



Impact of investment incentives and European funds on regional development

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Abstract

This paper analyses the situation of investment incentives and European funds from the regional economics point of view. These two public forms of support are examined with some selected statistical variables that might be considered as indicators of regional development. In particular, the paper offers an evaluation of the amount of investment incentives assigned and the amount of resources drawn from the Regional Operation Programme NUTS 2 with the following explanatory variables: the regional added value, the migration of the population within the region, the wage level in the region and the amount assigned to research and development in the companies of the region. The aim of this paper is to test and verify the influence of investment incentives and subsidies from EU funds on regional development. The research focuses only on regional development in the NUTS 2 Northeast region in the Czech Republic within the previous 2007–2013 framework. The methodology is based on a literature review of this topic, descriptive methods and statistical testing with the assistance of Spearman's coefficient of correlation and the Pearson correlation coefficient. In particular, it confirms the results from previous research on this topic indicating that European funds are able to affect some regional indicators more than investment incentives.

Keywords

European funds, investment incentives, regional development, subsidies.

JEL Classification: H71, R58

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1. Introduction

European Union funds are established to adjust interregional differences in the economy. The subsidies assigned from these funds are distributed on the basis of the deviation of the GDP value from the average GDP in the EU15, that is, the first 15 members of the EU (Novák and Fričová, 2015). The subsidies are distributed to individual countries, regions and recipients in the form of financial support, namely to assist in the achievement of greater economic prosperity of a given recipient but also to promote the greater economic prosperity of a given region. The companies using investment incentives are also moving to regions of which some are defined as rather backwards, and on that account they gain advantages through the investment incentives (CzechInvest, 2015). However, the investment incentives can also be used by companies that do not want to engage in business in these defined regions. Less support will be received, though. Thus, the purpose is to support businesses in regions of the CR that are lagging behind, less developed and less prosperous. Both forms of the subsidy focus on less capable regions equalling or at least approaching the economic level of economically prosperous ones. Large amounts are allocated to the budgets of both subsidies and further distributed among the individual recipients. The effect of both types of financial aid should represent a start-up or increase in economic development in the regions to which the money is sent. The influence should be visible in the economic prosperity of the entire region and not only at the level of individual recipients. The aim of the paper is to evaluate the impact of the investment incentives and the subsidies from EU funds on regional economic development. Such a regional impact is measured using regional macroeconomic indicators in this paper.

This article tests and verifies the influence of investment incentives and subsidies from EU funds for regional development on selected regional indicators within the scope of a certain period of time. The hypothesis of the paper is that the subsidies from the Regional Operational Programme (ROP) are better targeted at regional development than investment incentives. The goal of the paper is to verify or reject the hypothesis above based on the results from the

authors' previous research (Brzáková and Přidalová, 2015a). Using statistical methods, the hypothesis should be confirmed or disproved. The research focuses only on the NUTS 2 Northeast Czech region and the time period of the previous programming period of the European Union, specifically 2007–2013.

The paper continues as follows. In the next part, the theoretical approaches and important results of the related literature are summarized. The methods of the research and data used are presented in the third part. The results of the research and following discussion are provided in the fourth part. The final chapter concludes the paper.

2. Theoretical approaches

The theoretical approach has to be taken from a broader perspective of regional economic development. The effectiveness of the national economy depends on the interregional differences in living standards. The larger the interregional differences are, the more disrupted the effectiveness of the national economy is (Lungová et al., 2012). Thus, regional development is very important for the national economy, and it can be defined in two ways as a product or a process. Regional development as a product is for example a measured job position, investment and wealth. Regional development as a process can be defined as market development, industry and labour promotion. It is also necessary to distinguish regional growth, which is usually measured by the GDP from regional development as a much more complex indicator. According to Grabowski et al. (2013), a country with a high level of economic growth does not have to have a high level of economic development. It is difficult to measure the outcomes from the regional economy precisely due to the complexity of regional development (Lungová et al., 2012). Blakely (1994) stated that the use of valuable inputs from a region, such as natural mineral wealth, an educated workforce and the support of institutions, leads to a valuable outcome, such as an increase in living standards, an increase in the number of workplaces and so on, and thus an increase in regional development. The statement by Prager and Thisse (2012) that geography is a cornerstone of competition

