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Increasing absorption capacity of the EU structural funds, on regional level in Slovakia, by improving decision tools, with focus on innovation

1. Introduction

Problem of the absorption capacity of the structural funds is on high importance between public administrations on all levels (regional, national and also EU level). Research organizations within whole EU are also very active in this field. Most of the studies and analyses are focused on issues like managerial capacities, problems with co-financing, macroeconomic situation or problems with quality of projects developed by the applicants. These issues are analysed in detains with aim to find the best ways for increasing the absorption capacity of the EU structural funds throughout the EU member states.

This article is not focused on such issues and even through this; the main aim of the article is absorption capacity of the EU Structural funds, focusing on innovation. First part of the article is focused on analysis of the absorption capacity definition and its relationship to issues or problem that should be analysed regarding to increasing the absorption capacity.
Second part of the article is dealing with R&D and innovation impacts on economy – with aim to analyse possibilities to measure these impacts.

Third part of the article offers some solutions (tools) how to increase the effectiveness of EU structural funds in the field of innovation and therefore to increase the absorption capacity of structural funds.

Last part of the article presents the results of the analysis dealing with possibilities of implementation of selected tool for innovation impact measuring on regional level in Slovakia.

2. Analysis of the absorption capacity definition

There are many of absorption capacity definitions. The most important, regarding to the aim of this article, is definition of the Europe Commission (EC) which define absorption capacity of the EU structural funds as: "the degree to which a country is able to effectively and efficiently spend the financial resources received from the European Funds."[1]
Going deeper in analyzing the absorption capacity two faced (demand and supply side) of absorption capacity were defined by the NEI Regional and Urban Development institution[2] which has delivered the study "Key Indicators for Candidate Countries to Effectively Manage the Structural Funds" for the EC.

The Demand side measures the ability of potential beneficiaries - private and public - to generate appropriate and acceptable projects.

The Supply side of absorption capacity is determined by three main factors, which divide absorption capacity on:

- macroeconomic,
- financial,
- administrative.

[1] Absorption capacity definition: available on http://en.wikipedia.org/wiki/Absorption_capacity
[2] NEI Regional and Urban Development: "Key Indicators for Candidate Countries to Effectively Manage the Structural Funds" Rotterdam.2003

- Macroeconomic absorption capacity indicates the rate of EU funding in terms of the GDP of the country-beneficiary. The capacity to absorb macroeconomic effects generated by the inflow of the supplementary investments is also related to the macroeconomic absorption capacity.
- Financial absorption capacity means the ability to co-finance EU-supported programmes and projects, to plan and guarantee these national contributions in multi-annual budgets, and to collect these contributions from several partners (state, regional and local authorities, private bodies), interested in a program or project.
- Administrative absorption capacity can be defined as the ability and skills of central, regional and local authorities to prepare acceptable plans, programmes, and projects in due time, to decide on programmes and projects, to arrange co-ordination among the principal partners, to cope with the vast amount of administrative and reporting work required by the Commission, and to finance and supervise implementation properly, avoiding fraud as far as possible.

The core of this definition is focused on efficiency of the structural funds absorption. When taking into account the general meaning of term of efficiency and effectiveness than …."Being effective means producing powerful effects. Being efficient means producing results with little wasted effort".(HEARN, W.)

Translating this word to structural funds absorption "being effective" means to reach the largest possible positive impacts of structural funds on economy. On another side "being efficient" means to reach these impacts in best possible way.

Following these definitions the demand side and also supply side of the absorption capacity (except macroeconomic absorption capacity) is directly focused on ability of the country (or region) to efficiently spend the financial resources received from the European Funds.

But the effectiveness of structural funds is also very important (when not more important than efficiency). Effective exploitation of the available resources for improving the regions competitiveness is one of the bases of the endogen regional development theory. (ŠEBOVÁ, ŠEBO 2007) How therefore to ensure the effectiveness of Structural funds and to increase the absorption capacity? The only answer lies in the programming period of the structural funds. It is up to each member state which sectors, sub sectors and activities will be supported by the structural funds. To find out the sectors and activities which will initiate the largest possible effects, decision tools that can help state administrations to make "effective" decisions are needed.

3. R&D, innovation and their effects within the economy

When talking about the decision tool that will enable state administrations to increase the absorption capacity through the effectiveness of structural funds focused on innovation and R&D, there is high need to find out what effects are caused by the innovation within the economy.

Primary, innovation and R&D are increasing technology equipment of the companies and causing positive spillovers within the economy. In general innovation enables firms to produce better products (or services) at lower costs, which means for customer higher quality and lower prices. Innovation positive spillovers can be in general described as follows: (ADAM, B.)

Knowledge spillovers - knowledge created by one agent can be used by another without compensation, or with compensation less than the value of the knowledge. Knowledge spillovers are particularly likely to result from basic research, but they are also produced by applied research and technology development

Market spillovers - result when the operation of the market for a new product or process causes some of the benefits thereby created to flow to market participants other than the

innovating firm. It is this "leakage" of benefits through the operation of market forces, rather than the flow of knowledge itself, that distinguishes market spillovers from knowledge spillovers. Any time a firm creates a new product, or reduces the cost of producing an existing product, the natural operation of market forces will tend to cause some of the benefits thereby created to be passed on to buyers.

