF and CF resources on the regional level and generated GDP as a result of implementation in the given region. The value of CSF multiplier can be calculated as a share of the cumulative additional GDP generated by implementing SF and CF projects (numerator) and cumulative amount of the implemented resources of SF and CF (denominator) from the beginning of the programming period to the given year in the given region.

**Analysis and results**

The effectiveness of the geographical distribution of financial resources of SF and CF can be evaluated from various perspectives. First of all, geographical distribution of SF and CF resources implemented on the level of NUTS 3 regions reflect to a large degree the economic performance of the individual regions and the nature of projects realised in their territories. Considering the limited eligibility of financial resources implementation and the low share of implementation in Bratislava Region, approximately only 7% of the total resources was implemented in this region by 2013. Due to higher economic level (Trnava Self-Governing Region) and agricultural focus of the production in the majority of the territory (Nitra Self-Governing Region), Trnava and Nitra Region also implemented relatively low share of SF and CF resources. Higher concentration of large infrastructural projects realised mainly in the north-southern axis of the Váh River area caused almost 17.5% resources of SF and CF being implemented by 2013 in the Trenčín region. In the Trenčín Region, infrastructure expenditures made up for more than 76% of overall SF and CF expenditures of SF and CF directed to this region. Relatively high concentration of infrastructure expenditures was recorded in Žilina and Prešov Region where they made up for 61% of overall expenditures. Another pair of regions with similar level of implementation is Banská Bystrica and Košice Regions in which approximately 13% of overall SF and CF expenditures were implemented. Similarly as in the case of Prešov and Žilina Regions, expenditures for infrastructure in these regions also made up for more than half of the overall implementation (50.5 % Banská Bystrica Self-Governing Region, or 53.6% Košice Self-Governing Region KSK). As one can see, there are significant

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15 This type of production is financially supported from other EU funds.
differences in the geographical distribution of SF and CF SF and CF resources implementation on the level of NUTS 3 regions.

Chart 39: Shares of individual regions on overall implementation of SF and CF, 2007 -2013

Another aspect when examining effectiveness of the geographical allocation is the view of the ability of individual regions to implement financial resources of SF and CF. More detailed look on the levels of absorption of financial resources from EU funds implementation during the years 2007 – 2013 shown that the start of the actual implementation was delayed. In the first years of the programming period – 2007 and 2008, implementation level of implementation was very low, and the significant part of expenditures implemented during this period was made up of resources from technical aid used by institutions involved in cohesion policy implementation and administration. The year 2009 can be considered as the moment when the actual use of financial resources from SF and CF started. The greatest part of resources implemented in this year was directed to initial phase of infrastructural projects in Trenčín, Žilina and Banská Bystrica Regions. Similar development continued also in year 2010 when building of infrastructural projects started in a greater degree also in Prešov Region. Since 2011, the rate of absorption of SF and CF resources implementation intensified, and the volume of resources implemented from the EU funds exceeded for the first time 100 million EUR in all regions. Until 2012, the visible trend was the growth in the intensity of implementation in all regions of Slovakia. In 2013, this trend stopped in four regions (Trnava, Nitra, Žilina and Banská Bystrica Self-Governing Regions) in which in comparison with 2012 level of implementation decreased. This could indicate that the current level of implementation of SF and CF resources implementation is close to absorption capacity in several regions. This fact is supported also by relatively higher effectiveness of the SF and CF resources implemented in case of Bratislava Region where resources made up for less than 1% of the regional GDP. One of the problems of the programming period 2007 – 2013 is the low level of implementation in the years 2007 and 2008 and is highly improbable that it will be corrected in coming years. Among other problems limiting the level of implementation in the regions is also insufficient preparedness of project calls at the start of programming period, complexity of implementation process, relatively high administrative burden and conditions of some calls that were hard to fulfil.
Important piece of information about the effectiveness of implementation is offered by looking at the cumulative value of GDP increase as a result of SF and CF implementation on the level of individual regions. By the end of 2013, the highest recorded share of additional cumulative GDP on GDP of the given region for 2007 was in case of Žilina (31%), Prešov (30%) and Trenčín Region (28%). The lowest share occurred in Bratislava Region where it reached approximately 8%. Similar development can be seen in the following Chart also in case of expected impacts in 2015. In Prešov, Trenčín and Žilina Region we can also expect creation of additional GDP representing in aggregate more than a half of the GDP level from the first year of the programming period. The lowest volume of additional GDP created by implementing EU funds in 2015, at the level of 15% of GDP in 2007, can be expected in Bratislava Region. It is however necessary to note that the volume of resources drawn in this region represent only approximately 5% of its GDP in 2007, thus the effectiveness of using these resources is relatively high.

Source: ITMS
Chart 41: Comparing cumulative implementation and additional GDP in years 2013 and 2015, the NUTS 3 regions and the Slovak Republic, share on GDP in 2007

Based on the calculated values of CSF multiplier, Bratislava Region seems to be the most effective, representing economically the strongest region in the Slovak Republic and its absorption potential is high above the volume of allocated resources. Equally, the nature of projects realised within Bratislava Self-Governing Region represents projects with high share of added value, that is generating higher multiplying effects. Multiplying effects are relatively higher in this region also because a large part of implemented resources was used to pay the wages in sectors of services that are more labour demanding. These wages then relatively quickly generate through growing demand additional indirect effects in the economy of the region. In this region, CSF multiplier reached at the end of 2013 a relatively high value of 2.79, however the share of implementation on GDP in any of the years of implementation did not exceed 1% GDP implying relatively lower effects in absolute terms. The group of followers in effectiveness contains Žilina, Trnava and Nitra Regions that profited from their economic strength and relatively higher share of expenditures to support industry and services. The lowest effectiveness measured by CSF multiplier from economically stronger regions was reached by Trenčín Region. This was due to a high share of expenditures on infrastructure from which multiplying effects occur only later in time. Investments into infrastructure are accompanied by lower indirect effects on the economy of the region considering the relatively lower share of wages. Similar effectiveness was also reached by the economically weaker region of Košice in case of which the effectiveness was partially pulled by expenditures for research and development and for supporting industry and services. The last group is made up of economically weaker regions of Banská Bystrica and Prešov, in which a significant part of resources was directed at building and modernising infrastructure. Positive is the fact that the value of the multiplier gradually increases in case of all regions and in case of none region it is lower than 1 in 2013. As effective can be labelled those regions where the level of CSF multiplier reached the value higher than 2. This threshold was determined according to Bradley and Untiedt (2009) in which this is the level of CSF multiplier reached by medium effective countries from the programming period 2000 – 2006. The main source of differences in the
regional multiplier is the structure of implemented projects while higher effectiveness was recorded in regions where projects with relatively higher level of labour intensity were realised.

Table 16: Cumulative CSF multiplier SF and CF, NUTS 3 regions

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bratislava Region</td>
<td>2.02</td>
<td>2.27</td>
<td>2.38</td>
<td>2.52</td>
<td>2.69</td>
<td>2.79</td>
<td>2.9</td>
<td>3</td>
</tr>
<tr>
<td>Trenčín Region</td>
<td>0.87</td>
<td>1.18</td>
<td>1.29</td>
<td>1.38</td>
<td>1.51</td>
<td>1.62</td>
<td>1.76</td>
<td>1.92</td>
</tr>
<tr>
<td>Nitra Region</td>
<td>0.75</td>
<td>0.97</td>
<td>1.13</td>
<td>1.34</td>
<td>1.58</td>
<td>1.81</td>
<td>2</td>
<td>2.19</td>
</tr>
<tr>
<td>Žilina Region</td>
<td>1.17</td>
<td>1.54</td>
<td>1.74</td>
<td>1.84</td>
<td>2.01</td>
<td>2.17</td>
<td>2.31</td>
<td>2.44</td>
</tr>
<tr>
<td>Banská Bystrica Region</td>
<td>0.81</td>
<td>0.99</td>
<td>1.11</td>
<td>1.25</td>
<td>1.4</td>
<td>1.54</td>
<td>1.66</td>
<td>1.76</td>
</tr>
<tr>
<td>Prešov Region</td>
<td>0.89</td>
<td>1.12</td>
<td>1.17</td>
<td>1.34</td>
<td>1.47</td>
<td>1.55</td>
<td>1.64</td>
<td>1.73</td>
</tr>
<tr>
<td>Košice Region</td>
<td>0.85</td>
<td>1.03</td>
<td>1.19</td>
<td>1.39</td>
<td>1.52</td>
<td>1.65</td>
<td>1.78</td>
<td>1.92</td>
</tr>
<tr>
<td>SR</td>
<td>1.32</td>
<td>1.3</td>
<td>1.4</td>
<td>1.53</td>
<td>1.69</td>
<td>1.83</td>
<td>1.96</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: calculation of authors

Key findings

- The use of SF and CF resources to complete or modernise infrastructure was accompanied with lower value of CSF multiplier which indicated lower level of short-term effects.
- Effective seemed to be mainly investments in the area of research and science, as confirmed by the CSF multiplier level in 2013 in Bratislava and Žilina Self-Governing Region, representing two regions in the top three regions with highest level of cumulative expenditures for research and science by 31 December 2013.
- Expenditures for direct support of industry and services had a positive influence on the effectiveness measured by CSF multiplier.
- Regions whose value of multiplier reached 2 can be considered as relatively very effective.
- It is possible to state that in none of the regions, resources from the EU funds were used ineffectively since in all regions the value of CSF multiplier was higher than 1.

Answer to question

To what degree was the geographical distribution of financial resources from the EU funds at the level of NUTS 3?

Based on the achieved result it is possible to state that the geographical distribution followed aims defined by Cohesion policy. Bratislava Self-Governing Region can be evaluated as the most effective in utilisation of EU resources. This was determined by structure of implementation in this region focusing mainly on the support of science and research, as well as services and human resources in institutions responsible for management and implementation of resources from the EU funds. As can be seen, expenditures on direct support of industry and
services are accompanied by earlier effects on growth of production than investment into infrastructure, thus they were reflected on the CSF multiplier more intensely. Though investments into the infrastructure are less effective from short to medium-term, they are an inevitable prerequisite of future economic growth. From the aspect of regional allocation it is thus necessary to consider the conflict between growth and cohesion allocation of SF and CF in the current programming period. The geographical effectiveness of distributing resources measured by CSF multiplier indicates an effort to fulfil the aims of the NSFR. In line with findings in Chapter 5.5 we can state that financial resources were allocated geographically effectively to a large degree and within the limits given by the structure of NSFR.

5.8 Has the value added in sectors of national economy of the Slovak Republic changed or increased due to implementing SF and CF? If so, in which sectors in connection to individual regions.

Approach to evaluation

To find the answer for the question about the influence of implementing SF and CF on increasing the value added in sectors of national economy of the Slovakia Republic as well as in regions, model results of gross value added in selected sectors at the level of NUTS 3 were used. In the evaluation, we used their absolute value as well as the relative share on the overall gross value added in the given region. The value added represents part of production that was created by an economic unit by its activity.

Analysis and results

By SF and CF implementation, additional gross value added was directly generated in the majority of sectors of national economy. Since the model treats the development of the sector of agriculture as exogenous, without direct impact of EU fund implementation, the model results do not provide a view on the influence of implementation on the gross value added in this sector. Since the largest part of the EU resources was directed at building or modernising infrastructure, the highest influence of SF and CF was recorded in the sector of construction. In this sector, almost one fifth of the overall gross value added was generated in 2013 through implementation of the EU funds. The smallest influence on the gross value added had the implementation in the sector of non-market services where additional 1.5% was generated in 2013. In the sector of manufacturing and market services, as a result of implementation 3.1% and 5.3% respectively of gross value added were created. There are however significant inter-regional differences that are illustrated in detail in tables of the Annex C8. Greatest differences were recorded in construction in which the additional growth of gross value added generated by EU resources was 4.4% in 2013, and in Trenčín Region it was slightly more than 50%. These differences were caused by significant imbalance in shares of expenditures for building or modernising infrastructure on the regional level. In 2013, only less than 2% of total expenditures for infrastructure were allocated in Bratislava Region while as many as 28% flowed into Trenčín Region. The highest influence on the gross value added of market services was in 2013 in Trenčín Region where more than 10% of it was created as a result of implementing SF and CF. Similar situation was also in the sector of industrial production where the highest influence of 6.6% was recorded in Trenčín Region. These impacts were determined mainly by high rate of implementation in Trenčín Region in 2013, where almost 330 million EUR were drawn, representing almost one fifth of EU fund resources drawn that year.
Table 17: Share of additional growth of gross value added generated by SF and CF implementation, SR

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market Services</th>
<th>Non-Market Services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.2%</td>
<td>5.2%</td>
<td>1.0%</td>
<td>0.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>0.7%</td>
<td>11.2%</td>
<td>2.3%</td>
<td>0.5%</td>
<td>2.4%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>1.6%</td>
<td>13.1%</td>
<td>3.4%</td>
<td>1.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>2.3%</td>
<td>16.3%</td>
<td>4.4%</td>
<td>1.3%</td>
<td>4.2%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>3.1%</td>
<td>19.0%</td>
<td>5.3%</td>
<td>1.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>3.9%</td>
<td>21.0%</td>
<td>6.2%</td>
<td>1.8%</td>
<td>5.9%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>4.9%</td>
<td>24.8%</td>
<td>7.3%</td>
<td>2.2%</td>
<td>7.1%</td>
</tr>
</tbody>
</table>

Source: calculation of authors

When looking at the impact of SF and CF implementation on the share of individual sectors on the overall gross value added, we can state that in the majority of regions it is possible to divide sectors into two groups. In the first group, the share of sectors on the total gross value added decreases in all regions. This group includes sectors of agriculture, non-market services and manufacturing. Considering the relatively small volume of resources used for direct support of manufacturing when compared with the size of the sector, their effect on the growth of sector value added is a source of decrease of the share of this sector on the overall gross value added. The sector of non-market services was unable to generate additional volume of gross value added needed to maintain its share on the overall gross value added due to lower effectiveness of implementation. Charts expressing the scope of decrease of the share of these sectors on the overall gross value added are stated in the Annex C8.

Chart 42: Additional share of gross value added of the sector of civil engineering on the overall value added created by SF and CF

Source: calculation of authors

In the second group of sectors implementation of SF and CF increases their share on the overall gross value added. This group consists of following sectors: construction and market services.
A relatively large volume of SF and CF financial resources were implemented in the sector of construction (until the end of 2013, it was slightly more than 50% of the overall implementation). The sector of market services were able to effectively use the SF and CF resources and increase its share on the overall gross value added with their implementation. An exception in this group are Prešov and temporarily Žilina Region where the sudden growth of the sector of construction caused a temporary or permanent decrease in the share on the overall gross value added also in case of market services.

Chart 43: Additional share of value added of sectors of market services on the overall value added created by SF and CF

Source: calculation of authors

Key findings

- The implementation of SF and CF was accompanied with the growth of gross value added in all sectors in each region. Though the model does not describe any change in the sector of agriculture, we can assume that a slight growth of gross value added occurred also in this sector as a result of the indirect impacts of EU funds implementation.

- The highest influence of SF and CF implementation on the gross value added in all regions was recorded in the sector of construction in which significant part of resources was directed.

- Implementation had the smallest influence on the sector of non-market services that was able to use financial resources of SF and CF least effectively.

- The influence of resources from the EU funds on the sector of manufacturing is adequate considering the size of the sector and the volume of resources directed at direct support of this sector.

- The sector of market services was able to use the SF and CF resources most effectively as well to profit from indirect impacts considering the volume of resources implemented into this sector.
• Due to the growth of gross value added as a result of SF and CF implementation, growth of employment in relevant sectors occurred, significantly mitigating the negative effects of the economic crisis.

• The growth of the share of market services on the overall gross value added indicates that the implementation of EU funds positively influenced structural changes in the economy and helped the transformation process towards the structure closer to that of developed economies.

**Answer to the question**

**Have the value added in sectors of national economy of SR change or increase as a result of SF and CF implementation?**

If so, in what sectors in connection to the individual regions.