and the growth of developed countries, which can be adapted to the regional environment, corresponds to this. Many examples exist of less developed regions that are on the periphery, do not have easily accessible natural wealth or do not have sufficient infrastructure with peripheral localities and trading centres. Rydvalová and Žižka (2008) characterized some macroeconomic indicators, such as the unemployment rate, tax incomes and so on, as a way of measuring the economic level of individual regions. Kutscherauer et al. (2007) pointed out the relation of an increase in regional competitiveness through an increase in the wages in the region, the employment rate and so on and thus an increase in the regional development level. Brzáková and Přidalová (2015a) highlighted the possibility of improving regional development through investment incentives and subsidies from the Regional Operational Programme (ROP) on the theoretical basis of these two forms of public support. At the same time there is the finding resulting from the implemented research that, due to the analysis of the economic and social situation of the region carried out to establish goals within the ROP, it is possible to target regional development better through subsidies from the ROP. This conclusion also supports the fact that the ROP can be used not only by companies but also by municipalities and non-profit organizations, which can participate to a greater extent in increasing the level of the region. To the contrary, investment incentives that do not process any analysis of a region's needs focus on the regions with a higher unemployment rate only, whereas support is focused on firms only (Brzáková and Přidalová, 2015a).

Even though we are talking about regional development, in the present globalized world, it is necessary to think in the context of international competition. Regions should pursue the strategy of economic development; therefore, they should think globally but act locally to increase their attractiveness to the inflow of supranational companies. Decisions at the regional level can result in a subsequent influence on the region's competitiveness at the global level (Stimson et al., 2006). The important aspect for the development of a region is for it to have its own strategy of regional development determined on the basis of an analysis of the region and possibly a so-called SWOT analysis. On the basis of the strengths and weaknesses of the region, it is possible to create appropriate regional policies that will lead to strategic objectives in the given direction (Thissen et al., 2013).

The factors of increasing regional competitiveness are also dealt with by Porter (2004), who defines the basic principles of a competitive advantage from the long-term point of view. Porter points to competitiveness on the basis of several dependent factors, such as legislative support for companies,

sources, institutional requirements and regional strategies. Successful economic development depends on the political and institutional situation and requires mutual interaction between institutions and society (Grabowski et al., 2013). Improving the legislative conditions for companies leads to an increase in the attractiveness of the region for business and the inflow of companies, which can also offer favourable conditions to inhabitants and thus attract a qualified workforce to the region. The inflow of a qualified workforce results in an increase in the wage level and thus in regional development and increasing attractiveness of the region (Brzáková and Přidalová, 2015a). Therefore, the wage level and migration of the population are used as variables reflecting the attractiveness of the region. Locally operating companies and their character are indicators of the economic level of the region. The level of products produced by regionally operating companies reflects the region's economic development. A higher level of corporate spending on research and development leads to higher value-added production. A high level of added value increases the economic level of the region and brings to the economy not only regional attractiveness but also higher wages for workers. This implies that the added value of companies and the level of corporate expenditures on research and development may reflect the economic level of the region and thus its attractiveness too.

Selected region

In line with the needs of this research, the Northeast region in NUTS 2, including the Liberec, Pardubice and Hradec Králové regions, was selected. In terms of area, it is the third-largest region in the Czech Republic. Meanwhile, its GDP is about 81.8% of the national average. Due to its orientation and characteristics, it is rather an industrial region, which is demonstrated by the fact that 33% of the economically active inhabitants work in the processing industry (Czech Statistical Office, 2014a; 2014b; 2014c).

