

POTENTIAL OF THE CZECH BUSINESS ENVIRONMENT ASSUMES THE EFFECTS OF FOREIGN DIRECT INVESTMENT

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Introduction

As a consequence of political changes, the process of transitioning a centrally controlled economy to a market economy has influenced the development processes of the states in which this transformation has occurred (Hlaváček & Bal-Domanska, 2016). It was expected that the entry of foreign investors would bring an inflow of capital, new investment, export potential, and technological transfer (Estrin et al., 2009; Rapacki & Prochniak, 2009). Foreign direct investment (FDI) is generally considered to be the contribution of holders of know-how, technology, new management methods and skills, initiators of innovation activities, strategic employers, and exporters. FDI can lead to economic growth, changes in the business or institutional environment, restructuring of the economy and, ideally, also to the increase of labour productivity in the host region and the improvement of macroeconomic indicators (Damborský, 2013). Moreover, for transition economies, FDI is the key indicator for evaluating their economic transformation (Starzyczna, 2010). FDI in the Czech Republic, and in transition economies in general, is regarded as a crucial criterion for a successful economic transformation (Hlaváček & Bal-Domanska, 2016).

On the other hand, the inflow of FDI can negatively affect the local market by crowding out domestic investment. A high proportion of foreign firms in the host region poses a threat of a sudden outflow of investors, which can cause long-term structural problems in the local economy (Zamrazilová, 2007).

In addition, FDI can pressure institutions to change conditions and regulations to advantage foreign investors in view their negotiating power. This may lead to changes in the localisation of FDI and its distribution within countries. Multinational companies (MNCs)

will begin relocating FDI to areas with a 'softer' regulatory frameworks (Cheng, Li, & Liu, 2018) or with more attractive investment incentives.

After 2000, a significant growth of FDI took place in the Czech Republic. Act No. 72/2000, on investment incentives, played a role. The country's accession to the European Union (EU) in 2004 also had positive impacts on FDI inflow as well and brought the free movement of goods and services associated with the European Single Market. According to UNCTAD data (UNCTAD, 2019), the development of FDI inflow was higher after 2004 in comparison with the period before entering the EU. Between 2000 and 2012, FDI grew by about 17–18% per year. The same annual average increase was observed in Poland and Lithuania, while in Slovenia slower growth was observed (15%) while Hungary was slower still (14%). MNCs began to re-invest their profits in the Czech Republic, which is possible to interpret as a signalisation behaviour indicating increased confidence in the Czech business environment. This is reflected in the total share of FDI per capita amounting to almost 70% of the GDP per capita in the Czech Republic, in comparison with Poland where FDI did not exceed 50% (Hlaváček & Bal-Domanska, 2016).

FDI in the Czech Republic is significantly export-oriented, so its presence in the country is conditioned by the dynamisation of comparative advantages of the Czech regions. According to the theory of comparative labour costs, there are two key factors determining the comparative advantage: wage levels and labour productivity (Carbaugh, 2009). It would be interesting to take up the issue of how and to what extent the impact of multinational corporations (MNCs) is reflected in the productivity of the Czech business environment. From the point of view of economic policy, it would be useful to deal primarily with a group

of MNCs that were motivated by the granting of investment incentives when the localisation of their investments was under consideration.

The aim of this contribution is to determine the size of the technology gap between FDI supported by investment incentives and the business environment in a group of six regions of the Czech Republic as well as determining the absorption capacity of the technology transfer of these regions. This research explores the regional integration effect extend of internationalization (semiglobalization) of FDI.

Based on shift-share analyses, an indicator quantifying the size of the technology gap at the regional level of NUTS 3 has been constructed. This indicator has been supplemented by an indicator of technology transfer intensity. The benchmarking method illustrates the absorption capacity of the Czech business environment in an interregional comparison reflecting the strong and weak sides of the Czech regions in terms of absorbing the benefits of locating MNCs in their territory.

The size of the technology gap is usually quantified at the level of individual economies, typically between the country of origin of the investor and the host economy. The reason for this is the complexities of data collection: it is not enough to be based solely on national statistics, the annual reports of specific companies must also be factored in. Another problem related to the assessment of the regional business environment results from the macroeconomic concept of the competitiveness of states which cannot be fully applied at the regional level (Camagni, 2009). The quantification of the potential of a regional host business environment to absorb the inflow of FDI is a measure of filling the gap in current economic research to assess the impact of FDI on the host economy.