The creation of gross value added in all sectors of national economy and in all regions increased as a result of implementing SF and CF. Though the model does not reflect changes in the gross value added in the sector of agriculture, we can expect considering the growth of other sectors, that the effect on this sector was positive too. The implementation of SF and CF affected also the structure of gross value added created in all regions and contributed to its transformation to the structure that is closer to developed economies. The greatest change in gross value added was caused by EU resources by the end of 2013 in the sector of construction in which more than a half of resources were implemented. Without implementing SF and CF, the production and employment in the sector of construction would be reduced significantly. The sector of non-market services was able to use the SF and CF resources to increase generation of gross value added only to a limited extent. Sectors of industry and market services managed to use the effects of implementation to increase their gross value added adequately considering their size and the volume of resources implemented.

### 5.9 What is the share of the added value of the business sector and of the private sector?

**Assessment approach**

Model outcomes regarding the volume of a gross added value generated by the business sector and the private sector have been compared in order to obtain an answer to this question. The added value of the business sector and of the private sector express the power and condition of individual sectors and, to a certain extent, also the situation of the business environment in the country. Based on the values of the gross added value generated by the business sector and the private sector, we were able to calculate the contribution of SF and CF. This represents a difference between the share of the public sector, with and without EU funding, in the total gross added value or a share of the business sector, with and without Cohesion policy support, in the total gross added value. For the needs of this analysis, we consider the following to be the public sector: public administration, education, health and social assistance (NACE Rev.2: section O, P and Q). Art, entertainment and recreation (NACE Rev.2: R - U) have not been included in the public sector, since a large part of their added value is formed by private-owned businesses.
Analysis and its outcomes

The development of the share of the business sector and the private sector in the total gross added value in the programming period was considerably influenced by the start of the global economic crisis which was manifested in a relatively rapid growth of the public-sector share in 2009.

Table 18: Share of the business and of the public sector and the SF and CF contribution in the added value

<table>
<thead>
<tr>
<th>Region</th>
<th>Business sector</th>
<th>SF/CF contribution</th>
<th>Public sector</th>
<th>SF/CF contribution</th>
<th>Public sector</th>
<th>SF/CF contribution</th>
<th>Public sector</th>
<th>SF/CF contribution</th>
<th>Public sector</th>
<th>SF/CF contribution</th>
<th>Public sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banská Bystrica Region</td>
<td>86.3%</td>
<td>0.0%</td>
<td>13.7%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Bratislava Region</td>
<td>84.2%</td>
<td>0.2%</td>
<td>15.6%</td>
<td>0.5%</td>
<td>18.7%</td>
<td>0.2%</td>
<td>14.7%</td>
<td>0.3%</td>
<td>19.4%</td>
<td>0.3%</td>
<td>14.7%</td>
</tr>
<tr>
<td>Košice Region</td>
<td>84.8%</td>
<td>0.5%</td>
<td>14.7%</td>
<td>0.7%</td>
<td>19.4%</td>
<td>0.3%</td>
<td>14.4%</td>
<td>0.3%</td>
<td>19.4%</td>
<td>0.3%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Nitra Region</td>
<td>84.4%</td>
<td>0.7%</td>
<td>14.9%</td>
<td>0.9%</td>
<td>17.9%</td>
<td>0.3%</td>
<td>14.4%</td>
<td>0.3%</td>
<td>17.9%</td>
<td>0.3%</td>
<td>14.4%</td>
</tr>
<tr>
<td>Prešov Region</td>
<td>86.1%</td>
<td>0.0%</td>
<td>13.7%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Trenčín Region</td>
<td>83.1%</td>
<td>0.0%</td>
<td>13.7%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
</tr>
<tr>
<td>Žilina Region</td>
<td>83.8%</td>
<td>0.0%</td>
<td>13.7%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
<td>0.0%</td>
<td>17.9%</td>
<td>0.0%</td>
<td>19.4%</td>
</tr>
<tr>
<td>SR</td>
<td>84.4%</td>
<td>0.1%</td>
<td>13.8%</td>
<td>0.2%</td>
<td>14.5%</td>
<td>0.1%</td>
<td>15.6%</td>
<td>0.2%</td>
<td>14.5%</td>
<td>0.1%</td>
<td>15.6%</td>
</tr>
</tbody>
</table>

Source: calculations of authors

At the start of the programming period, the share of the gross added value of the business sector amounted to 86.4 %; however, in 2009 it dropped by over 2 percentage points to 84.2 %. This drop would have been even higher by 0.1 p.p. without the implementation of SF and CF. In 2013, the share of the business sector amounted to 85.5 %, while 0.5 % of this share was
generated by the contribution of the implementation of SF and CF. The lowest share of the public sector in the total added value was seen in the Nitra region – just below 10%. On the other end there is the region of Bratislava where the nation-wide public administration institutions are located and in 2009, its share amounted to 19.4% and it would have been even higher by 0.1 p.p. without the SF and CF implementation. In 2015, the share of the business sector should rise to approximately 86% of the total gross added value with a contribution of implementation of EU funds. The highest contribution to the growth of the share of the business sector as a result of SF and SF and CF implementation may be expected in 2015 in the region of Trenčín by 2 p.p., or by 1.2 p.p. in 2013.

Chart 44: Change in the share of the business sector in the total added value in the period of 2009 - 2013

Source: calculations of authors

Looking at the growth of the share of the business sector in the total added value from 2009 to the end of the programming period, we may see that most regions would have seen a lower increase of the private-sector share without the SF and CF. Region of Žilina could expect even the slight increase in the public-sector share (0.1 p.p.). The highest increase in the share of the business sector in the total added value may be expected in the region of Trenčín in which the highest part of indicative implementation is allocated. The second highest contribution may be expected in the region of Prešov; in both regions a significant part of funds has been allocated to building infrastructure; this will be manifested in an increase of the added value generated by the construction sector. Based on the model simulations, the lowest contribution of EU funds to an increase of the business-sector share in the total added value may be expected in the regions of Bratislava and Nitra in which it would amount to approximately 0.3 p.p.

Key findings

- The implementation of SF and CF has helped mitigate the impacts of the economic crisis on the business sector.
- The highest contribution of the implementation of SF and CF to the business-sector growth may be expected in the regions of Trenčín and Prešov in which a significant part of funds has been allocated to construction or modernization of infrastructure.
• Implementation in the region of Žilina will help increase the share of the business sector; without implementation of SR and CF, the region would have seen a stagnation of the proportion between the business and public sectors.
• The region of Trnava would have achieved the highest increase in the business-sector share without implementation of EU funds.
• With regards to a relatively strong position of the public sector in the region of Bratislava, the implementation of SF and CF only lead to a slight increase of the business-sector share.

Answer to a question

What is the share of the added value of the business sector and of the private sector?

The share of the added value of the business sector, representing a range of private activities in the economy, is relatively high in Slovakia and in 2013 it amounted to 85.5%. In 2008, the private-sector share reached its maximum (87%), consequently, as a result of the economic crisis in 2009, the public-sector share increased to almost 16%, afterwards we saw a slight increase of its share (0.1 p.p.) also in 2010. Since that year, the implementation of SF and CF has contributed to a growth in the business-sector share in the total added value in the Slovak Republic, while in 2013 the contribution of EU funds amounted to 0.5 p.p., and in 2015 a contribution of 0.8 p.p. may be expected. Most regions would have seen a growth of the business-sector share even without the implementation of EU funds, with the exception of the region of Žilina in which the proportion of the business and private sectors would have stagnated. The highest positive effects on the gross added value of the business sector were achieved in the regions of Trenčín and Prešov in which large infrastructural projects were implemented from EU funds and in 2013 they contributed to the growth of business-sector share by 1.2 p.p. or 1 p.p. respectively. The highest increase of the business-sector share without a use of funds from the Cohesion Policy would have been demonstrated in the region of Trnava – this implies its relative good economic condition stemming from the geographical proximity to the metropolitan region.

5.10 Based on the current implementation of SF and CF, to what extent has the strategic objective of the NSRF – “To significantly enhance the competitiveness and performance of the regions and of the Slovak economy until 2013, while respecting sustainable development” – been met?

Assessment approach

A set of indicators has been defined at the NSRF level; they monitor meeting the strategic objective “To significantly increase the competitiveness and performance of regions and of the Slovak economy and employment until 2013, while respecting sustainable development”. The progress in achievement of the target values of these indicators has been analyzed for the needs of the assessment (energy consumption of the economy, aggregate innovation index, GDP per capita in PKS to the EU15 average, labour productivity to the EU15 average, employment rate to the EU15 average) and subsequently the impact of SF and CF on the strategic objective of NSRF was interpreted.
Analysis and findings

The Table 19 shows the development of indicators at the level of NSRF. The specified objectives are being met practically in all indicators with the exception of the position of SR in the aggregate innovation index where we may see a worse placement in the last year. Qualitative factors of the economic growth of the Slovak economy still represent one of the major barriers of its more dynamic development.

Regarding the energy consumption indicator, the performance is flawless also as a result of determining a little ambitious target at the level of 663.4 kgOE/1000 €. In spite of that, there is an annual drop in the energy consumption of the economy, contributing to sustainability of the economic development of SR. Programmes of increasing the energy savings in production (OP CaEG) and investments in the public infrastructure reconstruction (PIR) significantly contribute to that.

Table 19: Development of target indicators of NSRF in 2007 - 2013

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energetická náročnosť ekonomiky</td>
<td>kgOE/1000 €</td>
<td>854,3 (2004)</td>
<td>388,5</td>
<td>377,8</td>
<td>362,8</td>
<td>370</td>
<td>349,8</td>
<td>329,3</td>
<td>.</td>
<td>663,4</td>
</tr>
<tr>
<td>Súhrný index inovatívnosti</td>
<td>poradie 22 (2005)</td>
<td>22</td>
<td>22</td>
<td>21</td>
<td>23</td>
<td>22</td>
<td>20</td>
<td>21</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>HDP na obyvateľa v PKS k priemeru EU15</td>
<td>%</td>
<td>53,7 (2005)</td>
<td>60,57</td>
<td>65,34</td>
<td>65,64</td>
<td>67,29</td>
<td>68,73</td>
<td>69,53</td>
<td>.</td>
<td>&gt; 60</td>
</tr>
<tr>
<td>Produktivita práce k priemeru EU15</td>
<td>%</td>
<td>60,9 (2005)</td>
<td>69,4</td>
<td>72,6</td>
<td>72,8</td>
<td>74,5</td>
<td>73,6</td>
<td>73,8</td>
<td>.</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Miera zamestnanosti k priemeru Ú1-15</td>
<td>%</td>
<td>88 (2005)</td>
<td>90,9</td>
<td>92,8</td>
<td>91,5</td>
<td>89,9</td>
<td>90,84</td>
<td>91,56</td>
<td>92,01</td>
<td>&gt;90</td>
</tr>
</tbody>
</table>

Resource: Eurostat, calculations of authors. Data for certain indicators was not available at the time of writing the report.

Implementation of SF and CF had a considerable effect on the amount of GDP per capita in PKS (see the Chapter 5.5), slight effect on the labour productivity growth (see the Chapter 5.2) and a positive effect on the development in the labour market (see the Chapter 5.13).

An answer to a question

Based on the current implementation of SF and CF, to what extent has the strategic objective of the NSRF – “To significantly enhance the competitiveness and performance of the regions and of the Slovak economy until 2013, while respecting sustainable development” – been met?

Based on the model estimates and analyses in the previous chapters, we may identify a positive effect of implementation of SF and CF on meeting the partial indicators of the strategic objective of NSRF. The implementation had a positive impact on convergence of the Slovak economy to the EU average, helped mitigate the impacts of the financial and economic crisis on the Slovak economy, lead to creation and maintenance of parts of the existing jobs. However, it was possible to considerably increase competitiveness and performance of the regions, with regard to the fact that several aspects of competitiveness were not influenced by interventions of the Cohesion Policy. This Policy played mainly a compensation role in this respect, in order to mitigate the impacts of the financial and economic crisis in Slovakia.
5.11 Are the objectives of the Europe 2020 Strategy being met in individual areas of economy and are the disparities among individual regions of SR being diminished as a result?

**Assessment approach**

In connection to the Lisbon Strategy, the Europe 2020 Strategy\(^\text{16}\) was adopted (hereinafter referred to as ES 2020) which defined the basic EU objectives for the next decade. The Strategy laid down three basic objectives – smart, sustainable and inclusive growth. The implementation of the Strategy is conditioned by using national resources at the level of national states as well as the resources of the Cohesion Policy of the EU. For the needs of implementation of the objectives of the Strategy, each Member State is obliged to transform these objectives in the form of the so-called National Reform Programme\(^\text{17}\) as the basic national document of ES 2020. Any progress in implementation of the programme is annually subject to reviewing, an action plan of the programme is elaborated within the Programme and macroeconomic impacts of structural reforms are assessed. The National Reform Programme determines and assesses the main structural measures to achieve a sustainable economic growth, creation of jobs and improvement of the quality of life. The Reform Programme is closely connected to the Stability Programme\(^\text{18}\) which specifies a medium-term outlook of the fiscal policy. The creation and implementation of the Programme is a part of a deepening cooperation of economic policies (the so-called European term) in the form of recommendations of the European Commission and of the Council of EU.

Meeting the objectives of the Lisbon Strategy was taken into consideration in the creation and implementation of NSRF and later, as a result of the economic and financial crises, meeting the ES 2020 objectives as well.

A set of indicators with particular target values is defined at the national level as a part of meeting the objectives of ES 2020. With regard to the nature of most indicators, it is not possible to foresee a contribution of interventions of the Cohesion Policy to the development of most indicators using an economic model. ITMS data was used for the needs of the assessment. The data was divided based on priority topics and the amount of expenditures was identified which had been allocated and drawn within the indicators relevant to the inclusive, smart and sustainable growth.

**Analysis and its outcomes**

**Smart growth**

Smart growth represents mainly improvement of the performance in education (motivation of people towards education and adapting their skills to the current needs), research and innovation (creation of new products and services generating growth and new jobs) and digital society (use of ICT). The following national objectives have been defined for a smart growth:

- Achieve investments at the level of 1 % of the GDP in R&D.

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- Decrease the dropout rate to 6%.
- Increase the proportion of the population aged 30 - 34 who finish the tertiary education level at least to 40%.

A negative turn was seen in SR in late 2013 regarding the dropout rate. While the rate was continuously falling from 6.5% in 2007 to 4.7% in 2010, since 2011 we may see a continuous increase in the dropout rate. The highest YoY increase, by one p.p., was seen exactly in 2013 in which the rate amounted to 6.3%. As for the area of financing science and research, we may see a positive impact of implementation of SF and CF on the proportion of expenditures to the GDP. Since 2007, there has been a gradual increase in the proportion of expenditures in the GDP which amounted to 0.82% in 2012. However, this proportion still represents one of the lowest values within the EU. While in 2007, the total proportion of expenditures on science and research from the SF represented 0.01% of the GDP, in 2012 the proportion amounted to 0.11% of GDP. Implementation of operational programmes focused on smart growth was affected by several facts. Implementation of the OP SaR was affected by an excessive administrative burden of the beneficiaries and was only little connected to the existing structures of supporting the science and research in Slovakia (mainly the Agency for Promotion of Science and Research).

As for the digital economy, since the start of the programming period, the implementation of OP IS as the crucial operational programme of informatization was delayed and significantly determined by the political cycle and the fact that the related legislation was not prepared.

Meeting the objective of the proportion of the population aged 30 – 34 who have finished a tertiary level of education seems to be flawless. From 2007 to 2013, this proportion grew from 29.9% to 36.6%. It is desirable, to a certain extent, to meet the target level of 40% in 2020, but the proportion itself does not say anything about the quality and qualification structure of the graduates who cannot often find employment in the labour market.