Investment incentives from the regional perspective

Investment incentives have been used in the Czech Republic since 2000, when Act No. 72/2000 Coll. on Investment Incentives came into force. According to this Act, which has been amended several times over the years, any domestic or foreign investor can gain investment incentives by meeting the conditions stipulated by the Act (a minimum amount of investment and outcomes). For example, tax abatement, job position subsidies, staff retraining subsidies or the possibility to buy lands at a promotional price can be deemed an investment incentive. However, the offered subsidies differ with the type of region – if the region

is defined as disadvantaged, its unemployment rate fluctuates by 25% and respectively 50% above the countrywide average (Act No. 72/2000 Coll., 2015). The monitored Northeast region does not fit with this characteristic; therefore, after investment incentives the investors can use tax abatement and the possibility to buy a piece of land at a promotional price here.

EU funds from a regional perspective

According to the European Commission, European funds are an underlying part of the support for integration and equity of economic growth and development in the European countries. The first European funds were established by the Lisbon treaty as part of the continuous integration of European countries. The main objectives are, in particular, support of enterprise development and enterprises' innovation incentives by the European regional development fund.

Financial support as the instruments mentioned above flows from the European fund to enterprises and other organizations in the form of a subsidy. There are not many words to define the term subsidy. Rubini (2010) reports that the EU regulation explains a subsidy as *any aid granted by the State or through State resources in any form whatsoever*.

According to Šipikal et al. (2013), EU intervention should have an essential impact on different indicators in the economy. Support of SMEs by EU funds should have impact on employment, the competitiveness of the region, the development of the region, the development of businesses in the region, technology development and the attractiveness of the region.

In the previous programming period, 2007–2013, the regional authorities prepared their own objectives, calls, programme rules, participant guide and so on to adjust the priorities to the regional situation and regional target group. According to Brzáková and Šímanová (2014), the total funding of ROPs in the Czech Republic exceeded EUR 4.66 billion; this is almost 18% of the total allocation of structural funds in the Czech Republic. In the period 2007–2013, a total of 789 754 312 EUR after adjustment was allocated to ROP NUTS 2 Northeast. Beneficiaries have been paid the amount of 644 138 144 EUR, specifically 81.6% of the total allocation cumulatively, as of 31 December 2013, as stated in the Annual Report of the Northeast Council (Regional Council NUTS 2 Northeast, 2013). From a broader perspective, the budget of the EU regional policy exceeded 34.9% of the full EU budget allocated to the Czech Republic (El-Agraa, 2011). Such a large amount of money should have had an intensive impact on the economy of the Northeast region.

The global target for the ROP NUTS 2 Northeast is: *Growing physical quality of the region, making it more*

attractive for investors, businesses and inhabitants. Increased attractiveness of the region will move toward the average socioeconomic level of the EU (Regional Council NUTS 2 Northeast, 2007).

3. Methods and data

The aim of the paper is to evaluate the impact of the investment incentives and the subsidies from EU funds on regional economic development. Sufficient regional economic indicators are used for the regional perspective analysis. Two key indicators were selected for the evaluation of the statistical methods: the amount of the investment incentives assigned (the annual absolute amount in CZK) and the amount of resources drawn from ROP NUTS 2 Northeast (the annual value in CZK). The explanatory variables are as follows: (1) the amount assigned to research and development expenses in companies of the region (the absolute amount in CZK), (2) the migration of the population within the region (absolute numbers), (3) the wage level in the region (monthly in CZK) and (4) the regional added value (mil. CZK).

One of the selected indicators deals with research and development expenses. Research and development expenses have one of the highest added values in the economy, and the indicator enables us to compare the competitiveness of regions. The Czech Statistical Office records data on expenses within three categories – the business, public and foreign sectors. The values of the sum of research and development expenses from business and public resources were used to evaluate the subsidies from EU funds. The sum of the business and foreign sectors was used for a comparison with investment incentives.

The attractiveness of the region can be observed via the migration of inhabitants at the regional level. Migration expresses the difference between the number of persons moving in and the number moving out in an absolute value. When the number of persons moving in increases, the region might be considered to be attractive and thus competitive. The empirical data for this indicator were obtained at the level of the NUTS II region from the Eurostat database.