1. Theoretical Background of FDI Effects on Regional Economies

The role of FDI in the development of Central and Eastern European countries CEECs has been dealt with by many scholars including Hafner and Kleinert (2018); Curwin and Mahutga (2014); Leibrecht and Riedl (2014) or Kornecki and Raghavan (2011). Professional literature distinguishes the observed determinants of FDI localisation and the role of spatial linkages between national and regional levels. FDI

effects are analysed in terms of certain key sectors (Pavlínek, 2012).

Blonigen et al. (2007) dealt with spatial issues of FDI determinants at the national level. Garretsen and Peeters (2009) took into account surrounding-market potential in their analysis of the foreign presence of Dutch FDI in 18 OECD countries. With regards to the penetration of FDI in individual countries, such studies exist for all countries that make up the Visegrad Four group. Hlaváček and Koutský (2013) in particular dealt with the penetration of FDI in the Czech Republic, while Wokoun, Tvrdoň and Damborsky (2010) examined Slovakia; Boudier-Bensebaa (2005) examined Hungary; and Gorynia, Nowak and Wolniak (2007) examined Poland.

Some research studies following on Blonigen et al. (2007) focused on regional perspectives. Hafner and Kleinert (2017), Sharma et al. (2014), and Wu and Burge (2017) should be highlighted for their contributions in this area, as should Coughlin and Segev (2000), who found that the productivity and geographical position of the regions are significant determinants of FDI effects.

Chausse and Pomfret (2019) analysed FDI flows in six ASEAN countries, focusing on the sector level in the perspectives of global production chains influenced by institutional conditions stimulating FDI inflow. Pavlínek (2018), who dealt with foreign subsidiaries and domestic companies in the automotive sector in regions of Slovakia, took institutional guidelines, global production networks, and sector-specific aspects into account.

For economies that have undergone a successful transition process, investigations into the impact of FDI on technology exist (Bucar, Rojec, & Stare, 2009), as do investigations into institutional quality (Tun, Azman-Saini, & Law, 2012), analyses of global production networks (Pavlínek, 2018), geographical distributions of FDI inflow (Blažek, 2012) and concentration tendencies (Hardy, Micek, & Capik, 2012). Thus it is possible to evaluate the existence of regional disparities, including identifying the strengths and weaknesses of evaluated regions.

The basic question is how the region could, as much as possible and as profitably as possible, benefit from the location of a specific factor of production in its territory. This refers to how a host market business environment can

deal with so-called semiglobalisation (regional-level integration) of multinational companies' FDI (Verbeke & Asmussen, 2016). Answers to this and related questions about the impacts of FDI on the business environment are provided by various theoretical approaches.

Neoclassical theories are based on the individualistic concept of the company in the market environment, with institutional directions emphasising the perception of the company as an actor connected by a number of specific mechanisms – formal as well as informal links and structures, eg production chains, supplier-customer relations, etc (Blažek & Uhlř, 2011). The effects of these links and structures are very important in terms of FDI effects because they influence not only FDI itself, but the existence of FDI also partly determines the composition and functioning of these structures (Blažek, 2016). Therefore these effects can be considered as bi-directional. They more or less define the conditions for the development of the potential of FDI positive effects in the host economy – ie especially the rooting or settling down of investments and the development of other activities with local subjects, the establishment of business or cooperative links, the spillover effect, the agglomeration effect, or the effect of attracting new investment related to the original one (Blomstrom & Kokko, 2001). Fonseca and Liamosas-Rosas (2019) agree and point out both direct and indirect effects of agglomeration, labour force and human capital levels, and states' fiscal margins. FDI can benefit these business environments through capital localisation as well as – above all – through positive externalities related to the diffusion of expertise, technology transfers, and increasing managerial skills (Gutierrez-Portilla, Maza, & Villaverde, 2019). On the contrary, Shevelova and Plaskon (2018), in their research of Ukrainian regions, have shown that not every territory is able to obtain the positive benefits of FDI localisation. Their results point out the unflattering absorption capacity of the Ukrainian economy: human as well as physical capital has not been used effectively to attract FDI and economic growth. The authors' recommendations do not focus on attracting new FDI, but policymakers should increase R&D expenditures, loans, and financial support for encouraging students to complete their university education.