Objectives related to smart growth are focused on strengthening the qualitative factors of the economic growth such as science, research, innovation, informatization and education (Table 20). In this programming period, these are promoted through the OP CaEG, OP SaR, OP EaSI, OP BR, OP E and OPIS. The amount of allocation relevant to the smart growth objective amounts to euro 3.49 billion, while the highest proportion in the total allocation is related to innovation, R&D with 37.6%, education with 33.5% share and digital Europe with 28.8%. At the end of the monitored period, the highest proportion of drawing of EU resources was achieved in education, preparation and lifelong learning, of which euro 662 million was used to build and recover the educational infrastructure (PIR) and euro 185 million to educational activities themselves (OP E). At the end of 2013, the drawing amounted to 68.8%. A relatively low drawing percentage continues in the area of implementation of information technologies (41%) and similarly, the drawing related to innovation, science and research (45.3%) cannot be considered as satisfactory.

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20 Allocation of resources as per individual operational programmes – see the Annex C.11 Tables 1 to 3.
### Table 20: Allocation and drawing of the Cohesion Policy for the ‘smart growth’ objective as of 31 December 2013 (EU resources)

<table>
<thead>
<tr>
<th>Europe 2020 themes</th>
<th>Priority theme</th>
<th>Allocation</th>
<th>% overall allocation</th>
<th>Absorption 31.12.2013</th>
<th>Absorption in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Europe</td>
<td>10-15</td>
<td>1,007,806,427</td>
<td>28.81%</td>
<td>413,168,328</td>
<td>41.00%</td>
</tr>
<tr>
<td>Innovations, research and development</td>
<td>1-9</td>
<td>1,317,128,844</td>
<td>37.66%</td>
<td>597,542,720</td>
<td>45.37%</td>
</tr>
<tr>
<td>Education, training and life-long learning</td>
<td>72-75</td>
<td>1,172,942,079</td>
<td>33.53%</td>
<td>807,657,818</td>
<td>68.86%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>3,497,877,350</td>
<td>100.00%</td>
<td>1,818,368,866</td>
<td>51.98%</td>
</tr>
</tbody>
</table>

*Resource: ITMS, calculations of authors*

The above-stated facts indicate that despite a progress achieved in implementation, a large part of funds allocated in areas with a higher potential to have a positive impact on smart growth has not been drawn, as a result of what the contribution of the Cohesion Policy in this area is now limited. Similarly, with regard to the long-term economic return of the investments focused on smart growth, it is necessary to eliminate the existing barriers of implementation and to intensify the rate of implementation until the end of 2015.

### Inclusive growth

In the context of ES 2020, inclusive growth represents mainly increasing the employment rate (creation of new and higher-quality jobs), investment in expert preparation and increasing the qualification with the aim to be prepared for any expected changes in the labour market, modernization of the labour markets and social welfare systems and the transfer of the benefits of growth onto all EU regions. The following national objectives have been defined for inclusive growth:

- To increase the employment rate of the population aged 20 to 64 to at least 72%.
- To decrease the number of population living below the poverty line by 170,000 to 17.2% of the population.

Euro 922 million was earmarked to measures related to inclusive growth in the programming period of 2007-2013, of which euro 766 million (83%) was allocated to employment and euro 156 million (17%) to social inclusion. As for employment, projects are focused on improvement of the access to employment and its maintenance (OP E, OP EaSI) and increasing the adaptability of employees, companies and businesses to the changing conditions (OP CaEG, OP E, OP EaSI). Operational programmes related to social inclusion are focused on improvement of social inclusion of disadvantaged persons (OP E and OP EaSI).
In spite of a relatively significant volume of resources allocated to the areas of inclusive growth, we may see a prevailing negative trend in the development of inclusive growth indicators in Slovakia. In 2013, the employment rate in the age group of 20 – 64 amounted to 65%, while in 2007 its value was 67.2%. The target value for 2020 is an employment rate of 72% which, looking at the current development, will be very difficult to achieve.

Similarly, since 2007, the number of population living below the poverty line has not been developing favourable, while the target value is to decrease the number to 17.2% of the population. In 2012, it amounted to 20.5% and compared to 2007, it dropped only by slight 0.8 p.p. Long-term unemployment, which was rising continuously from 2007 to 2013 from 8.3% to 10%, has been a continuing and typical problem of the national market. In view of the current development, achieving the target value of 3% is unrealistic even with the help of the remaining resources of the Cohesion Policy. However, we may state that without implementation resources from SF and CF it would be significantly more difficult to meet the above-stated objectives.

**Sustainable growth**

In the context of the ES 2020, sustainable growth objectives are focused on building a competitive low-carbon economy, protecting environment, implementing and benefitting from green technologies and procedures, improving the business environment and smart electric energy distributions using the ICT. The following national objectives related to sustainable growth have been defined for the Slovak Republic:

- Decrease the rise of greenhouse gases emissions beyond the ETS sector so that they do not exceed the 2005 level by more than 13%.
- Increase the proportion of energy from renewable resources in the gross final energy consumption to 14%.
- Increase the energy efficiency through savings of 11% in the final energy consumption compared to the average consumption in 2001 – 2005.

Looking at the development of the national objectives we may state that the national ES 2020 objectives are being successfully met. 2012 saw a decrease in greenhouse gases emissions beyond the ETS sector by 8.4%, similarly the proportion of renewable energy resources (RER) in the final consumption amounted to 10.4% (target 14%) and the final energy consumption decreased by 5.6% (target 11%) compared to the average of 2001 – 2005. As for the proportion of RER, as a result of a decrease in state subsidies21 as well as a relatively little allocation of EU resources in this area, we may expect that the target value will not be met.

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21 An increase in the production of energy from renewable resources caused a pressure on increasing the price of electric energy for households, as a result of high guaranteed purchase prices of the energy from renewable resources.
In order to meet the sustainable growth objectives, the highest volume of financial resources has been allocated in the current programming period. The overall allocation of EU resources represents euro 5.4 billion, out of which euro 3.4 billion (62.7% of the total allocation) is intended for finalization of the construction of transport infrastructure, for environmental programmes it is euro 1.8 billion (33.9%) and the lowest volume of resources in the amount of euro 180 million (3.4%) is intended to support RER and energy efficiency.

<table>
<thead>
<tr>
<th>Europe 2020 themes</th>
<th>Priority theme</th>
<th>Allocation</th>
<th>% overall allocation</th>
<th>Absorption 31.12.2013</th>
<th>Absorption in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>16-32, 52</td>
<td>3 395 214 529</td>
<td>62.77%</td>
<td>1 725 179 727</td>
<td>50.81%</td>
</tr>
<tr>
<td>Energy</td>
<td>33-43</td>
<td>1 804 946 401</td>
<td>3.35%</td>
<td>87 754 752</td>
<td>48.50%</td>
</tr>
<tr>
<td>Environment</td>
<td>44-51, 53, 54</td>
<td>1 832 532 371</td>
<td>33.88%</td>
<td>838 530 853</td>
<td>45.76%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5 408 693 301</td>
<td>100.00%</td>
<td>2 651 465 332</td>
<td>49.02%</td>
</tr>
</tbody>
</table>

Source: ITMS, calculations of authors

In the current programming period, the implementation of transport projects was affected by several factors which had a negative impact on the pace of construction of the transport infrastructure. An impact of the political cycle, unprepared projects at the start of the programming period, problems related to assessing the impacts on the environment and the public procurement process were some of the main factors limiting the implementation.

**Key findings**

- Implementation of the operational programmes related to achieving the objectives specified in the ES 2020 amounted to levels close to 50% in all three main objectives as of the end of 2013.
- The most striking progress in implementation was seen in the area of education, preparation and lifelong learning. Most resources in this area were used to build or modernize the educational infrastructure, in particular euro 662 million was used to build and reconstruct the educational infrastructure (PIR) and euro 185 million to activities related to education (OP E). A high demand for funding of this type of projects is a signal of a continuing debt in educational infrastructure which had to be eliminated. However, these infrastructural investments have no major contribution to improving the contentual and qualitative aspect of education which is a precondition for a smart growth.
- As for funding science and research, Slovakia is, in spite of using EU resources, one of the countries with the lowest proportion of expenditures on science and research in the EU. Since 2007, EU resources have become the main tool for increasing their share in the GDP, with a minimal increase in the national public resources only. In 2007, the total proportion of expenditures on science and research from SF amounted to 0.01% of the GDP; in 2012 it was the proportion of 0.11% of the GDP.
- We are not successful in meeting the objectives of inclusive growth. However, we may state that without a contribution of SF the development related to inclusion would have been more dramatic. In 2013, the unemployment rate in the age group of 20 – 64 amounted to 65%, while in 2007 it was 67.2 %. The objective is to achieve the unemployment rate of 72% in 2020. This objective will remain pending when we look at the current and the expected development.
As for sustainable growth, we are successful in meeting the targets mainly in environment and energy, in spite of a relatively low rate of financial implementation.

**Answer to an assessment question**

*Are the objectives of the Europe 2020 strategy being met in individual sectors of economy and are the disparities among individual regions of SR being diminished as a result?*

Meeting the objectives of the ES 2020 with an effect of SF and CF may mainly be seen in relation to sustainable growth, particularly in the area of environment and energy. With regard to a relatively slow pace of construction of transport infrastructure, the effect of SF and CF is only limited to particular regions of SR at the end of 2013. The target values of ES 2020 are not being successfully met in the area of sustainable growth, what is mainly related to continuing structural problems in the labour market (disharmony in the qualification of graduates in the labour market, high long-term unemployment and the related loss of work habits, slow integration of disadvantaged job-seekers, etc.). As for the area of smart growth, the contribution of the Cohesion Policy is decisive, in view of the limited national resources, mainly in the area of building infrastructure of science and research and transfer of knowledge into practice. A low implementation rate is still the limiting factor in a more favourable development in this area.

### 5.12 What is the proportion of the total amount of implementation SF and CF within NSRF in the GDP?

**Assessment approach**

Aggregate annual data from ITMS was used for the needs of calculation of the proportion of implementation of SF and CF, while the source of financing (EU, state budget and own resources of the beneficiaries) and the target investment sector (infrastructure, industry, human resources, services and science and research) were taken into consideration. Individual proportions of implementation EU funds were quantified then (expressed as a sum of EU resources, state budget resources and beneficiaries’ resources) in the gross domestic product of individual Slovak regions. Values of the regional gross domestic product in current prices for 2008 – 2011 were taken from official statistics (Statistical Office of SR). The data for 2012 and 2013, which is not available, was quantified based on the methodology described in 3.2.

**Analysis and outcomes**

As a result of delays in preparation of the 2007 – 2013 programming period, the implementation of resources was minimal in 2007 and 2008. As can be seen in the Chart 42, rate of implementation increased on annual basis 2009 implementation due to the low rate implementation in previous years. In 2009, the implementation reached 602.9 million EUR which represented an annual increase by 569 million EUR.
The highest Y-o-Y increase of implementation has been achieved in 2010. The implementation amounted to 1.36 billion EUR and in comparison with 2009 was higher by 758 million EUR. The majority of expenditures was mainly directed to infrastructure and market services. Since 2010 the annual growth of implementation has been declining. (Chart 43).

The total proportion of the drawn resources from SF and CF in the GDP can be seen in the Chart 44. In 2009, the proportion of resources drawn from the EU, state budget and beneficiaries’ resources intended for co-financing amounted to 0.96% of the GDP. In 2010, the
proportion amounted to 2.06% of the GDP and it was gradually growing to achieve 2.87% of the GDP in 2013. It is obvious from the above-stated data that since the start of the financial and economic crisis, the resulting insufficient domestic demand and the need to carry out fiscal consolidation, the funds of the cohesion policy represent an important source of public and private investments in the Slovak economy.

Chart 47: Proportion of annual implementation of SF and CF in SR in the GDP (%)

Looking at the regional level we may see an even more striking proportion of the resources of the Cohesion Policy in the GDP of individual regions (Chart 45)\(^{22}\). Bratislava region, which was not allowed to draw the same volume of resources as other regions due to its economic level, represents an exception. Similarly, the GDP of the Bratislava region is considerably higher than the GDP of other regions, distorting, to a certain extent, the proportion of resources of the Cohesion Policy in its GDP.

\(^{22}\) The share in GDP is calculated as a sum of resources of EU and co-funding from the state budget and from beneficiaries’ own resources.
From regional perspective the highest share on GDP have been achieved in Trenčín in 2013 (5.92% of GDP), Prešov in 2013 (5.81%), Banská Bystrica in 2010 (4.16% of GDP) and Košice in 2013 (4.05% of GDP), Žilina in 2012 (3.72% of GDP) and Nitra in 2012 (2.85% of GDP), Trnava in 2012 (2.26% of GDP) and Bratislava in 2013 (0.85% of GDP).

In the Banská Bystrica region, the highest share of expenditures has been spent on infrastructure which amounted to 1.5% of GDP. The highest proportion of expenditures on infrastructure was seen in 2010 which amounted to 2.9% of its GDP. The second highest proportion of expenditures in the region has been spend in the sector of services and science and research with an average value of 0.4% of GDP. Expenditures in these sectors were continuously increasing and in 2013 they amounted to 0.7% of GDP of the region. The share of expenditures on industry amounted on average to 0.2% of GDP and on human capital to 0.1% of GDP. As for industry, they reached the highest amounts in 2011 and 2012 (0.5% and 0.4%); in the case of human capital in 2012 (0.2%).

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23 The share is calculated as a proportion of resources of the Cohesion Policy implemented in the particular year in the gross domestic product of the region in the particular year. The YoY fluctuation is caused mainly as a result of finishing mainly infrastructural projects in individual regions in which most financial resources have been allocated compared to other sectors, and as a result of the development of the GDP of the region in the particular year.
As for the region of Bratislava and its limited implementation options as a result of its high performance of the measured GDP per capita in PKS, the share of the drawn resources in the GDP is relatively small compared to other regions. Distribution of the drawn resources is more even in individual sectors. With regard to a high concentration of scientific and research capacities and the eligibility of the region of Bratislava, the expenditures on science and research, growing gradually from 0.06% of the GDP in 2009 to 0.26% in 2013, achieved the highest proportion in the GDP of the region. In absolute terms they amounted to euro 51 million at the end of the year (2013). The second highest proportion of expenditures was seen in the area of services – 0.17% of the GDP, industry 0.15%, followed by investments in human capital with a 0.12% share, and the smallest amount was drawn in the area of infrastructure (0.11% of the GDP).
Chart 50: Proportion of the implementation of SF and CF in the GDP in the regions of Košice and Nitra as per sectors

Looking at the region of Košice we may state that the highest proportion of implementation of SF and CF in the GDP was found in expenditures on infrastructure. The proportion was continuously growing from 2009 and in 2013 it amounted to 2.55% of the GDP of the region. The second highest proportion in 2013 was seen in the sector of services with 0.54% of the GDP, followed by science and research with 0.51%, industry with 0.29% and human capital with 0.16%. In absolute terms the expenditures on infrastructure amounted to euro 215 million in 2013 and thus represented 63% of the total expenditures of SF and CF in the region.

As for the region of Nitra, expenditures were distributed more evenly in individual sectors. The proportion of expenditures on infrastructure represented 0.78% of the GDP in 2013, followed by
services with 0.55%, industry with 0.45%, science and research with 0.21% and human capital with 0.1%. The average proportion of expenditures on industry in the GDP from 2009 to 2013 amounted to 0.55% of the GDP\textsuperscript{24}. The average proportion of expenditures on infrastructure amounted to 1.19% of the GDP in the same period.

\textit{Chart 51: Proportion of the implementation of SF and CF in the GDP in the regions of Prešov and Trenčín as per sectors}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{chart51.png}
\caption{Proportion of the implementation of SF and CF in the GDP in the regions of Prešov and Trenčín as per sectors}
\end{figure}

\textit{Source: calculations of authors, ITMS}

The regions of Prešov and Trenčín represent regions in which the highest proportion of expenditures in the GDP was seen in infrastructure. As for the region of Prešov, they

\textsuperscript{24} 2008 was intentionally left out since drawing in all sectors was very low and considerably distorted the average level of shares in the GDP of the region.
represented 64% of all expenditures of structural funds, and as for the region of Trenčín even 78% of all expenditures. In the case of the region of Prešov, it represents 2.42% of the GDP from 2009 to 2013 and in the case of the region of Trenčín 2.95% of the GDP. The proportion of expenditures on infrastructure in both regions peaked in 2013 (Chart 51) and represented 3.69% in the region of Prešov and 4.55% in the region of Prešov respectively. It is mainly caused by high costs of infrastructural projects compared to projects in other sectors. It is also evidence of a continuing infrastructural debt in these regions and its gradual elimination.