Another variable is the development of the average gross wage. This indicator is monitored by the Ministry of Labour and Social Affairs at the level of individual regions (Liberec, Hradec Králové and Pardubice) and sectors (business and non-business). For the needs of this research, the average of all three regions was calculated to obtain the average gross wage at the level of the Northeast region. For the comparison with the investment incentives, the average gross wage was created at the level of the Northeast region from the values related to the business sector, because a non-

business entity cannot apply for an investment incentive. For the comparison with the subsidies from the ROP, the average at the level of the Northeast region from the business and non-business sectors was created, as both business and non-business entities can apply for subsidies from the EU.

The last selected indicator is added value, which is expressed at the regional level. The data necessary for measuring were obtained from the Czech Statistical Office for the Northeast region cohesion. Added value relates to companies' performance, their know-how or goodwill and the level of their production sophistication. The greater the company added value is, the greater the competitiveness of the company and the entire region is.

The time period for collecting data was selected so that at least the previous budgetary period of the EU was covered, namely 2007–2013. With regard to the statistical method used, the time series was prolonged as much as possible according to data availability, specifically 2004–2013 to evaluate the investment incentives and 2005–2013 to evaluate the subsidies from EU funds. The amounts of the approved and granted subsidies from ROP NUTS 2 funds Northeast were taken from the Annual Reports of the Northeast Regional Council. The amounts of the approved investment incentives given above were taken from the documentation of the agency CzechInvest – Granted Investment Incentives.

In the first stage of the research, we used the available scientific periodicals and books dealing with economic regional development, regional development indicators, the measurement of a result and the outcome from regional development. We also used partial conclusions from our own research work, previously published articles and a research project. Based on the research, we selected the regional development indicators that we considered to be the most suitable and looked for the relevant data. The reasons for selecting these indicators are described above in the chapter on theoretical approaches.

Before the testing we prepared the collected data for year-based value. Some of the variables (wage level) were found only in NUTS 3 regional-level values, so we took an average value of the three NUTS 3 regions and calculated a comparable indicator on the NUTS 2 level. To prove the mutual relation between the given quantities, we carried out dependence tests, namely Spearman's coefficient of correlation and the Pearson correlation coefficient. We selected Spearman's rank correlation coefficient because it is suitable for quantities for which we cannot presume the linearity of the expected relation or the normal division of the monitored variables. Using Spearman's coefficient it is also possible to determine the strength of the mutual

relation (Hindels and HronovÁ, 2007). For the preparation of the data and the testing, we used the Excel program with suitable formulas for the coefficients.

4. Results and discussion

Spearman's rank correlation coefficient at the level of significance of 5% confirmed the mutual relation between the amount of subsidies from EU funds and all the explained variables, namely research and development expenses (0.75), net/real migration of inhabitants from/to the region (–0.93), wage level (0.65) and added value (0.65). However, the statistical test did not prove the mutual dependency between the amount of investment incentives and the individual variables. In this case the results of none of the indicators were statistically significant. The coefficient value differed from –0.18 to 0.27. This can be seen in the first part of table 1.

The data were verified again through the Pearson correlation coefficient, which, at the level of significance of 5%, proved mutual dependency in only one of the total of eight pairs of variables. A statistically significant result was proved between the amount of subsidies from EU funds and research and development expenses (coefficient 5.01 > critical value 2.365). In the other seven cases the mutual dependency of variables was not proved. These results can be seen in detail in the second part of table 1.