According to the theory of endogenous growth, the knowledge generated by FDI is a public good that may be, under certain circumstances, well disseminated, but the basic precondition is a sufficient supply of quality human capital. Supplying this factor may be a problem in certain regions with incompatible educational structures due to regional labour market demands and slowdowns in economic growth (Blažek, 2016). The Karlovy Vary Region can be mentioned as an example of this situation.

It can be said that polarisation theory creates pressure on or appeals to economic policy to eliminate or reduce regional disparities by appropriate adjustments to the institutional system. This is due to the fact that according to this group of theories, in an international context an open economy logically leads to regional inequalities (Špiroch, 2017). From the point of view of regional development mechanisms, governments influence can the investment decision-making of business entities by favourably redistributing resources to peripheral regions. In this context, it is necessary to mention the issue of investment incentives, the primary objective of which is to support local employment increases in weak regions (Cooke, 1983).

The current setting of investment incentives, in terms of support for the creation of new jobs, is based on Keynesian concepts of the core-periphery and attracts investors primarily to regions with high unemployment and low economic performance. This setting weakens potential positive effects both in the core regions and in the peripheral regions. Peripheral regions with low economic performance reach low economic performance, and it remains a question what amount of FDI would have to be attracted by investment incentives to the region to create spillover effects or to increase the potential for these effects. At the same time, without the dispersion of economic activities into the peripheral regions due to the investment incentives setting, the effects in the so-called core regions would be intensified.

In this context, the question is whether the investment incentives are properly set up and updated in the Czech Republic, which is related to the issue of the time delay and the influence of the political cycle. The current investment incentives setting is still focused on reducing the unemployment rate, which was below 3%

in the first half of 2018. The supported areas of investment incentives include the manufacturing industry, the building of technology centres, and strategic service centres that, according to the theories of growth centres and growth axes, could have the potential to identify dynamic industries. However, the most supported projects are related to assembly plants that create a relatively high number of jobs. The question remains who will fill these jobs when the Czech Republic dips below its natural rate of unemployment. A space for the influx of foreign workers is arising as is the pressure to internationalise the labour market.

The undertaken research evaluated the impact of FDI with investment incentives on the regional labour market ex-post in the period of 2002–2016 (The time series ends in 2016 deliberately due to a significant delay in the publication of the annual reports of the analysed companies.), which saw the highest unemployment rates in the modern history of the Czech Republic (CZSO, 2018). Because of the turnaround in this area, it would be appropriate to adjust the current investment incentives settings to better match other economic priorities, such as attracting foreign capital, generating higher value-added features, concentrating on high-tech industries, supporting regional competitiveness, and curtailing support for projects where Czech workers would have a relatively lower share in the structure of employment compared to the employment rates of foreign workers.

2. Methodology

The size of the technology gap is one of the basic determinants of the occurrence of spillover effects. The productivity of both domestic and foreign companies is mutually determined. The amount of foreign business productivity in the host market leads to gains in the productivity of domestic enterprises, and productivity gains in domestic enterprises cause increased technology transfers and gains in the productivity of other companies (Ferenčíková & Fífeková, 2008).

The size of the technology gap and the absorption capacity of technology transfers are examined on a sample of six regions of the Czech Republic – the impacts of FDI effects are identified within the business environments of the Plzeň, Karlovy Vary, Ústí nad Labem, Liberec, Hradec Králové, and Pardubice

regions (at the regional level of NUTS 3). The common characteristics of these regions include their position along international borders and their neighbouring locations. These are formerly connected regions with historically more industrial specialisations, including weak (montan) and standard regions, as well as a model of a successful region (Plzeň). Given its strategic position, this region enjoys spillover from the well-developed Bavaria region. In comparison with other regions – in terms of contribution to GDP, concentration of business activities, and FDI inflow (Czech National Bank, 2019), as well as the firm anchoring and continuous tradition of important industries in the area – it can be supposed that the best results will be quantified in the Plzeň region. The opposite situation could indicate anomalies in the surveyed set of regions.

It is difficult to identify the effects of all FDI because of the lack of comprehensive data, but it is possible to rely on resources of the CzechInvest, which conducts a survey of projects of foreign investors (applicants) for investment incentives. Statistics on investment incentives provisions that were issued by the CzechInvest agency were the main source of data (CzechInvest, 2019). The financial statements and annual reports of foreign companies that have received a promise of investment incentives were a secondary source of data (Ministry of Justice, 2018). The CzechInvest evidence provided a list of FDI including information on regional location, investor country of origin, sector, accorded investment incentives, promises of the number of newly created jobs, and other information. This information was subsequently extended by data on the number of employees obtained from the annual reports by the analysed company for each year of the analysed period. It was created using a unique data collection method completed by 234 foreign subsidiaries of MNCs.