*Chart 52: Proportion of the implementation of SF and CF in the GDP in the regions of Trnava and a Žilina as per sectors*

Compared to other regions, expenditures on infrastructure in the region of Trnava represented 0.66% of the GDP on average. They peaked in 2012 with 1.05%. In 2012, a relatively high
proportion of expenditures in industry was achieved in the amount of 0.5% of the GDP. Another sector with the highest proportion of expenditures of SF and CF in the GDP in the region of Trnava was the sector of services (Chart 52). Their proportion in the GDP has been continuously increasing since 2008 from 0.03% in 2008 to 0.46% in 2013 and in 2013, their proportion in expenditures amounted to 25%. Expenditures on infrastructure amounted to 44% of the total expenditures in the same year. Expenditures on R&D in the region amounted to 0.15% in the GDP on average in the region and they achieved the highest proportion in 2013, when they amounted to 0.21% of the GDP.

The region of Žilina had a similar share in implementation the funds from SF and CF as the region of Košice with the exception of 2012 when the region of Košice significantly outperformed the region of Žilina. This was caused by termination of a large infrastructural project of modernization of the railway track Žilina - Krášno nad Kysucou. Funds were drawn from SF and CF mainly in 2011 and 2012 when they were slightly higher than 3.5% of the GDP. Funds were drawn slightly less in 2010. The highest proportion in implementation of the SF and CF was seen in the investments in building infrastructure. In 2010, they represented almost 2.4% of the GDP. In the following years, investments in infrastructure were decreasing and were gradually squeezed out by investments in industry, science, research and services. Investments flowing from SF and CF into industry were the highest in this region in 2012, at the level of almost 0.84% of the GDP. It may be generally said that the investments in industry were some of the highest ones in the region of Žilina from among all other regions. Similar ones were seen in the region of Nitra and higher ones in the region of Prešov.

Key findings

- In all regions, except for the region of Bratislava, expenditures in infrastructure represented the highest proportion of expenditures in the GDP of the region. These expenditures considerably helped mitigate the existing infrastructural debts by finishing the construction and reconstruction of the transport and environmental infrastructure and by enhancing the facilities of the territory. A secondary effect of such expenditures was a creation or maintenance of jobs in the building sector in these regions.

- The combination of EU resources together with co-funding from public resources and the resources of the beneficiaries represents a significant proportion in the GDP of individual regions in all regions with the exception of the region of Bratislava. In the case of certain regions (Trenčín, Prešov, Banská Bystrica), the proportion of these resources in the GDP is slightly higher than in the case of other regions. It is caused by the nature of the implemented projects on the one hand, and a relatively lower regional GDP compared to more advanced regions of SR on the other hand.

- The specific position of the region of Bratislava was also reflected in the structure of the subsidized sectors and a relatively even proportion of the drawn resources in individual sectors (infrastructure, human capital, industry, services and science and research) in the GDP of the country. We mainly appreciate the increase in expenditures in science and research, more specifically the infrastructure of science and research, which creates conditions for excellent research in the future. Modernization of scientific equipment represents a crucial factor which increases the potential of the Slovak science in the international scientific and research area.

- In 2013, several regions saw a drop in the proportion of implementation SF and CF in the GDP as a result of termination costly projects.
- At the end of the programming period, in 2015, we may expect a more significant increase in the proportion of SF and CF resources in the GDP of individual regions as a result of termination of a large number of projects mainly in the area of infrastructure as well as industry, science and research and human resources.
- We may state that within the national budgetary limitations, the support from SF and CF formed a considerable proportion in the performance of individual regions and it helped mitigate the impacts of the financial and economic crisis on the regions.

**Answer to the question**

*What is the proportion of the total amount of implementation of SF and CF within NSRF on the GDP?*

The main findings stated in the previous paragraph also represent an answer to this question.

5.13 **To what extent was fulfilled long-term sustainability of existing and newly created jobs by SF and CF in selected sectors?**

**Approach to assessment**

For the needs of assessment, in the econometric model HERMIN there was estimated the number of established and sustainable jobs in the sectors of construction, industry and market services at NUTS 3. Number of jobs created represents the number of additional jobs created through the use of assistance from the cohesion policy, i.e. compared to the situation when the funds were not drawn from SF and CF. In applied econometric model HERMIN, sustainable jobs are considered jobs that are maintained for a period of three years. Method of reporting sustainable jobs is different from the definition of sustainable job for reporting on projects and programs financed by SF and CF under CCA Methodical Instruction for Reporting the Number of Jobs Created.

**Analysis and results**

The total additional employment represents in 2013 more than 81,000 jobs. In 2013, the construction sector has created more than 29,000 jobs resulting from the increase in spending SF and CF in the area of infrastructure. Industrial sector has recorded the smallest growth rate of new job creation. In 2013, more than 7,000 additional jobs were created in this sector as a result of use of the SF and CF. In 2015, it is expected that this number should reach 10,000 jobs. In 2013, 44,000 additional jobs were created in sector of market services. In 2015, the number of people working in this sector should be increased by 63,000 persons, compared to the situation without implementation from SF and CF.

By the use of SF and CF in 2015, at the national level should be created about 110,000 jobs, of which about 39,300 would be sustainable. Looking at the sector breakdown, the most jobs will be created in the market services sector, followed by construction sector and industry sector. In the market services sector, there should be created 57,800 jobs, of which 24,100 sustainable. In the construction sector, there should be created 37,300 jobs. Given the nature of jobs in the construction industry, there is the lowest number of sustainable jobs. Especially in the construction sector, employment is limited to the length of the period of implementation of a particular project. After finishing, there is a sharp decline in employment. The construction sector, however, creates jobs in other sectors of the national economy, contributing indirectly to
job creation such as industry. Total number of sustainable jobs in the construction sector represents only 14% of the expected number of jobs created. The lowest number of jobs will be created in the industrial sector, but in this sector can be expected the highest sustainability of jobs. Interventions, therefore, create permanent jobs under usual external conditions. Overall, there is expected a creation of 10,000 jobs and estimated level of sustainability achieves 98%.

Chart 53: Estimation of created and sustainable jobs in 2015 in SR, in thousands

Source: calculations of authors, ITMS

Based on the estimates, we can conclude that the majority of jobs will be created in Trenčín region and especially in the service sector. Use of SF and CF will create 22,8000 jobs, while the share of retained jobs reaches 44% (10,100 jobs). In Prešov region, we estimate the creation of 16,800 jobs, of which 4,400 will be sustainable. Low level of sustainability is caused by a high share of employment in the construction sector in the region.

Chart 54: Creation of new and sustainable jobs by region and sector, in thousands persons

Source: calculations of authors, ITMS
In Košice region, we expect the creation of 15,400 new jobs, particularly in the sector of construction and market services (see Chart 54). Number of sustainable jobs in the Košice region is estimated at 4,400 and related predominantly to the sector of market services and industry. In Žilina region, we expect creation of 7,800 jobs, of which 3,500 sustainable, especially in the sector of services and industry. In Banská Bystrica region, we expect creation of 10,100 jobs, of which 3,900 sustainable, especially in the sector of market services. Number of jobs created in cities in the Nitra region shall reach 9,300 jobs, of which 3,900 will be sustainable in the long term, especially in the sector of services (2,600 jobs). A smaller number of sustainable jobs will be in the construction sector (400 jobs) and industry (700 jobs). In Trnava region, we expect the creation of 9,000 jobs, of which 47% will be sustainable. Minimum number of jobs created is expected in the Bratislava region. Overall, we expect the creation of 6,900 jobs, of which 33% will be sustainable. The highest proportion of sustainable jobs (2,300 jobs) is expected in the market services sector.

Impact of implementation SF and CF on the unemployment rate at national and regional level

The positive effect of implementation SF and CF on job creation is naturally also reflected in unemployment rates across regions. We can conclude that the implementation of cohesion policy has contributed to reducing the unemployment rate in all regions (see Chart 55). In 2009, negative impact of the economic and financial crisis was demonstrated in varying intensity by the growth in the unemployment rate in all regions of Slovakia. It was implementation of SF and CF that helped to significantly mitigate the negative impacts of the crisis in the following years.

Chart 55: Effect of implementation SF and CF on the unemployment rate at regional level in the years 2007 – 2013.
Most significantly, this effect is manifested in Trenčín region in which the difference in the unemployment rate should amount to 8.82 percentage points (pp) in 2015. The given value is somewhat distorted due to the higher volume of infrastructure investment in comparison with other regions. The said effect on the unemployment rate must therefore be interpreted with some degree of caution, particularly in relation to the fact that the model does not take into account the interregional labour migration.

In the case of SF and CF undrawn, the estimated unemployment rate at the end of 2015 would be for the Prešov region increased by 6.12 pp, Žilina region 5.08 pp, Košice region 4.93 pp, Trnava region 3.9 pp, Banská Bystrica region 3.82 pp, Nitra region 3.46 pp and Bratislava region 1.63 pp.

At the national level we expect the unemployment rate of 13.32% in 2015, while in the case of undrawn SF and CF it could reach the level of 19.4%. Implementation of EU funds has the potential to contribute to reducing the unemployment rate by 6.04 pp in 2015.

Chart 56: Effect of implementation of SF and CF on the unemployment rate at national level in the years 2007 – 2015.

Source: calculations of authors
Key findings

- The total additional employment induced by implementation SF and CF represents in 2013 more than 81,000 jobs. In 2013, there were created more than 29,000 jobs in the construction sector, 7,000 jobs in the industry sector and 44,000 jobs in the market services sector.
- In 2015, we expect the creation of 110,000 jobs, of which 39,300 are sustainable.
- The highest rate of job sustainability at the end of 2018 is expected in the industrial sector (98%), market services sector (42%) and lowest in the construction sector (14%). In Slovakia, the share of sustained jobs to created jobs represents about 37%.
- The highest number of jobs created by the end of 2015 is expected in Trenčín, Prešov, Košice and Žilina region.
- The highest proportion of sustainable jobs at the end of 2018 at NUTS 3 is expected in Trnava (47.3%), Trenčín (44.3%), Nitra (41.9%), Žilina (40.5%) and Banská Bystrica (38.3%).
- In the case of undrawn SF and CF, the estimated unemployment rate at the national level would reach in 2013 a value of 18.4% and in 2015 a value of 19.4%.

Answer to the evaluation question

To what extent was fulfilled long-term sustainability of existing and newly created jobs by SF and CF in selected sectors?

Implementation of cohesion policy substantially contributed to the creation or maintenance of jobs and mitigating the impact of the economic crisis on employment. In the case of undrawn SF and CF, the rate of unemployment at the national level would reach the level of 19.4% at the end of 2015. We expect that implementation of SF and CF will cause the creation of 110,000 jobs by the end of the programming period (2015), of which about 39,300 jobs would be maintained until 2018. At the sectoral level, the highest level of sustainability of jobs will be reached in the industry sector (98%), services sector (42%) and the lowest in the construction sector (14%).
6 Findings and conclusions

Based on the results of the assessment of the effects of SF and CF by econometric model (HERMIN) and expert opinion of authors, it can be stated that the use of Cohesion policy resources in the programming period 2007 – 2013 had a statistically significant and positive impact on the Slovak economy. There is a direct correlation between the volume of used SF and CF and the effect on national and regional economies, while the important factor is the thematic focus of the support. Benefit of the use of EU aid began to materialise in 2009 following the actual implementation of supported projects.

The overall development of the economy was substantially affected by the global financial and economic crisis. Importance of Cohesion policy is fully reflected in mitigating the negative impacts of the global financial and economic crisis on the Slovak economy, and in the process of restart of economic growth. It is the best to demonstrate the effects of SF and CF through the indicator of Gross Domestic Product (GDP) and value added. Both indicators are composite indicators capturing the overall performance of the economy. In 2013, an additional cumulative GDP growth reached 5% due to implementation of Cohesion policy, while in 2015 it is expected to reach approximately 7.5%. Cumulative GDP growth is the difference between GDP generated with the resources of SF and CF compared to a scenario without SF and CF investments in particular year. An interesting finding is that the real contribution of Cohesion policy quantified in the ex-post analysis exceeds effects forecasted in the ex-ante evaluation of the NSRF (2006). The main reason was the unexpected collapse of the Slovak economy in 2009 as a result of the global financial and economic crisis and significantly lower rates of economic growth in the consequent years compared to the pre-crisis period, which increased the importance of SF and CF.

The increase in household consumption, which originated as a net effect of the Cohesion policy expenditures implementation, started to be visible only in 2009. Household consumption being primarily caused by the additional employment growth directly reflects the impact of SF and CF on living conditions and households. In 2010, additional household consumption grew in all regions, due to the increased implementation of available resources and the creation of new jobs. In the following years (2011 - 2013), there was additional increase of household consumption, while significant growth of households consumption can be expected in years 2014 and 2015 as a result of efforts to maximize absorption of funds allocated for the programming period 2007 – 2013. Model simulations suggest that due to the use of EU resources, the nominal household consumption could increase by 7% in 2015.

Slovakia’s position in the ranking of competitiveness (Global Competitiveness Report) has been worsening. Since 2007, the position of the country deteriorated by 42 positions, while the decline was recorded in majority of the evaluated factors of competitiveness. Several areas of evaluation is focusing on the overall conditions, e.g. macroeconomic, legal and institutional, which are not systematically addressed through interventions supported from SF and CF, but had impact on efficiency of use of SF and CF in Slovakia. Factors that influenced the deteriorating position of Slovakia with respect to competitiveness are the quality of institutions, the quality of the education system, the tax system as well as labour market efficiency and flexibility. For assessing competitiveness at regional level, labour costs and labour productivity were chosen to serve as key indicators. Based on the results of the analysis it can be concluded that the use of EU funds had almost neutral impact on the competitiveness of regions measured by labour costs and labour productivity.
The strategic objective of the NSRF “to significantly increase competitiveness of the regions and the Slovak economy and employment by 2013, while respecting sustainable development” was fulfilled only partially.

Process of real convergence to the average EU 28 was positively supported by implementation of SF and CF in all regions of Slovakia, except for Banská Bystrica region. Without implementation of Cohesion policy, the process of convergence would be disrupted in six out of the eight regions of Slovakia. The economically strongest region – Bratislava region - had a significant impact on maintaining level of national convergence, without its positive impact there would been a negative development in the convergence process at the national level. Analysis confirmed that the continuation of convergence of Slovakia to the EU 28 average in the 2007-2013 programming period, was also determined by the contribution of Cohesion policy resources. Convergence trend is expected to continue in 2014 and 2015, when the level of convergence should reach 77% of the EU 28 average (measured by GDP per capita in PPP).

In the case of regional convergence, defined as the variance between the economic level of Slovak regions, there was an opposite trend. This means that the regional convergence did not occur and regional differences slightly deepened during the programming period 2007-2013. It should also be stressed that without sources of SF and CF, the regional disparities would be even more significant. Therefore, addressing wide regional disparities and continued economic growth still remain the specific challenges of the regional policy in the country.

Impact of Cohesion policy on employment at national and regional level can be considered also as significant. The global financial and economic crisis has deepened the problems and imbalance on the labour market. Negative effects of the crisis on the Slovak labour market (employment and unemployment) occurred with a certain time lag, but more intensely. Negative development on the labour market continued after 2009, despite the fact that until 2013 there was created about 81,000 jobs as a result of SF and CF investments. Based on the econometric model, SF and CF support should generate in total 110,000 jobs until 2015, of which 37% would be classified as sustainable (occupied for the period of 3 years).