Table 1 Result of the statistical analysis

<i>Spearman's rank correlation coefficient</i>				
		<i>European funds</i>		<i>Investment incentives</i>
<i>Significance level of a test</i>	0.05		0.05	
<i>Critical value</i>	0.60		0.564	
	<i>Coefficient</i>	<i>Statistically significant</i>	<i>Coefficient</i>	<i>Statistically significant</i>
<i>Research and Development</i>	0.75	Yes	–0.02	No
<i>Migration of population</i>	–0.93	Yes	0.27	No
<i>Wage level</i>	0.65	Yes	–0.18	No
<i>Added value</i>	0.65	Yes	0.08	No
<i>Pearson correlation coefficient</i>				
		<i>European funds</i>		<i>Investment incentives</i>
<i>Significance level of a test</i>	0.05		0.05	
<i>Critical value</i>	2.365		2.306	
	<i>Coefficient</i>	<i>Statistically significant</i>	<i>Coefficient</i>	<i>Statistically significant</i>
<i>Research and Development</i>	5.01	Yes	0.23	No
<i>Migration of population</i>	–3.07	No	0.72	No
<i>Wage level</i>	1.42	No	–0.84	No
<i>Added value</i>	1.41	No	–0.24	No

The research results proved the correctness of the hypothesis that the subsidies from EU funds have a greater influence on regional development. The hypothesis outlined in the introduction and theoretical part of this article was confirmed.

Figure 1 represents the relation that is statistically significant, so the mutual dependency between the variables of subsidies from EU funds and the amount of research and development was proved by linear regression. On axis X the research and development indicator is represented in mil. CZK, and on axis Y the amount of subsidies is represented in mil CZK. The determination index (R^2) of the linear regression of these two indicators was calculated at 0.782. Because the determination index always gains some value within the interval $<0, 1>$, we can state that it is a relatively high percentage of the variability of the independent variable explaining the variability of the dependent variable. More precisely, the determination index gives the percentage of dispersion of the explained variable to be explained by a model and the percentage that remains unexplained.

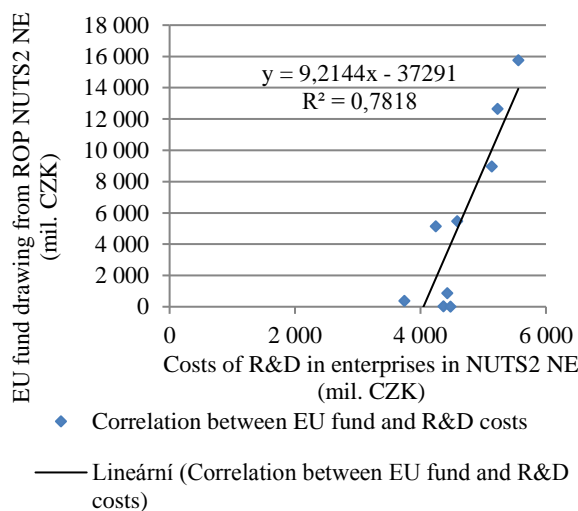


Figure 1 Correlation between EU funds and R&D costs

The summary of these two tests unequivocally states that statistically significant dependence was proved only for the amount of subsidies and research and development expenses. Despite the high Spearman's correlation coefficient between the amount of subsidies and the migration of inhabitants, this result was not confirmed by the Pearson coefficient. The dependence between the variables was excluded. We can explain this fact for example by the departure of inhabitants from the Northeast region to Prague, a trading centre with more work opportunities. We reached the same conclusion with the following pairs of variables: EU subsidies and wage level; EU subsidies and added value. The dependency of Spearman's coefficient was proved here, but it was not

proved with the Pearson coefficient. At the same time, the results of Spearman's coefficient were at the significance limit. The reason for the different results in the two tests could be the fact that Spearman's calculation method is non-parametric, which means that it is less accurate than Pearson's method, which is parametric. We explain this by the fact that the outcome from projects subsidized by EU funds is not always job position creation and thus pressure on a wage increase. The outcome of other projects might be different. The relation between the amount of subsidies and the added value was insignificant, which could be caused by the reality that subsidies are not always granted to companies only but to a broader spectrum of recipients, such as municipalities and non-governmental non-profit organizations.

Statistical proof of the dependency between the amount of investment incentives and the individual explained indicators, that is, research and development expenses, net/real migration of inhabitants from/to the region, wage level and added value, was not obtained in any of the cases. The results of Spearman's and Pearson's coefficient were statistically insignificant. We cannot state unequivocally whether mutual dependency exists or not. We propose the explanation that investment incentives are in essence not focused on regional development. The unemployment rate is the only evaluating criterion for the broader support of the region by investment incentives, whereas, apart from the evaluation of this indicator, no adaptation to the requirements or needs of the given region occurs; thus, their influence on the selected regional indicators is not significant. This result proved the given hypothesis.