Network spillovers - result when the commercial or economic value of a new technology is strongly dependent on the development of a set of related technologies. An example of network spillovers exists among all of the different developers of application software for use with a new operating system platform. If one firm develops a particular application, people will buy it only if many other firms develop other sufficient applications so that the platform itself is attractive and widely used

There are many more effects of innovation to be describing, but this article is not focused on that issue. The aim of this article is to describe decision tools that have strong potential to increase the effectiveness of the structural funds in the field of innovation and R&D.

Innovation effects within the economy are complicated and have impact on supply side as well as demand side of the economy. Therefore simple analytical tools, usually used in Slovakia for allocation of the structural funds, are not able to offer outputs suitable for effective decisions in the field of structural fund allocation.

4. Decision tools for improving the absorption capacities of structural funds on regional level

Increased absorption capacity through the effectiveness of structural funds can be ensured only by the decision tool that will enable state administrations to effectively decide which innovative sectors and which innovative activities to support by the structural funds. This decision tool, must therefore in addition, be able to cover complexity of problems regarding to innovation effects within the economy.

This part of the article is analysing methods that ca be used as effective decision tool for increasing absorption capacity of structural funds in the field of innovation.

When analyzing the approaches, methods and tools used for structural funds evaluation in the EU, there must be clearly defined the level of evaluation. There exist several approaches and tool which ate mostly divided by the level of evaluation.

In the literature are these levels describes in most of the cases as follows:

- “micro level” – impact evaluation of concrete projects and theirs contribution for the region
- “mezzo level” – impact evaluation of the group of the projects on one goal from operational program. (for example evaluation of decrease in unemployment as a consequence of some employment program)
- “macro level” – using these types of methods all impacts and factors of policy are taken into account. These types of methods are suitable for evaluation of the structural funds.

From methodological point of view, methods used on “micro level” are mostly methods like case studies, CBA – Cost benefit analyses, Input – output models, CGE models etc. These methods are usually used for project ranking according to theirs efficiency, without any further impact on wider environment (region).

As it was already mentioned group of methods on “mezzo level” are usually used for impact evaluation of several projects on one objective. These methods also does not take in to account all factors (using former example – by evaluation impact on unemployment they ignore problem of salaries) Use of these methods are useful by evaluation smaller supporting programs or programs with shorter duration.

"Macro level" methods are characteristic by the fact, that they are trying to cover all possible influences and factors. They are, for example, able to describe and analyse technological progress within the economy (direct connection to innovation). There exists wide range of methods – macroeconomics models – used for different policy impact evaluation. On another hand there also exist different opinions on their applicability. Concrete method selection depends on several factors.

The most discussed "macro level" methods in EU at the present are macroeconomics models focused on structural funds impact evaluation. The biggest advantage of these methods is that they give opportunity to estimate impacts of the structural funds in advance. That enables policy maker to find the best possible way for sources allocation. These methods also enable to evaluate already implemented programs in very flexible way and to measure direct impact of the policy on basic macro-economic indicators as GDP, unemployment etc. This direct impact is purify from another influences (additional state support) so policy makers can for example clearly investigate what share of annual GDP growth was directly caused by the support from the structural funds. In the EU environment are frequently used for structural funds evaluation models like HERMIN or QUEST.

Another example of the method used on "macro level" is adjusted Input-Output method which was several times used for Community Support Framework impact analyses. This method was used on regional level in formal East Germany, in Mezzogiorno region in Italy and on national level in Greece, Ireland, Portugal and Spain.

Some macro level approaches are based on common statistical treatments. De la Fuente a Vives 1995 has measured the impacts of the European regional development and public infrastructure and education investment fund on level of incomes in several Spanish regions. (FUENTE, VIVES 1995)

Frequently used tool is also a panel data analysis which is based on time series relationships investigation. Ederveen, De Groot and Nahuis have used this method for structural funds impact evaluation in 13 countries from 1960 till 1995. (EDERVEEN, GROOT, NAHUIS 2002)

From all mentioned methods are at the present the most frequently used already mentioned macro econometrics models, which usage is also supported by the Europe Commission.

The main advantages of the macro-econometric models (as decision tool) regarding to increasing absorption capacity can be summarized as follows:

1. econometrics models are able to evaluate impact of the structural funds ex-post as well as ex-ante and therefore enable decision makers to allocate sources in the most effective way,
2. econometrics models are complex enough to cover effects of innovation within the economy.

In the EU environment there exists several methods which were practically used for structural funds evaluation in different EU countries and regions. The development of new model is very difficult and expensive, so actual experiences from different EU countries suggest adapting existing models for usage in particular country or region.

This part of the paper, therefore briefly describes the main outcomes of the analyses and selection of the existing econometric model suitable for evaluation of the structural fund on regional level in Slovak environment.

Six existing econometric model were selected for analysis. Each model was in details analyzed from following points of view (criterions).