The highest number of jobs will be created in the sector of services, where the multiplier effect of higher demand for job creation is the most evident. Following the implementation of Cohesion policy, the highest proportion of additional jobs will be created in the construction sector. In 2015 it is expected to create more than 40,000 additional jobs in this sector, but their sustainability is lower compared to other sectors, only 15%. Implementation of SF and CF on employment in the industry sector has a significantly different effect. In the last year of implementation (2015), we expect a growth of 10,000 jobs in the industry compared to a scenario of without SF and CF support, but almost all jobs should be sustainable.

In terms of job creation at NUTS 3 level, spill-over effects of economic growth between individual regions are not adequately captured. This limitation is particularly important in the construction sector, where significant part of funds for infrastructure projects overestimates the jobs created and total production. The construction sector is characterized as one of the highest inter-regional mobility of workers, which has to be taken into account when interpreting the model estimates. Bratislava region is greatly influenced by labour migration, while in other regions mobility is rather low and has character of intra-regional mobility.

The CSF multiplier is a comprehensive indicator measuring the effectiveness of the SF and CF, which represents the additional effect of each euro spent from SF and CF on GDP in EUR. Bratislava region has achieved the highest value of CSF multiplier throughout the programming period, which is mainly due to the volume of the financial allocation. Compared to other
regions, Bratislava region received the lowest amount of support from SF and CF, while the share of resources for infrastructure is the lowest among all regions. Increased investment in research and development creates conditions for higher growth potential. High value of CSF multiplier was achieved also thanks to the development of the region, where even a modest amount of spending leads to higher potential growth. On the contrary, the smallest CSF multiplier was recorded in Prešov region, which in 2015 would reach the value of 1.7. In other regions, the value of CSF multiplier ranges between 1.76 to 2.47.

In addition to the sectorial structure of investments from SF and CF, a time aspect of implementation the funds has also a significant impact on the ability to generate additional effects (benefits) in the economy. Delay in absorption at the beginning of the programming period is one of the reasons for high probability of not utilising the whole allocation for 2007 - 2013. More balanced implementation of funds throughout the programming period would lead to increased cumulative effects on the Slovak economy, and likely to further contribute to the mitigation of negative impacts of global economic and financial crisis in Slovakia.
7 Recommendations

Based on main findings and conclusions, recommendations aimed at increasing the efficiency of SF and CF and maximizing the benefits for the development of Slovakia at the national and regional level were formulated. Their main focus is on the increased efficiency of planning and implementation process in the next programming period 2014 – 2020. The main recommendations are summarized in the following paragraphs:

- When preparing the programming period 2014 – 2020, it is necessary to define the objectives and targets of the use of the SF and CF (ESIF). The objectives of Cohesion policy and economic growth support at national and regional level can be contradictory in terms of allocations and the expected cost-effectiveness of implementation. Therefore, it is important to align the objectives of Cohesion policy and its impact on economic development at national and regional level (national vs. regional convergence). Better links between national policies and objectives of Cohesion policy will ensure greater efficiency, as well as long-term sustainability of the ESIF.

- Interventions of SF and CF helped greatly to mitigate the negative impacts of external factors (the crisis), but were not accompanied by structural reforms in the labour market, education system, business environment etc., which resulted in reduced potential effect on the economy. Therefore, it is necessary to intensify efforts in these areas, including funding from ESIF, and to condition the Cohesion policy support by the reform of systems and national policies. As an example, to support education infrastructure and its links to promotion of human resources in education (quality of teachers with adequate financial and non-financial motivation), modern curricula and practices, which are necessary precondition to achieve synergies in this area. Support for increasing the competitiveness of enterprises must be accompanied by measures of economic policies that create stable and predictable conditions for the implementation of long-term investment plans (investment in business R&D and development of innovations). Frequent changes in labour code and other relevant legislation, changes in tax and contribution rates, slow settlement of trade disputes etc. negatively affect the potential positive effects on businesses.

- Implementation of SF and CF in the area of infrastructure is able to create short-term jobs. In pursuing the sustainable employment, it is therefore appropriate to focus resources primarily to industry and services, where the sustainability of jobs is higher. It is important to minimise implementation of programmes/scheme that significantly distort competition at the level of individual industries, sectors or regions.

- Investments in infrastructure are essential from the long term perspective and help to eliminate existing infrastructure gaps and to improve accessibility of regions. The pace of construction, in particular transport infrastructure (motorways and expressways) has long been insufficient and it is necessary to ensure readiness to finance transport infrastructure projects in the programming period 2014 - 2020. Regions without good infrastructure, especially the economically underdeveloped regions, are not able to generate additional growth despite other comparative advantages.

- For building the knowledge economy, it is essential to allocate sufficient funds and national public and private sources (outside of ESIF) to ensure long-term sustainability of investments in science, research and innovation, which were implemented in 2007 – 2013. Investments in this area have, in the long term, the highest multiplier effect on the
economy. However, their long-term return requires a stable environment. A key condition for their positive impact on the national economy is stabilization of human resources, adequate and stable funding from public and private sources (institutional or contractual) in this area.

- Given the importance of implementation of SF and CF, it is necessary to emphasize the complementary nature of these sources to the national public expenditures. For relevant national policies, SF and CF became the major source of funding, particularly for development activities. For the design of national policies, it is essential to provide a sufficient amount of financial resources needed for implementation in synergy with the use of SF and CF.

- In relation to the promotion of private sector, there is a need to focus on supporting projects creating overall stimulating conditions for business entities without adverse effects on competition. Private sector entities should be primarily supported through repayable forms of assistance that minimize market distortion and distortion of competition.

- Following the European Commission and other EU Member States, it is necessary for the effective implementation of Cohesion policy to utilise econometric models in a more active manner. Econometric models are widely used in the preparation of national policies and programs, as well as in the evaluation of their effects. In the context of Cohesion policy, it is suitable to supplement macroeconomic analysis of the effects of SF and CF by other qualitative assessments.

- In addition to volume and sectorial investment structure, the ability to generate additional effects of SF and CF and contribute to the development of Slovakia and the regions is significantly affected by absorption capacity. Given the importance of EU assistance and demonstrable benefits for economic development, it is necessary to ensure the start of available resources implementation at the very beginning of the programming period 2014-2020. It requires readiness of the bodies responsible for the management, implementation and control of European Investment and Structural Funds (ESIF), as well as the absorption capacity of beneficiaries. An important aspect to accelerate the use of available resources is effective reduction of administrative burden of processes associated with the implementation of Cohesion policy.

- From an analytical point of view, it is necessary to create a harmonized set of indicators in ITMS, needed to assess the effectiveness of the implementation of projects. Important data needed for evaluation of the effects of SF and CF are indicators of spatial and sectorial levels. This is particularly the disintegration of data at regional level (NUTS 3) and a detailed breakdown of beneficiaries and their suppliers on the basis of the classification of economic activities.

- Given the underperformance of the NSRF objective in the area of competitiveness, it is necessary to strengthen the SF and CF interventions in areas which have the potential to positively affect the current situation (e.g. quality of public administration, science, research and innovation, education, quality of human resources).
8 Bibliography


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9 List of abbreviations, charts and tables in the document (to be completed at the end)

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<thead>
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<th>Description</th>
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<tbody>
<tr>
<td>BA</td>
<td>Bratislava region</td>
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<tr>
<td>BB</td>
<td>Banská Bystrica region</td>
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<tr>
<td>CSF</td>
<td>Community Support Framework</td>
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<tr>
<td>DG JRC</td>
<td>Directorate General Joint Research Centre</td>
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<td>DG Regio</td>
<td>Directorate General Regional and Urban Policy</td>
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<td>EC</td>
<td>European Commission</td>
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<td>ERDF</td>
<td>European Regional Development Fund</td>
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<td>ESF</td>
<td>European Social Fund</td>
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<td>EU</td>
<td>European Union</td>
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<td>HP</td>
<td>Horizontal priority</td>
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<td>ICT</td>
<td>Information and Communication Technologies</td>
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<td>KE</td>
<td>Košice region</td>
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<td>CF</td>
<td>Cohesion Fund</td>
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<td>MRC</td>
<td>Marginalized Roma communities</td>
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<td>NR</td>
<td>Nitra region</td>
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<td>NSRF</td>
<td>National Strategic Reference Framework</td>
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<td>OP IS</td>
<td>Operational Programme Information Society</td>
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<td>OP CaEG</td>
<td>Operational Programme Competitiveness and Economic Growth</td>
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<td>OP E</td>
<td>Operational Programme Education</td>
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<td>OP RaD</td>
<td>Operational Programme Research and Development</td>
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<td>OP EaSI</td>
<td>Operational Programme Employment and Social Inclusion</td>
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<tr>
<td>RE</td>
<td>Renewable energy</td>
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<td>PPP</td>
<td>Purchasing power parity</td>
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<td>PO</td>
<td>Prešov region</td>
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<td>MA</td>
<td>Managing Authority</td>
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<td>E 2020 S</td>
<td>Europe 2020 Strategy</td>
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<td>FCA</td>
<td>Financial Control Administration</td>
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<td>SB</td>
<td>State budget</td>
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<td>OR</td>
<td>Own sources</td>
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<td>Sustainable development</td>
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<td>SUSR</td>
<td>Statistical Office of the Slovak Republic</td>
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Appendix A: Model HERMIN

A1. Reasoning behind choosing the econometric model

The analysis of the impact of cohesion policy is carried out using various qualitative and quantitative methods including model simulations and evaluations based on the econometric models. General motivation behind the analysis of SF (Structural Funds) and CF (Cohesion Funds) is to obtain answers to issues directly connected to the effectiveness of cohesion policy on decreasing regional disparities, effectiveness of distribution of financial resources, and need for reform of cohesion policy in case of new member countries being admitted to the EU. First attempts at evaluation of cohesion policy using econometric models were conducted using model simulations with HERMES model. However, this model was only used for Ireland. Successor to the HERMES model was the HERMIN model, which covered a larger geographic area within the EU. At the beginning of 1990s, the HERMIN model was used to evaluate the impact of SF and CF in Ireland and Portugal, later including also Greece and Spain. Within the first decade of the new millennium, European Commission (EC) has created a HERMIN model for all 27 EU member countries. In addition to the HERMIN model, EC used QUEST model for analysis of the cohesion policy (Varga and in’t Veld, 2009), model QUEST being a demand-oriented type of model. Recently, the effort is being exerted to find successors to these models resulting in creation of various alternative types of modeling approaches (MASST, EuImpactMod, RHOMOLO, GMR-EUROPE and others). However, these models still face difficulties with real application.

Majority of functioning regional models in Europe use NUTS 2 regional segmentation standards. However, following the decentralization of Slovakia in 1996 the regions used can be categorized according to NUTS 3 classification, i.e. local administrative units. Thus the evaluation was carried out on NUTS 3 level and on the national level.

The Directorate-General for Regional and Urban Policy of European Commission (DG REGIO) has been using macroeconomic models to evaluate the impact of cohesion policies on countries and regions within EU for decades. Most commonly used were the HERMIN model and the QUEST III model. The HERMIN model was developed in 1980s and was commonly used and
updated. It is a macroeconomic structural model that uses econometrically estimated parameters. QUEST III model was developed and used by Directorate-General for Economic and Financial Affairs (DG ECFIN). It is a DSGE (Dynamic stochastic general equilibrium) type of model based on macroeconomic principles. Both above-mentioned models were successfully used for several decades, however, their disadvantage was that they provided results only on macro-level, not fulfilling DG REGIO’s need for research on impacts of policy cohesion on regional levels. Therefore possible extensions of existing models were analyzed. European Commission concluded that none of the existing models is able to fulfill all the set up objectives and thus development of a new regional model was needed. As a consequence, European Commission and Joint Research Centre (JRC) is developing RHOMOLO model (RHomolo: A Dynamic Spatial General Equilibrium Model for Assessing the Impact of Cohesion Policy, JRC Technical Report, 2013) as a comprehensive successor of previous models, being a regional dynamic and multi-sector spatial general equilibrium model. Major advantage of this model is its completeness and ability to capture so-called spatial spill-over effects and mutual dependencies between regions. Its major flaw is the need for a large set of input data, which are sometimes not included in national statistical databases or are often not available in the required form. Consequently, a new regional model was developed in Poland, using the principles of the HERMIN model. Major advantage of this regional econometric model is its relatively easy structure, enabling the analysis of the impacts of cohesion policy on the regional level. It is applicable for small open economies and functions also with limited data availability. Major flaw is the inability to capture the above-mentioned spill-over effects.

Other models used for modeling impacts of policy cohesion are model EUImpactMod and model MASST. EUImpactMod was specifically developed for V4 countries by Polish institute IBS (Instytut Badań Strukturalnych) as an alternative to the HERMIN model. It is a DSGE model that uses micro- and macroeconomic data. Its major goal was to research the impact of cohesion policy in V4 countries on EU-15 countries. The analysis showed that the impact of cohesion policy in V4 countries translated into significant increase in their performance and consequently also into increase of consumption, investment, and demand, which pertains to a great extent to goods and services from EU-15 countries.

A more complex alternative is the MASST (Macroeconomic Sectoral, Social and Territorial) model, which combines an econometric model of growth on national and NUTS 2 regional level with a simulating algorithm that forecasts medium- and long-term trends of real economic growth as well as certain demographic variables, such as population and migration for each EU-27 country and each one of the 259 regions of European countries. This model is unique in its use of top-down design, meaning that regional growth is dependent on the national growth and consequently due to the feedback-loop mechanism and bottom-up process the national growth depends on regional growth with a year delay. Equations on macro level are estimated using standard econometric approach and equations on regional levels include the spatial effect. The downside of this type of model is intense database that is required on both national and regional level.

A.1.1 RHOMOLO model

RHOMOLO, a regional holistic model, is currently being developed and administered by EC, JRC, and Dutch TNO (Organization for Applied Scientific Research). It is a multi-sector regional dynamic general equilibrium model with features of endogenous economic growth. At the moment, the model is being tested in five European countries on regional levels: Germany
(NUTS I – due to small size of NUTS 2 regions), Poland (NUTS II), Slovakia (NUTS II), Czech Republic (NUTS II), and Hungary (NUTS II). Economic, social, and environmental factors are integrated into one framework in the model. RHOMOLO can be used for both ex-post and ex-ante evaluation of cohesion policy impact. It enables simulation and comparison of various political scenarios. The most important attributes of the model are:

- connection of regions through a new economic-regional framework
- it is dynamic and based on the endogenous economic growth approach
- it includes a detailed and elaborate public sector enabling simulation of public sector intervention
- it includes a built-in multiple level governance framework

Each country included in the RHOMOLO model is disaggregated into several regions. The ties between the regions are reflected in flows of goods and services and migration flows. Trade between regions is determined by an inclination towards consumption from a specific region, price levels, and costs of shipping. Migration flows between regions are considered individually in each country and are influenced by the ratio of real wage in the region to the national average and by the ratio of unemployment rate in the region to the national unemployment level. Regions with a higher real wage and lower unemployment rate will produce higher net migration. Each NUTS 2 or NUTS 1 region includes certain economic agents such as households, production sector, and regional and national government.

RHOMOLO is a dynamic model that generates various social, economic, and environmental outputs until 2030. The economic growth rate is determined by the investments into research and development (R&D) and education. These investments allow a certain region to catch up to the technology leader region. Time periods are connected through investments and savings. Households save a certain fraction of income during each period. These savings are then distributed to production sectors in each region through investment banks. Allocation of investments depends on the profitability of the sector. Currently, this model is still in its testing phase as a complex model for simultaneous estimation of impacts in all included regions, while a development of this type of model for individual countries is not being considered at the moment. Due to the above mentioned circumstances, this model is inapplicable for the evaluation of impacts of SF and CF in Slovakia.