4. Conclusion

Regional development plays an important role in the effectiveness of the national economy. If the regions within one state develop differently and large differences among the regions occur, the effectiveness of the national economy becomes disturbed. This is the reason for supporting regional development with public resources. Such support includes, for example, subsidies from European funds and investment incentives. Investment incentives are provided by domestic or foreign investors throughout the Czech Republic. With regard to the focus of investment incentives on regional development, division of the region into less developed and developed areas occurs, for which the only evaluating criterion is the unemployment rate. For regions showing a high unemployment rate, a broader range of investment incentives is available, so investors are more motivated to invest in these regions. As the evaluation of any indicator other than the unemployment rate does not occur, investment incentives cannot focus on regional

development comprehensively or support it completely. With regard to the support for regional development in the studied Northeast region and because this is not a region with a higher unemployment rate, only a basic investment incentive applies to it – tax abatement – so we cannot talk about targeted support of this region by investment incentives at all. To the contrary, subsidies from the EU are provided not only to companies but also to municipalities, non-profit organizations and so on. Their targeting of regional development is more efficient, because the ROP is based on an analysis of the needs of the given region so that its development takes place in the subsequent programme period. The applications for subsidies from the ROP must also comply with the long-term strategy of the area, or more precisely the region, which specifies the needs of regional development by SWOT analysis. In the Northeast area, the needs in the observed programme period 2007–2013 were also established so that it is possible to come closer to achieving the established targets related to the development of this region. One of the obstacles that can have a negative impact on the achievement of the given regional targets is the complexity and administratively demanding character of the application process for subsidies from the EU. Such a difficult process can discourage an applicant from applying for a subsidy, which can indirectly slow down regional development. Compared with an investment incentive, for which the process is not so demanding and for which the acquisition of investment incentives is almost 100% when all the necessary documents are supplied, an applicant for a subsidy from the EU can be rejected, for example due to depletion of the budget, even though all the documents have been supplied and all the given deadlines met (BrzÁková and PŘidalová, 2015b).

The conclusions mentioned above resulted from previous research, which enabled us to determine the hypothesis of this research. Thus, the presumption resulting from the above states that subsidies from the ROP are more focused on regional development. This fact is reflected in the indicators of regional development. To verify the given hypothesis, indicators such as the regional added value, the migration of the population within the region, the wage level in the region and the amount allocated to research and development in the companies of the region were selected. These indicators were compared using the Pearson correlation coefficient and Spearman's rank correlation with the amount of investments implemented through investment incentives and the total amount of investments from subsidies from the ROP in the Northeast region within the period 2004–2013. On the basis of statistical measurements, it was proved that the statistical values of the amount of

investments from investment incentives and the mentioned regional indicators are insignificant. Therefore, we cannot confirm with certainty that a mutual relation exists between them. To the contrary, the amount of investments from the ROP and the indicator of research and development expenses are statistically significant. This allows us to confirm that subsidies from the ROP have an influence on this indicator and thus can affect regional development. In conclusion we can assert that the hypothesis stating that, due to the setting of the entire system of subsidies from the ROP, it is possible to affect regional development positively with these investments was confirmed.

For further research there is a still gap that could be covered. In our research we did not cover the effectiveness of allocated subsidies and investment incentives, which is very important. Both resources have two sides of their budget – incomes and expenditures. A future research question might focus on whether both resources are effective from the perspective of inputs and outputs. This means determining whether the allocated money brings to the economy a bigger output than the inputs that must be spent. Future research might continue by analysing other EU or non-EU funds allocated to the Czech regions. There are other national programmes and international programmes. In the previous EU financial period, for example, there was the Operational Program Enterprise and Innovation and in the current period for example the Integrated Regional Operation Program.

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