The CzechInvest agency (2019) states that as of 31 December 2018, there were a total of 1,204 supported projects, 556 of which were done by foreign companies; 42% of them were oriented toward the six surveyed regions. The subject of the research was the localisation of FDI in relevant regions (taking into account regional aspects) and thus contributing to recent calls for research measuring the determinants and effects of localisation of FDI at subnational levels.

2.1 Relative Regional Technology Gap of Foreign Presence Indicator

The constructed 'Relative Regional Technology Gap of Foreign Presence Indicator' (RRTG) tracks the difference between the technology levels of foreign companies that have gained investment incentives and the regional business environment. The indicator also indicates the lag of the region (here, the selected groups of regions) behind the technology levels of foreign companies, and identifies where this lag is generated: in the depth of lagging (the difference of labour productivity) or in the width of lagging (the extent of foreign presence). Based on the development of this indicator over time, it is possible to predict the future dynamics of productivity growth that a region with a high foreign presence (FP) can achieve compared to a region with a low FP.

The technology gap development is determined using the shift-share analysis method, more precisely the decomposition of the technology level of the regions to the technology effect, the employment effect and the combination of both effects. RRTG is calculated according to Formula 1:

$$RRTG_n = \frac{\sum_{i=1}^r (AP_{Li}^{FDI} - AP_B^{reg}) \cdot FP_B^{reg}}{AP_B^{reg}} + \frac{\sum_{i=1}^r (FP_i^{FDI} - FP_B^{reg}) \cdot AP_B^{reg}}{AP_B^{reg}} + \frac{\sum_{i=1}^r (AP_{Li}^{FDI} - AP_B^{reg}) \cdot (FP_i^{FDI} - FP_B^{reg})}{AP_B^{reg}}, \quad (1)$$

where AP_{Li}^{FDI} is the productivity of foreign companies of the given country in year n (OECD, 2018), which is expressed as the productivity of the investor's country of origin (reported by the OECD in constant prices of 2010, where the rate of use of labour inputs is measured by the total number of hours worked);

AP_B^{reg} is the productivity of the benchmark in year n , which is expressed as the arithmetic average of the productivity of all the examined regions (measured in USD; the exchange rate of the Czech National Bank: USD/CZK = 18.751 as of 31 December 2010);

FP_i^{FDI} is the proportion of employees of the companies in the given country to the total number of people employed in the region in year n ;

FP_B^{reg} is the benchmark of the proportion of employees in foreign companies in the

examined regions in year n , which is expressed as the arithmetic average of the proportion of employees in the examined regions (Kotíková, 2018a).

In professional literature, shift-share analyses are often used to determine the development of the dynamics of employment, labour productivity, or value added (Zdeněk & Štřeleček, 2012). In the Czech Republic, this method was used by Šimanová and Trešl (2011) to track the development of four branches of the technology gap by decomposing the shift-share analysis into a technology effect, sector effect and the combination of these effects. Zdeněk and Štřeleček (2012) also used this method to assess the development of labour productivity, average wages, and employment from the point of view of regions and sectors from 2004 to 2008, when an acceleration of economic growth was expected.

The main advantages of the shift-share analysis method are its ability to be used at any regional level and the option to choose the assessed components. In the structure of Formula 1 it is possible to trace its possible decomposition (it is formed as a sum of three components of RRTG basic approach).

The productivity effect shows the extent of regional productivity lag behind the productivity of foreign companies. The employment effect represents the proportion of the contribution of the relative difference in the technology level generated by the difference in the level of FP. If the employment effect grows, it can be assumed that FDI with investment incentives collectively create a high number of jobs in the region. The high number of jobs in these companies allows a faster transfer of technology level and knowledge to the economic life of the region. The third component is a combination of both the above-mentioned effects. This component summarises the degree of interdependence of both effects.

For the final indicator values, the following applies:

- a) The higher values the region achieves, the higher the potential for creating indirect spillover effects can be expected (due to all the facts considered). The size of the value is given by the number of foreign companies in the region, their technology level (labour productivity of their country of origin) and the share of these companies in employment in the region.