### A.1.2 QUEST model

QUEST model is a global macroeconomic model used by DG ECFIN for macroeconomic analysis and research. It uses a neo-Keynesian dynamic stochastic general equilibrium type of model (DSGE model), which is considered to be the contemporary type used for econometric modeling. These models are based on the microeconomic principles of profit and utility maximization. QUEST III was estimated for Eurozone and USA based on the Bayesian methods of parameter estimation. DG ECFIN developed several models to test various scenarios differing in disaggregation of sectors and regions. The model can be applied to research interaction effects between monetary and fiscal policy. Another version of the model was developed to analyze structural reforms. It considers investments into tangible and intangible assets as well as disaggregated unemployment based on three different education levels. Additionally, there is a version that allows the analysis of various climate changes and energy policies. All these versions include certain disaggregation of the Eurozone, EU27, or other unit. The model is not designed to be applicable for regions of individual countries, but rather for larger entities.
The model assumes open economies and exogenous tax rates, world prices, and world demand. Domestic products are not perfect substitutes to the foreign products. The model economy consists of households, firms, and a monetary and fiscal authority. The monetary and fiscal authority is based on the principles of stabilization policy that is predefined. The model distinguishes between households that have liquidity limited by their disposable income and households that have full access to the financial markets. Households with limited disposable income can only consume the income they earn and are not able to borrow to achieve the optimal level of consumption. Households with full access to the financial markets are able to realize the optimal level of consumption, which determines the decisions about financial and real capital investments.

Models RHOMOLO and QUEST belong to the category of computable general equilibrium models. Major differences are:

- RHOMOLO is a regional model that considers trade and migration between regions,
- RHOMOLO includes a more detailed production technology structure,
- RHOMOLO includes more detailed sector structure,
- RHOMOLO considers not only economic but also environmental and social aspects,
- RHOMOLO includes a less detailed financial sector structure,
- RHOMOLO does not include the so-called forward-looking features,
- Both models have a similar labor market, unemployment, and wage structure,
- Both consider government spending on the national level,
- Both models are based on the models with endogenous growth.

A.1.3 HERMIN model

The origins of the HERMIN model come from the complex, multi-sector HERMES model that was developed by EC at the beginning of the 1980 (d’Alcantara and Italianer, 1982). HERMIN was originally designed to be a smaller version of the HERMES model in order to be applicable in circumstances of decreased data availability; e.g. in poorer, less-developed member countries and EU regions of western and southern periphery (Ireland, Northern Ireland, Portugal, Spain, Italian Mezzogiorno, and Greece). Due to the limited data availability and sufficiently long time series without structural changes, the model used had to be based on a simple theoretical framework. This relative simplicity is one of the major advantages of the HERMIN model.

One of the basic characteristics of the general HERMIN model is that it considers a small open economy. The theoretical model also considers the cohesion policy structure. The model creation and structure need to satisfy certain basic requirements:

- The economy needs to be split into a small amount of sectors that can identify key structural changes in the economy during the researched period.
- It needs to specify a mechanism that connects the economy with the „outside world“ and captures international trade of goods and services, inflation transfers, migration of workforce, as well as foreign direct investment. Outside (or world) economy is an important direct and indirect factor that influences economic growth and convergence of the country with the developed EU countries.
- Production in individual sectors in the model is depicted by the CES (Constant Elasticity Substitution) and C-D (Cobb-Douglas) functions.
- The creator and user of the model must be able to recognize the conflict between the current state of the economy based on the historical data as described by the HERMIN model and
the future state of the economy approaching an environment dominated by a unified EU market.

The most common way to fulfill these requirements is to use a theoretical model structure of the general HERMIN model, which consists of four sectors: manufacturing sector, which mostly consists of sectors engaged in international trade, service sector, which mostly consists of sectors not engaged in international trade and that comprise the domestic supply, agriculture sector, and public sector.

Looking at the production side, the model consists of three major blocks: supply, demand, and the allocation of incomes in the economy. The model is constructed as an integrated system of equations with connections between individual blocks and sectors. It is founded on the Keynesian assumptions and mechanisms that comprise the core of the model. In substantiated cases it included certain features from the neoclassical economic theory, specifically in the demand block. For instance, manufacturing sector outputs are not simply determined by the demand, rather the model considers potential impacts of price and cost competition. It reflects the assumption that firms seek places and countries that allow them to minimize production costs. The demand for production factors in manufacturing and service sectors is derived from the cost minimizing production function with constant elasticity substitution.

Within the supply block, the HERMIN model describes the aggregate supply (outputs of individual sectors), output prices, nominal wage index, wage inflation, competitiveness, demand for labor, and demand for investments. Additionally, the block includes equations of aggregate labor supply, unemployment, and labor force migration. The demand block includes the equations for modeling domestic consumption, domestic demand, and net balance of international trade. The block of income allocation includes equations used for computing public sector expenses, income, household disposable income, public deficit, public debt, as well as current account balance.

The application of the model on the regional level was developed in Poland, where the region (in case of Poland NUTS II) is considered to be a separate satellite model with a connection to the national data.

A.1.4 MASST model

MASST model allows for research of various alternatives of economic progress based on specifically chosen policy scenarios, i.e. it is a modeling tool able to forecast the economic growth on a regional level as well as the impacts of various national and transnational policy scenarios on the well-being of the region. In general, MASST model is a multiple equation econometric model suitable for proposing and evaluating various policy strategies, even though it is not a typical general equilibrium model. The model consists of two interconnected parts, the national and regional blocks. A major part of the model consists of so-called simulation algorithm that enables the interconnection between the two blocks. This feedback mechanism ensures the consideration of the impact of the national and regional policy on both national and regional growth and on the income allocation among the regions.

National block is based on the “standard” macroeconomic model for EU-27. By standard, it is meant that this type of model was used in the 70s and 80s by the governments and national banks to support political decisions (Chizzolini, 2005 MASST: a forecasting model of regional growth). Only the goods and services markets are specified in the model. Prices, wage, exchange rate, and interest rate are considered to be exogenous variables. On one hand, this
could be considered a pitfall of the model design; however, the authors note that this model fully satisfies their needs and that the above mentioned exogenous variables are basically tools of economic policy (interest rate, exchange rate and public spending) or policy goals (inflation).

The regional block of the model is unique among other regional models due to the feedback loop, which is rarely a part of these types of models. Most models use top-down or bottom-up approach. MASST model first uses the top-down approach. Real national growth is transformed into real regional growth. The real regional growth is equal to the real national growth adjusted for the characteristics of the region. As opposed to other models, MASST model estimates a coefficient reflecting the characteristics of the model, i.e. authors try to find out why certain regions grow faster in the short run compared to other regions in the same country. Using a quasi-production function, the factor estimating the difference between regional and national growth is depicted as a reduction function of economic and labor resources, structural and sector characteristics, spatial effects, integration processes, and geographical attributes. The variables describing labor capital, physical capital, infrastructure, sector characteristics and geographical attributes such as structural funds are considered to be exogenous. The effects such as potential growth of labor force, population growth, spill-over effects, and impact of integration between regions are considered predetermined variables, i.e. they influence the estimated coefficient of the difference between national and regional growth with a year delay.

Demographic block is a separate part of the model, where the population depends on the migration, mortality, and fertility. Migration is modeled for three separate age categories and it depends on the delayed per-capita income in the neighboring regions and on a number of specific indicators characterizing local labor market and geographical attributes. Simulation procedure considers the growth potential of the available regional production factors used for the national economic growth in the next year, which means that it allows for the national and regional growth to be consistent in each researched year.

A.1.5 EuImpactMod model

EUImpactMOD V4 is a structural econometric model belonging to the DSGE model category. It possesses all the general characteristics typical to DSGE models. Additionally, some characteristics are distinctive:

- it considers the influence of the EU and its help through structural funds.
- it is a multi-sector model able to analyze the impact of structural funds on specific sectors
- it has a built-in government block, which significantly determines the economy progress though the decisions about the allocation of structural funds;
- EU funds are divided into three categories: transfers, investments, and improvement of human capital. This division allows for separate analysis of each category’s impact on the economy.

EUImpactMOD V4 is a model of an open economy, consisting of the domestic economy and foreign economy in form of the EU countries. Foreign countries are modeled in the same manner as the domestic economy, i.e. they have the same entities, sectors, and markets as the domestic economy. The difference between the foreign and domestic economy arises from the difference in parameter estimation of individual parts of the model. It is important to note that the model closely captures the relationships between the V4 countries and the EU. As
mentioned above, it is a multi-sector model; specifically, the model distinguishes between these sectors:

- Agriculture sector (agriculture, forestry, hunting, fishery)
- Manufacturing sector (light industry, heavy industry, energy industry, construction, mining)
- Service sector (retail, financial services, public services, transport, and other services)

The model assumes the economy to be controlled by the government, which raises revenue from the value added tax, the corporate income tax, the individual income tax, and from the profits of the central bank. Financial resources are being spent based on the predetermined set of goals. Specifically, the government allocates the resources into public spending, investments into infrastructure (transportation, communication, or environmental infrastructure and into social infrastructure, such as healthcare), and into subsidies for businesses in various sectors.

A2. Justification of choosing model HERMIN

The most suitable model for analyzing the impact of cohesion policy in Slovakia seems to be the HERMIN type of model, due to the fact that it was designed for application on small open economies with limited data availability. While QUEST III and RHOMOLO models use a more advanced modeling apparatus and are much more complex, their application in Slovakia is questionable or rather inapt due to the aforementioned lack of data accessibility on the regional level. RHOMOLO model is still in its testing phase and is not applicable for individual countries. QUEST III model is only applicable to the limited degree on the national level.

Similar national level limitation of the HERMIN model was partly eliminated during the development phase in Poland, where a new type of HERMIN model was designed that is capable of analysis on the regional level. Another adjustment of the model is expected in the evaluation work. The major advantage is the suitable model structure that does not pose excessive requirements on the input data as well as the comprehensiveness of the output interpretation. The inclusion of certain features from the QUEST model (such as microeconomic decision-making of market agents) remains questionable. This possibility needs to be empirically examined on the regional level. Another option is to acquire the combination of top-down and bottom-up approach from the MASST model. Similarly, this option needs to be empirically tested on both regional and national level. EUImpactMod V4 model is not suitable for the evaluation, as it does not include the regional dimension and will therefore not be considered.

The evaluator set an ambitious goal to design and create a regional HERMIN model for Slovakia that would be applicable for both ex-ante and ex-post evaluation of the impact of cohesion policy. Therefore the Polish experts that worked on the development of the Polish regional model and possess experience with it were invited to join the team. It is important to note that the HERMIN model is not able to consider the spill-over effects between regions, as opposed to QUEST III or RHOMOLO models. However, that is the price for the model’s simpler structure and applicability in our circumstances. The adjustment of QUEST III model to the regional framework was not feasible due to time and data constraints.
### A3. Specific application of the HERMIN model

HERMIN types of model have been successfully applied to research the impacts of cohesion policy on the labor market, economic growth, etc. on both national and regional level. This is also one of the reasons why the working team has decided to create two HERMIN types of models for Slovakia on both national and regional level. We will base the methods of the model creation on previous existing and applied models, thus we present a structured overview of the specific HERMIN models that were applied in both EU as well as outside the union.

#### A.1.6 HERMIN model applications in Slovakia

<table>
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<tr>
<th>Name of the project</th>
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<tbody>
<tr>
<td>Ex-ante evaluation</td>
<td>The HERMIN model was created and applied for the evaluation of the</td>
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<td>of the National</td>
<td>impacts of EU funds allocation.</td>
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<td>strategic reference</td>
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<td>framework 2007 –</td>
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<td>2013</td>
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<td>of the Partnership</td>
<td>impacts of EU funds allocation.</td>
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<td>Agreement of</td>
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<td>Slovakia for 2014</td>
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<td>– 2020</td>
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#### A.1.7 HERMIN model applications abroad

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<td>Support to the</td>
<td>Advisory work for the Ministry of Labor and Social Policy FYROM.</td>
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<tr>
<td>national employment</td>
<td>Development of the HERMIN model for the Republic of Macedonia</td>
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<tr>
<td>policy</td>
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</tbody>
</table>

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**Table 1 Overview of functionalities and technical specifications of the econometric models**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>RHOMOLO</th>
<th>QUEST III</th>
<th>MASST</th>
<th>EUImpactMod</th>
<th>HERMIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model type</td>
<td>DSGE</td>
<td>DSGE</td>
<td>Econometric</td>
<td>DSGE</td>
<td>Econometric</td>
</tr>
<tr>
<td>Includes sectors</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Demand and supply side</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Data-demanding</td>
<td>Extreme</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Regionalization</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Spill-over effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Application for 1 country</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Complexity</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Time-demanding</td>
<td>Extreme</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Suitability for Slovakia</td>
<td>No</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
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Source: Working team
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<td>The economic return of cohesion expenditure for EU member states</td>
<td>Analysis of the economic returns of structural and cohesion policy expenditure (ERDF and Cohesion Fund) to net contributors to the EU budget, (“donor” member states).</td>
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<td>Analysis of the Impact of Cohesion Policy</td>
<td>Ex-ante evaluation of NSRFs for all “convergence” countries and two macro-regions (East Germany and the Italian Mezzogiorno), for inclusion in the European Commission’s 4th Cohesion Report.</td>
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<tr>
<td>Quantitative Assessment of the Estimated Impact of the NDP/NSRF using a Macroeconomic model for the Czech Republic</td>
<td>Design, construction and testing of a HERMIN model for the Czech Republic and use of the new model to carry out an ex-ante evaluation of the Czech Structural and Cohesion Funds for the period 2004-2006</td>
</tr>
<tr>
<td>Macro-economic impact of the Estonian National Development Plan 2004-</td>
<td></td>
</tr>
<tr>
<td>Name of the project</td>
<td>Content</td>
</tr>
<tr>
<td>--------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Analysing the macroeconomic impacts of EU Structural Policies 2000-2006 in Saxony-Anhalt (Germany)</td>
<td>Ex-ante evaluation of NSRFs for all “convergence” countries and two macro-regions (East Germany and the Italian Mezzogiorno), for inclusion in the European Commission’s 3rd Cohesion Report.</td>
</tr>
<tr>
<td>Evaluation of impacts of Polish NDPs</td>
<td>Designed, implemented and applied a HERMIN-type model of the German region of Sachsen-Anhalt to the mid-term analysis of the Structural Funds for 2000-2006.</td>
</tr>
<tr>
<td>Construction of the prototype national HERMIN model for Poland, incorporating mechanism to facilitate an initial ex-ante evaluation of the draft Polish NDP 2004-2006. Subsequent development of that model, and further applications to NDP analysis. Development of a disaggregated version of the Polish model. Design, development and implementation of a series of 16 regional HERMIN-type models for use in the ex-ante analysis of the Regional Operational Programmes in the voivodship Marshal planning offices. A series of training sessions with the Ministry and all voivodships in the use of the models.</td>
<td></td>
</tr>
</tbody>
</table>

Source: [http://www.herminonline.net/index.php/projects](http://www.herminonline.net/index.php/projects)

A4. **Keys aspects of the HERMIN model**

**Supply side**

**Manufacturing sector**

Output = f1 (world demand, domestic demand, price competitiveness, time)

Employment = f2 (output, relative ratio of input prices, time)

Investments = f3 (output, relative ratio of input prices, time)

Capital stock = Investments + (1-d) Capital stock t-1

Output price = f4 (world prices*exchange rate, unit labor costs)

Nominal wage index = f5 (output price, tax incidence, unemployment, labor productivity)

Competitiveness = Domestic output price/ World output price
Construction sector
Output = f6 (overall investments in the construction sector)
Employment = f7 (output, relative ratio of input prices, time)
Investments = f8 (output, relative ratio of input prices, time)
Capital stock = Investments + (1-d) Capital stock t-1
Output price = Derived from the unit labor costs
Wage inflation = Derived from the wage inflation in the manufacturing sector

Market services sector
Output = f9 (world demand, domestic demand)
Employment = f10 (output, relative ration of input prices, time)
Investments = f11 (output, relative ratio of input prices, time)
Capital stock = Investments + (1-d) Capital stock t-1
Output price = Derived from the unit labor costs
Wage inflation = Derived from the wage inflation in the manufacturing sector

Agriculture and non-market services sector: exogenous, control variables.