- (C1) Practical usage for structural funds impact evaluation
- (C2) Possibility and practical usage for evaluation on regional level
- (C3) Suitability for evaluation during whole programming period (ex-ante, mid-term and ex-post evaluation)

- (C4) Data- intensive point of view.

Wide spectrum of information and data were collected and analyzed for each criterion. According to this analyses selection of the most suitable model for Slovak regional environment was made. This selection was made with the usage of the multicriterial analysis according to following conditions:

- Criterions were consistent with analyzing point of views (criterions).
- Alternatives were defined as six selected models:
  - Model HERMIN
  - Model QUEST
  - Model REMI
  - Model E3ME
  - Beutel model
  - CGE Model
- For improving the objectivity of the multicriterial analysis the criterions weights were determined with usage of the Satty matrix.

Results of the weight determination from Saaty matrix and results of the multicriterial analyses can be seen in table 1 and 2.

Table1: Criterions weights according to the Saaty matrix

Criterion (C)	Weight (W)
C1	0,123
C2	0,275
C3	0,062
C4	0,540
Total	1

Source: DŽUPKA P.

Table2: Evaluation and results of the multicriterial analysis

Criterions/ Alterna-tives	C1	W1	C2	W 2	C3	W 3	C4	W 4	Result
HERMIN	6	0,123	9	0,275	8	0,062	10	0,540	9,12
QUEST	4	0,123	4	0,275	4	0,062	8	0,540	6,16
REMI	4	0,123	10	0,275	8	0,062	7	0,540	7,52
E3ME	3	0,123	8	0,275	8	0,062	3	0,540	4,69
BEUTEL	4	0,123	10	0,275	8	0,062	5	0,540	6,44
CGE	4	0,123	2	0,275	2	0,062	2	0,540	2,25

Source: DŽUPKA P.

According to these results the most suitable decision model which should be adaptable for Slovak environment on nation as well as on regional level is the model HERMIN.

5. Possibilities of implementation of the HERMIN model as decision tool in Slovakia

The aim of this article is to offer concrete decision tool for increasing the absorption capacity through the increasing the effectiveness of structural funds supporting innovation within the Slovak regions. Going beyond this aim, this article presents also the results of the implementation possibility analysis of the HERMIN model on regional level in Slovakia.

Possibility of HERMIN model implementation has been made according to the regional data accessibility in Slovakia. First of all, detail input data analysis of the model HERMIN has been made. According to the list of HERMIN input data, the accessibility of data on regional level in Slovakia has been investigated. For analysis of data accessibility Kosice self-governing region has been selected.

For regionalization of HERMIN model 28 input regional data are needed. Only 9 of these data are available in requested form, quality and for period long enough for econometric modelling. One data category (household consumption) was not available in requested form, but according to Eurostat methodology there is possibility to adjust these data to form requested by the HERMIN model. The rest of the data (18 input data) are absolutely not adjustable to requested form. Availability of regional data is presented in table 3.

Table3. Availability of the regional data

Data	**Available for period**	**Availability**	**Source**
Production side of the HERMIN model:			
Regional GDP	1995-2003	Data not available in requested form	Statistical office of the Slovak Republic -REGSTAT
Employment	1997-2005	Available	Statistical office of the Slovak Republic
Gross fix capital creation	1995-2003	Data not available in requested form	Statistical office of the Slovak Republic -REGSTAT
Employees income	1994-2006	Available after adjusting	Statistical office of the Slovak Republic
Population according to age	1997-2006	Available	Statistical office of the Slovak Republic
Migration	1997-2006	Available	Statistical office of the Slovak Republic
Expenditure side of the HEMRIN model:			
Household consumption	1998-2005	Available after adjusting	Statistical office of the Slovak Republic
Public consumption		Not available on regional level	
Stocks chase	1995-2003	Not available	Statistical office of the Slovak Republic -REGSTAT
Export/Import		Not available. Estimation possible : NTSV=GDPV-(CONSV+GV+IV)	
Income side of the HERMIN model:			
Incomes and expenditures of the state administration		Not available	
Income and expenditures of the regional administrations		Not available	

Source: own table

According to this analysis, implementation of the HERMIN model on regional level in the Slovakia is impossible because of the regional data unavailability. According to the HEMRIN model analysis and its comparison with other existing econometric models this model is undemanding to data – to be usable also in new EU countries with "pure" statistic availability. Impossibility of usage of the HERMIN model on regional level in Slovakia explicitly means that with very high probability no existing econometric model is usable on regional level in Slovakia.

6. Conclusion

Increasing absorption capacity of EU structural funds through the increasing effectiveness of its usage on regional level depends on quality of decision tools. Innovation and its complex and very hardly measurable impact on regional economy, require also very complex decision tools (methods). Only econometric models are suitable for regional authorities to be able to prepare effective decision regarding to increasing effectiveness of the structural funds usage. Very low availability of regional statistic data in Slovakia unable usage and adoption of existing econometric models, therefore regional public administrations are missing effective tool for decision making in the field of structural funds and innovation.

Increasing availability of the regional statistic data in Slovakia should therefore be very first step in the long way of increasing absorption capacity of the structural funds through its effectiveness increase.

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