Labor supply and unemployment
Population growth = f12 (natural growth, migration)
Labor supply = f13 (population, participation rate of economically active population)
Unemployment = Economically active population – Overall employment
Migration = f14 (relative expected wage)

Modeled relationships of the aggregate demand (absorption)
Consumption = f15 (household disposable income)
Domestic demand = Private and public consumption + Investments + Change in reserves
Net exports = Total output – Domestic demand

Modeled relationships of the income allocation
Public sector expenses = f16 (output prices, import prices, rate of indirect taxes)
Income = Total output
Household disposable income = Income + Transfers – Direct taxes
Current account balance = Net exports + Net factor income
Public deficit = Public sector expenses – Tax rate * Tax Base
Public debt = (1 + interest rate) Public debt t-1 + Public deficit

Exogenous variables:
Foreign: world output and prices, interest rates, exchange rate
Domestic: Public spending, tax rates
Assessment of Cohesion Policy Impacts on the Development of Slovakia using a Suitable Econometric Model

Evaluation report 2014
June 2014

- Agriculture (A)
- Manufacturing (B-E)
- Construction (F)
- Market services (G-N)
- Non-market services (O-U)

Investments
Employment
Output
Added value
Labor productivity

Output price
Wages

HERMIN

Private consumption
CPI, GDP deflator, Import deflator
Public sector – public spending
Expenses
Government revenue

- Agriculture (A)
- Manufacturing (B-E)
- Construction (F)
- Market services (G-N)
- Non-market services (O-U)

Labor market requirements
A5. References to the appendix A


Appendix B: Methodology of disaggregation of the data from ITMS

This methodology defines the disaggregation process of SF and CF implementation in supra-regional projects for the purpose of its use in the econometric model. To successfully carry out this task, data about implementation of SF and CF in the period 2007-2013 in each region (NUTS 3) are needed. The suggested approach can be replicated in order to achieve consistent division of data from ITMS, which are needed for the compilation of the aggregate data and their subsequent division into regional units using NUTS 3 categorization. Majority of the projects financed from the SF and CF have a definite place of realization that can be attributed to the specific region. However, a part of the projects is being carried out in a number of countries and therefore the implementation of the financial resources needs to be divided between more than one region. In the following text, projects that are being realized in more than one NUTS 3 region will be denoted as supra-regional projects. In ITMS these projects are characterized as follows: SLOVAK REPUBLIC, NUTS 2 Western Slovakia, NUTS 2 Central Slovakia, NUTS 2 Eastern Slovakia. It is important to note that supra-regional projects are not identical to the national projects. In fact national projects (127 projects) form a subgroup of supra-regional projects (801)\(^{25}\). During the quantification of the SF and CF implementation within the supra-regional projects we recommend to take into account the characteristics of the operational programmes and supported projects, which will allow for a more detailed disaggregation of the data on funds implementation at the regional level.

Technical assistance projects

It is important to note that due to the specific characteristics of technical assistance projects (TA) we deem wise to consider them separately. The total amount of the drawn funds can be established through the identification of the individual policies, within which TA projects were realized. For the majority of the operational programmes we suggest to bind the funding to the Bratislava Self-Governing Region as most of the structures responsible for implementation and oversight of the programmes are located in Bratislava. The exception being the Regional Operation Programme (ROP), for which both the self-governing region in the function of Intermediate body under Managing authority (based on the ratios by the managing authority\(^{26}\)) and Operational programme Environment are responsible for the programme implementation, where a part of the funding is directed at the operation of the regional centers. Additionally, based on the information from each managing authority the technical assistance projects in OP Employment and Social inclusion and OP Education will be evaluated based on the number of regions realizing these projects.

Operational programme Informatisation of society

Almost EUR 390 million were drawn from the OPIS operational programme. Within the whole programme, 83% of the financial resources were used on supra-regional projects. The supra-regional projects are mostly implemented by the public institutions. Majority of these supra-regional OPIS projects have a nation-wide impact. For this reason it is rational to apply the

\(^{25}\) All data presented in this document are based on the ITMS database from 31.12.2013

\(^{26}\) On 31.12.2013 the ratio was BSGR – 70%; TTSGR – 3%; TNSGR, ZSGR, BBSGR – 4%; NRSGR, PSGR, KSGR – 5%
disaggregation of the drawn funds uniformly based on the number of regions, where the project was realized. The major criterion for the disaggregation of the fund implementation onto the regional levels is not the “effect” of the project (number of inhabitants) but rather the administration of the financial resources and their utilization in the regions.

Regional operational programme

The major goal of the Regional operational programme (ROP) is to increase availability and quality of the civil infrastructure and facilities in the regions. Based on the project title it can be expected that all projects are carried out within one region; nevertheless, there are some supra-regional projects. The amount of financial resources used for these supra-regional projects (9 projects) represents only about 2% (EUR 18 million) of the overall amount of drawn funds within the ROP (EUR 1.1 billion). In most cases these projects are managed by the state administration bodies within the TA activities, which are of supportive nature (technical and staffing support of managing authorities, press). The methodology of the disaggregation was described above in the section concerning the technical assistance projects. Among the rest of the supra-regional projects within the ROP, similarly to the OP IS, the method of disaggregation of drawn funds was applied uniformly based on the number of regions, where the project was realized.

Operational programme Technical assistance

The basic goal of the operational programme is to ensure an efficient, effective, and correct administration, implementation, financial management, control, and audit of the structural funds and the cohesion fund for years 2007 – 2013. Overall 139 projects were realized within the Operational programme Technical assistance (OP TA) that targeted technical and staffing, coordinating, strategic, and other similar activities realized on the nation-wide level. Most of the authorized recipients of the OP TA are situated in Bratislava and only a small part in the regions (e.g. regional managers of the Horizontal priority of marginalized Roma communities, regional managers of the Horizontal priority of sustainable development, parts of Financial Control Administration). The results of the analysis by the managing authority of the OP TA reveal that the distribution of the drawn funds was 97.7% for Bratislava region and the remaining 2.3% were uniformly distributed among the remaining 7 regions.

Operational programme Bratislava region

Within the OP BR, all 295 projects were realized within the area of the Bratislava Self-Governing Region. Up till 31.12.2013 over EUR 51 million were drawn.

Operational programme Transport

Within the Operational programme Transport, around EUR 1.5 billion were drawn, of which 18% were used for the supra-regional projects. Overall, 21 projects were identified as supra-regional within the OP D. The supra-regional projects include: modernization of railways and
rolling stock of ZSSK, resolution of the unsatisfactory road conditions, reconstruction of intersections and bridges, and various projects of the Ministry of Transport, Construction, and Regional development (studies, analyses, equipment for the managing authority, etc.). The combination of the collaboration with the managing authority of the OP and the small amount of supra-regional projects enabled the utilization of additional information about the realization of the projects (such as the number of km, place of vehicle use, etc.).

**Operational programme Environment**

Within this OP, almost EUR 850 million were drawn, with 96% of the funds being used for regional projects. The 47 supra-regional projects were dealing with mostly monitoring and evaluation, building and reconstruction of monitoring capacities, various studies, insight, strategies, management, etc. All the projects were dealing with state organizations with nationwide operations (e.g. Slovak Hydrometeorological Institute, Slovak Water-Management Enterprise, Slovak Environment Inspection, etc.), with the exceptions of the AGB ekoservis s.r.o., City of Spišská Nová Ves, SEZO – Spiš, municipalities union, and the Zoological garden Bojnice, therefore we used the location of the project realization as an indicator of the disaggregation of the drawn funds within the NUTS 3 regions.

**Operational programme Competitiveness and Economic Growth**

Within this operational programe, out of 774 projects only 5 are considered supra-regional projects. However, almost 16% of the total available budget (EUR 471.6 million) was used for the supra-regional projects. The supra-regional recipients were GPEÚ, s. r. o., European investment fund, Slovak innovation and energy agency, and Slovak tourist board. All the projects were realized in all NUTS 3 regions except for Bratislava Self-governing Region. The types of projects include advertisement, insight, processing and control of accounting, and initial grants. As similar effects can be expected for individual regions, the information regarding the qualification of the region for the reception of the grants was used for the disaggregation of the funding.

**Operational programme Education**

The goal of this OP is the formation and support of the human capital towards the attainment of basic skills and key competencies necessary in the knowledge economy and the labor market. So far EUR 222 million were used for this purpose. The ratio of the number of regional to the number of supra-regional projects is 9:1; however, the ratio of the financial resources used is 44:56 for regional and supra-regional projects respectively. These projects target mostly education and professional growth of teachers and other educational employees, creation of new educational programmes, development of technical education, professional specialization of students, growth of educational quality and innovative forms of schooling at universities,
competitiveness of Slovakian enterprises, consulting, etc. together with the technical assistance for the OP. Upon consultation with the managing authority of the OP, the criterion used for the regional division of the drawn resources within the supra-regional projects was the number of places, where the projects were realized. However, it is important to note that this division does not sum up to a 100% resource allocation. Nevertheless, even the managing authority cites it as applicable.

Operational project Research and Development

The funds used within this operational programme sum up to over EUR 550 million, of which more than a quarter was used in supra-regional projects. The 108 supra-national projects can be divided into the projects of technical assistance, R&D infrastructure, building of centers of excellence, research and competence, specialized R&D, and modernization of university equipment. Disaggregation of the funds into individual NUTS 3 regions was conducted on the basis of the number of places in the region, where the projects were realized.

Operational programme Employment and Social Inclusion

Out of 1402 projects conducted through this OP, 183 of them were supra-regional projects. The total amount of funds drawn was EUR 586 million, out of which 82% were used for the supra-regional projects. These projects can be divided into three main categories: projects of the Central Office of Labour, Social Affairs and Family (active policies for the labor market), projects of the Ministry of Labour, Social Affairs and Family in Slovak Republic (technical assistance), and other projects (education and development of human resources). Due to the project characteristics the appropriate method of disaggregation of the fund implementation was based on the project information about the regional justification of the fund implementation.

Operational programme Health

Quality improvement, availability, and efficiency of healthcare together with the support of health are among the top priorities of this OP. Overall almost EUR 212 million (EU source) were used up till 31.12.2013 for achieving these goals, with 97% of the funds used for regional projects. The only supra-regional project up to date is the national project of the Completion of infrastructure of the National Transfusion Service of Slovakia in the amount of around EUR 6.1 million (EU source), which was realized in 14 locations in Slovakia (including 3 cities in Bratislava Self-Governing Region). Even though the ITMS does not allow following the project resources in individual regions, it is still possible to identify the fund implementation in individual regions using the supporting documents attached to each request of payment.
Appendix C: Additional overviews

C.1 What is the quantification of impacts of SF and CF implementation on the overall performance of the Slovak economy on national and on regional level?

Table 1: Gain in average gross wage due to the SF and CF

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</table>

Source: authors’ calculations

Table 2: Gain in household consumption due to SF and CF in EUR millions

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<th>PO</th>
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<td>590.1</td>
<td>298</td>
<td>444.1</td>
<td>3064.6</td>
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</table>

Source: authors’ calculations
### C.8 Has the value added in sectors of national economy of the Slovak Republic change or increase due to implementing SF and CF?

**Table 1: Proportion of increase in gross value added generated through SF and CF implementation, Bratislava region**

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Together</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
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<tr>
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<tr>
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<td>0.4%</td>
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<td>2015</td>
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<td>0.9%</td>
<td>2.5%</td>
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</table>

*Source: authors’ calculations*

**Table 2: Proportion of increase in gross value added generated through SF and CF implementation, Banska Bystrica region**

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
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*Source: authors’ calculations*
Table 3: Proportion of increase in gross value added generated through SF and CF implementation, Kosice region

<table>
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<td>5.3%</td>
<td>43.5%</td>
<td>10.6%</td>
<td>2.9%</td>
<td>10.2%</td>
</tr>
</tbody>
</table>

Source: authors’ calculations

Table 4: Proportion of increase in gross value added generated through SF and CF implementation, Bratislava region

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Together</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.1%</td>
<td>2.8%</td>
<td>0.6%</td>
<td>0.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>0.5%</td>
<td>7.1%</td>
<td>1.6%</td>
<td>0.5%</td>
<td>1.4%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>1.3%</td>
<td>13.8%</td>
<td>3.4%</td>
<td>1.1%</td>
<td>3.0%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>2.0%</td>
<td>19.2%</td>
<td>4.8%</td>
<td>1.7%</td>
<td>4.2%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>2.5%</td>
<td>17.0%</td>
<td>4.8%</td>
<td>1.7%</td>
<td>4.2%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>3.0%</td>
<td>19.2%</td>
<td>5.6%</td>
<td>1.9%</td>
<td>4.8%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>3.5%</td>
<td>22.6%</td>
<td>6.6%</td>
<td>2.3%</td>
<td>5.7%</td>
</tr>
</tbody>
</table>

Source: authors’ calculations
### Table 5: Proportion of increase in gross value added generated through SF and CF implementation, Presov region

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.1%</td>
<td>4.1%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>0.8%</td>
<td>14.6%</td>
<td>2.5%</td>
<td>0.8%</td>
<td>3.3%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>2.4%</td>
<td>26.0%</td>
<td>5.1%</td>
<td>1.8%</td>
<td>6.3%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>3.5%</td>
<td>32.8%</td>
<td>6.4%</td>
<td>2.3%</td>
<td>7.5%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>4.9%</td>
<td>44.2%</td>
<td>7.9%</td>
<td>2.6%</td>
<td>9.3%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>6.5%</td>
<td>47.9%</td>
<td>9.3%</td>
<td>3.1%</td>
<td>11.0%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>8.4%</td>
<td>61.9%</td>
<td>11.2%</td>
<td>3.8%</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Source: authors’ calculations

### Table 6: Proportion of increase in gross value added generated through SF and CF implementation, Trecin region

<table>
<thead>
<tr>
<th></th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.5%</td>
<td>13.1%</td>
<td>2.4%</td>
<td>0.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>1.6%</td>
<td>26.9%</td>
<td>4.8%</td>
<td>0.6%</td>
<td>4.7%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>3.1%</td>
<td>20.4%</td>
<td>5.2%</td>
<td>0.9%</td>
<td>4.7%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>4.3%</td>
<td>25.9%</td>
<td>6.8%</td>
<td>1.4%</td>
<td>6.2%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>6.6%</td>
<td>50.9%</td>
<td>10.9%</td>
<td>1.8%</td>
<td>9.9%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>9.4%</td>
<td>60.0%</td>
<td>13.8%</td>
<td>2.4%</td>
<td>12.7%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>13.3%</td>
<td>80.7%</td>
<td>17.9%</td>
<td>3.2%</td>
<td>16.8%</td>
</tr>
</tbody>
</table>

Source: authors’ calculations
### Table 7: Proportion of increase in gross value added generated through SF and CF implementation, Trnava region

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.1%</td>
<td>2.2%</td>
<td>0.6%</td>
<td>0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>0.4%</td>
<td>5.8%</td>
<td>1.7%</td>
<td>0.3%</td>
<td>1.2%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>1.2%</td>
<td>10.8%</td>
<td>3.4%</td>
<td>0.6%</td>
<td>2.5%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>1.9%</td>
<td>16.3%</td>
<td>5.1%</td>
<td>1.0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>2.5%</td>
<td>15.5%</td>
<td>5.5%</td>
<td>1.2%</td>
<td>4.2%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>3.1%</td>
<td>15.8%</td>
<td>6.4%</td>
<td>1.4%</td>
<td>4.9%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>3.8%</td>
<td>18.6%</td>
<td>7.6%</td>
<td>1.6%</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

*Source: authors’ calculations*

### Table 8: Proportion of increase in gross value added generated through SF and CF implementation, Zilina region

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Manufacturing</th>
<th>Construction</th>
<th>Market services</th>
<th>Non-market services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2008</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>2009</td>
<td>0.0%</td>
<td>0.4%</td>
<td>10.4%</td>
<td>2.3%</td>
<td>0.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>2010</td>
<td>0.0%</td>
<td>1.6%</td>
<td>21.7%</td>
<td>5.1%</td>
<td>0.9%</td>
<td>5.4%</td>
</tr>
<tr>
<td>2011</td>
<td>0.0%</td>
<td>3.1%</td>
<td>19.2%</td>
<td>6.1%</td>
<td>1.8%</td>
<td>6.1%</td>
</tr>
<tr>
<td>2012</td>
<td>0.0%</td>
<td>4.1%</td>
<td>23.3%</td>
<td>7.8%</td>
<td>2.1%</td>
<td>7.5%</td>
</tr>
<tr>
<td>2013</td>
<td>0.0%</td>
<td>4.9%</td>
<td>22.3%</td>
<td>8.4%</td>
<td>2.3%</td>
<td>7.7%</td>
</tr>
<tr>
<td>2014</td>
<td>0.0%</td>
<td>5.8%</td>
<td>25.5%</td>
<td>9.6%</td>
<td>2.6%</td>
<td>8.9%</td>
</tr>
<tr>
<td>2015</td>
<td>0.0%</td>
<td>6.8%</td>
<td>31.0%</td>
<td>11.4%</td>
<td>3.1%</td>
<td>10.6%</td>
</tr>
</tbody>
</table>

*Source: authors’ calculations*
Chart 57: Additional proportion of the gross value added of the manufacturing sector to the overall gross value added created by SF and CF

Source: authors’ calculations

Chart 58: Additional proportion of the gross value added of the non-market services sector to the overall gross value added created by SF and CF

Source: authors’ calculations
Chart 59: Additional proportion of the gross value added of the agriculture sector to the overall gross value added created by SF and CF

Source: authors’ calculations
C.11 Are the objectives of the Europe 2020 Strategy being met in individual areas of economy and are the disparities among individual regions of SR being diminished as a result?

Table 1: Available budget and paid grants for the operational programmes in the field of intellectual growth on 31.12.2013

<table>
<thead>
<tr>
<th>Operational Programme</th>
<th>Budget Available</th>
<th>Paid grants EU</th>
<th>Paid grants ŠR</th>
<th>Paid grants total</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Research and Development</td>
<td>1 176 761 158</td>
<td>539 405 483</td>
<td>77 208 219</td>
<td>616 613 701</td>
</tr>
<tr>
<td>OP Education</td>
<td>443 049 839</td>
<td>185 295 797</td>
<td>27 969 946</td>
<td>213 265 743</td>
</tr>
<tr>
<td>OP Employment and Social Inclusion</td>
<td>75 350 000</td>
<td>33 820</td>
<td>5 968</td>
<td>39 788</td>
</tr>
<tr>
<td>OP C and EG</td>
<td>523 617 374</td>
<td>245 682 683</td>
<td>41 358 152</td>
<td>287 040 835</td>
</tr>
<tr>
<td>OP Bratislava region</td>
<td>37 587 460</td>
<td>24 587 688</td>
<td>4 339 263</td>
<td>28 926 951</td>
</tr>
<tr>
<td>OP IS</td>
<td>812 511 519</td>
<td>370 227 711</td>
<td>117 589 238</td>
<td>487 816 949</td>
</tr>
<tr>
<td>ROP</td>
<td>429 000 000</td>
<td>453 135 685</td>
<td>54 766 691</td>
<td>507 902 376</td>
</tr>
<tr>
<td><strong>Total sum</strong></td>
<td><strong>3 497 877 350</strong></td>
<td><strong>1 818 368 866</strong></td>
<td><strong>323 237 477</strong></td>
<td><strong>2 141 606 344</strong></td>
</tr>
</tbody>
</table>

Source: ITMS, authors’ calculations

Table 2: Available budget and paid grants for the operational programmes in the field of inclusive growth on 31.12.2013

<table>
<thead>
<tr>
<th>Operational Programme</th>
<th>Budget Available</th>
<th>Paid grants EU</th>
<th>Paid grants ŠR</th>
<th>Paid grants total</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Education</td>
<td>92 919 676</td>
<td>19 894 201</td>
<td>3 510 769</td>
<td>23 404 971</td>
</tr>
<tr>
<td>OP Employment and Social Inclusion</td>
<td>830 679 515</td>
<td>558 584 293</td>
<td>97 158 169</td>
<td>655 742 462</td>
</tr>
<tr>
<td>OP Health</td>
<td>242 175 000</td>
<td>207 474 321</td>
<td>36 366 924</td>
<td>243 841 245</td>
</tr>
<tr>
<td>OP C and EG</td>
<td>18 500 000</td>
<td>73 426</td>
<td>12 958</td>
<td>86 384</td>
</tr>
<tr>
<td>OP Bratislava region</td>
<td>5 000 000</td>
<td>3 000 000</td>
<td>529 412</td>
<td>3 529 412</td>
</tr>
<tr>
<td>ROP</td>
<td>262 357 043</td>
<td>133 246 219</td>
<td>19 357 641</td>
<td>152 603 860</td>
</tr>
<tr>
<td><strong>Total sum</strong></td>
<td><strong>1 451 631 234</strong></td>
<td><strong>922 272 461</strong></td>
<td><strong>156 935 873</strong></td>
<td><strong>1 079 208 334</strong></td>
</tr>
</tbody>
</table>

Source: ITMS, authors’ calculations

Table 3: Available budget and paid grants for the operational programmes in the field of sustainable development on 31.12.2013

<table>
<thead>
<tr>
<th>Operational Programme</th>
<th>Budget Available</th>
<th>Paid grants EU</th>
<th>Paid grants ŠR</th>
<th>Paid grants total</th>
</tr>
</thead>
<tbody>
<tr>
<td>OP Transport</td>
<td>3 112 051 026</td>
<td>1 537 563 252</td>
<td>344 225 748</td>
<td>1 881 789 000</td>
</tr>
<tr>
<td>OP Environment</td>
<td>1 771 400 000</td>
<td>822 026 770</td>
<td>118 933 256</td>
<td>940 960 026</td>
</tr>
<tr>
<td>OP C and EG</td>
<td>395 826 401</td>
<td>209 418 833</td>
<td>35 065 301</td>
<td>244 484 134</td>
</tr>
<tr>
<td>OP Bratislava Region</td>
<td>49 140 147</td>
<td>21 910 060</td>
<td>2 577 655</td>
<td>24 487 715</td>
</tr>
<tr>
<td>ROP</td>
<td>817 918 384</td>
<td>494 329 229</td>
<td>59 359 521</td>
<td>553 688 571</td>
</tr>
<tr>
<td><strong>Total sum</strong></td>
<td><strong>6 146 335 958</strong></td>
<td><strong>3 085 248 145</strong></td>
<td><strong>560 161 481</strong></td>
<td><strong>645 409 626</strong></td>
</tr>
</tbody>
</table>

Source: ITMS, authors’ calculations
C.13 To what extent was fulfilled long-term sustainability of existing and newly created jobs by SF and CF in selected sectors?

Table 1: Job creation on the regional level in each sector

<table>
<thead>
<tr>
<th>Region</th>
<th>Construction</th>
<th>Manufacturing</th>
<th>Market services</th>
<th>Total</th>
<th>Construction</th>
<th>Manufacturing</th>
<th>Market services</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bratislava Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of sustainable jobs in thousands</td>
<td>14%</td>
<td>0.00%</td>
<td>36%</td>
<td>33%</td>
<td>17%</td>
<td>93%</td>
<td>45%</td>
<td>40%</td>
</tr>
<tr>
<td>Number of sustainable jobs in thousands</td>
<td>0.1</td>
<td>0.0</td>
<td>2.1</td>
<td>2.3</td>
<td>0.9</td>
<td>1.6</td>
<td>3.5</td>
<td>6.1</td>
</tr>
<tr>
<td>Number of created jobs in thousands</td>
<td>0.9</td>
<td>0.0</td>
<td>6.9</td>
<td>5.4</td>
<td>1.7</td>
<td>7.8</td>
<td>14.9</td>
<td></td>
</tr>
<tr>
<td>Zilina Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of sustainable jobs in thousands</td>
<td>20%</td>
<td>97%</td>
<td>55%</td>
<td>47%</td>
<td>13%</td>
<td>94%</td>
<td>45%</td>
<td>38%</td>
</tr>
<tr>
<td>Number of sustainable jobs in thousands</td>
<td>0.6</td>
<td>0.7</td>
<td>3.0</td>
<td>4.2</td>
<td>0.4</td>
<td>0.6</td>
<td>2.8</td>
<td>3.9</td>
</tr>
<tr>
<td>Number of created jobs in thousands</td>
<td>2.9</td>
<td>0.7</td>
<td>5.4</td>
<td>9.0</td>
<td>3.1</td>
<td>0.7</td>
<td>6.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Trnava Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of sustainable jobs in thousands</td>
<td>18%</td>
<td>99%</td>
<td>42%</td>
<td>44%</td>
<td>9%</td>
<td>96%</td>
<td>31%</td>
<td>26%</td>
</tr>
<tr>
<td>Number of sustainable jobs in thousands</td>
<td>1.3</td>
<td>3.9</td>
<td>4.9</td>
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Appendix D: Methods for ex-post estimation of regional values for 2012 and 2013

The missing regional data was estimated using the econometric-optimization methods. The econometric-optimization method consisted of value determination of the variable of interest during the uncertain period 2012-2013 based on the partial information consisting of the observed value of the national indicators and various regional factors that influence the variable. The data about their development are currently available at the regional level, e.g. labor market statistics that are published at the same time as the national data. Due to the nature of the HERMIN model, it was essential to include the values of the gross domestic product (GDP), the gross value added (GVA), the employment based on the national accounts (L, ESA), the gross fixed capital formation (GFCF), and the employee rewards (ER) in 5 individual sectors of the economy.

Ex-post estimation of the regional variables is based on the available statistical data and the available methods of data estimation. In general, there are two data sources on the regional level. The most accessible source of the data regarding the labor market is the Labour Force Sample Survey (LFS). At the time of writing, regional data were available for the 1997-2011 periods. The regional accounts, which are created using the production method, i.e. they don’t include the detailed data about the consumption components, was the second source. In spite of that, the regional GDP estimation published by the Statistical office of the Slovak republic using the production method is balanced out by the national data. National level will therefore serve as the boundary for determining the regional data during 2012-2013. As mentioned in the methods part, the lagged publication of the regional accounts is t-2, i.e. currently published data are from 2011. Part of the regional data is estimated using the “partial ex-post analysis” utilizing data that are available for that period.27

The procedure of estimation was chosen based on the need to minimize the level of uncertainty. Firstly, the employment data were established using the European System of Accounts (ESA), with the basis being the sector and regional employment rates published in the Labour Force Sample Survey altered using optimization and sector limitation,

\[ L_{i,o,t}^{ESA} = f\left( L_{i,o,t}^{LFS} \right) + \varepsilon_{t0} \text{ with the boundary } \sum_i L_{i,o,t}^{ESA} = L_{o,t}^{ESA} \]

where \( i \) represents the \( i \)th region, \( o \) represents the sector (5 sectors identical with the model definition) and \( t \) represents the time period. The employment estimation based on the ESA comes from the structure changes indicated in the LFS corrected for the error term from the last observed period \( t_0 \) (2011).

The gross fixed capital formation for each region was estimated using the job creation data

\[ GFCF_{i,o,t} = f\left( GFCF_{i,o,t-1}, L_{i,o,t} \right) \text{ with the boundary } \sum_i GFCF_{i,o,t} = GFCF_{o,t} \]

27 The described method is based on Radvanský (2014), Možnosti analyzovania vplyvu kohéznnej politiky na regióny a trh práce SR. with certain modification and added sector dimension. In this paper, a more detailed reasoning is present behind the parameter estimation of the regional ex-post and ex-ante model using optimization of the control variables of the economic policy.
The question remains on how to deal with the residual from the last observed period that could skew the estimation in the following periods, as the calculated estimates are founded on the long-term stability of the system. One possible solution is to use the value of this residual in the last observed period $\varepsilon_t$, while expecting an exponential return to the long-term trend. We can derive the value of the variable in period $t + \Delta t$ analytically, from the log-log equation estimate

$$\ln(GFCF_{i,o,t}) = \alpha_i + \beta_1,0\ln(GFCF_{i,o,t-1}) + \beta_2,0\ln(GFCF_{i,o,t-1}) + \varepsilon_{i,o}$$

where, after estimation, we can define the parameter of the response to the residual in the period $t+\Delta t$ as $1 + \Delta t \varepsilon_t$. Thus during the forecast of the first missing period ex-post (2012) the value of the parameter of response will have the value $1/2 \varepsilon_t$, in the second period $1/3 \varepsilon_t$, etc. The estimated value of the gross fixed capital formation for $i$th region is therefore

$$GFCF_{i,o,t+\Delta t} = e^{\alpha + \beta_1 \ln(GFCF_{i,o,t+\Delta t-1}) + \beta_2 \ln(L_{i,o,t+\Delta t}) + \frac{1}{1+\Delta t} \varepsilon_t}$$

In case of distortion of the ex-post forecast it is possible to keep the residual constant, using the last observed error term

$$DFK_{i,o,t+\Delta t} = e^{\xi_0 + \beta_1 \ln(DFK_{i,o,t+\Delta t-1}) + \beta_2 \ln(L_{i,o,t+\Delta t}) + k} \text{ where } k = \varepsilon_t$$

with the boundary $\sum_i DFK_{i,o,t} = DFK_{o,t}$

Similar approach of dealing with the error term will also be used with other estimated indicators.

Several methods were analyzed to estimate the values of gross value added. We based our analysis on the assumptions of the production function $GVA_{i,o} = GVA_{i,o}(K_{i}, L_{i,o})$, where $K$ represents the regional capital stock, or its alternative $GVA_{i,o,t} = GVA_{i,o,t}(GVA_{i,o,t-1}, DFK_{i,o,t}, L_{i,o,t})$; however, a low relevance of the employment turned out to pose a threat to estimation. Finally, a suitable alternative estimation of the gross value added turned out to be the function

$$GVA_{i,o,t} = GVA_{i,o,t}(GVA_{i,o,t-1}, DFK_{i,o,t})$$

using sector and region boundaries

$$GVA_{o} = \sum_i GVA_{i,o} \text{ and } GVA = \sum_o GVA_{o}$$

on the aggregate level.

The gross value added variable estimate on the regional level was used as an endogenous variable in the econometric equation of the nominal GDP, $Y_t = Y_t(GVA_t)$, where $Y_t$ represents the nominal GDP. Following the inclusion of the condition $Y = \sum_i Y_i$ into the calculation the values of the nominal GDP were estimated.

Calculation of the employee rewards for years 2012 and 2013 were based on the relationship between the developments of employment rate and wages. Detailed estimation of the wages on regional and sector levels ($W_{i,o}$) was based on the estimates of the labor productivity expressed by the ratio of the value added, wages on the sector level, and number of unemployed in the region (observed value from the LFS), thus

$$W_{i,o} = W_{i,o}(LP_{i,o}, U_iW_o),$$

where $LP_i$ represents the labor productivity expressed as the ratio of value added and the employment rate, $PP_{i,o} = \frac{GVA_{i,o}}{L_{i,o}}$.
The employee rewards estimation represents a logical assumption of paid wages for an estimated number of employees on the regional and sector level, thus

$$ER_{i, o} = ER_{i, o}(12 \times W_{i, o} \times L_{i, o})$$, where $$\sum_t ER_{i, o, t} = ER_{o, t}$$

The results of the estimation of the mentioned parameters are included in the model. The values of the variables on the regional and sector level are graphically illustrated in this work. These are not shown in the appendix, as the output volume due to the regional and sector dimensions (7 parameters x 8 regions x 5 sectors) represents more than 250 time series.

In case the results are not as expected, one might consider recalibration of certain parameters, changes in the model specification and alternative estimation. In case of the scenario analysis this procedure is not necessary as we are looking at the comparison of regions vis-a-vis the basic scenario and not at the parameter forecasting into the future. Parametric boundaries on the aggregate level in the ex-post period (2012-2013) limit the possibility of the increase in the error estimate.