- b) The higher the productivity effect and the higher (more positive) the difference between the values of the first component compared to the second component of the constructed RRTG indicator, the deeper the technology lag of the region (benchmark) can be noted.
- c) Looking at the individual components of the indicator, it can also be stated that if the second component of the formula – the so-called employment effect – achieves high positive values, the relatively faster the examined region can transfer technology and productivity in its territory (in comparison with other regions).

The described approach has to be taken in space and time with certain limitations and notes:

1. It does not take into account the interconnectedness of the regions (eg transfer of acquired technology knowledge gained from FDI between regions).
2. It does not take into account the interaction between companies in the region or between regions. This would lead to the need of adjustment the annual productivity levels for the individual countries from which the investment comes into the examined region. Thus, for example, it cannot be precisely determined to what extent a company from a more productive country will affect a company based in a country with a lower labour productivity. The so-called third-country (region) effect (Fonseca & Lamosas-Rosas, 2019) is not taken into account.
3. It does not consider the absolute rate of contribution of foreign companies to the region. The absolute benefit of the presence of foreign companies in the region could grow over time even if the RRTG falls or stagnates – which would be due to the over-proportional growth of the FP in the other regions of the benchmark, in the extreme case also assuming that labour productivity in the region has grown at a much higher rate than the productivity of incoming foreign companies (the country of origin of investors). A region with a historically high rate of FP may, in terms of the RRTG indicator, stagnate or decrease due to the saturation of the region by FP. Therefore, it is appropriate to monitor or construct

the 'indicator of potential saturation' of the regional market and its capacities. The values of this indicator could then be a certain limitation on the use of the RRTG indicator.

4. It does not consider outsourcing in the area of HR. Only employees reported in the annual reports enter the FP. It does not take into account the delivery of agency employees.
5. The absence of data is an important limitation for the expansion of research. So far, there is no specified database or system to monitor FDI flows at the regional level, which would make it possible to conduct a comprehensive comparison not only within one country but also between countries, for example, when evaluating technology transfer in border regions in the areas of three-terrain, etc.

2.2 Intensity of Use of Foreign Presence in the Region

Besides the RRTG indicator which answers the question of how much the presence of foreign companies in the region during the monitored period was reflected in the region's productivity growth, it would be also appropriate to monitor the level (rate) of the capacity of the region to use FP. So, it would be interesting to look at the extent to which, all else being equal, a region can harness productivity gain from an average FP unit. The average FP unit is the average FDI productivity per FDI worker in the given year. Such an intensity indicator can be termed an 'indicator of the intensity of use of FP in the examined region', in short: an indicator of transfer intensity (IT).

To monitor this absorption capacity of the technology, for example, a construction of a share indicator can be used in which the productivity of a region in a given year will be in the numerator and the weighted average of the productivity of foreign companies (where the weights will represent the individual shares of employees of these companies, again in the examined year) in the denominator. The indicator also logically is not a summative indicator, unlike the RRTG indicator.

It is possible to calculate the constructed IT indicator as shown in Formula 2:

$$IT = \frac{AP_{Li}^{reg}}{\sum (AP_{Li}^{FDI} FP_i^{reg}) / \sum FP_i^{reg}} * 100, \quad (2)$$

where AP_{Li}^{reg} is the productivity of the given region in year n ;

AP_{Li}^{FDI} is the productivity of foreign companies (expressed as the productivity of the investor's country of origin) in the given region in year n ;

FP_i^{reg} is the proportion of employees of foreign companies employed in the given region in year n .

The higher values the indicator achieves, the more the region managed to absorb the experience and possibilities of technology growth offered by foreign companies (Kotíková & Čuhlová, 2017). The IT sector can, due to its unique character, be considered an indicator of knowledge transfer spillovers. The evaluation of knowledge spillover is more and more important – principally due to the potential it has for bringing positive impacts (Prokop & Stejskal, 2018).

To evaluate the overall capacity of the region to absorb the offered technology potential during the monitored period, ie the evaluation of the monitored trend, the indicator of the average growth coefficient of the IT can be used. In such a case, the year-on-year change in regional productivity, ie the absolute annual productivity gain, will be placed in the numerator of the formula instead of the annual productivity of the region (Kotíková, 2018b).

The constructed IT indicator very well complements the RRTG indicator because, unlike the RRTG, the IT indicator works with the relative transferability (absorption) of the technology level in the region. The indicator evaluates the level of utilisation – intensity – of the opportunity to take over the technology level of foreign companies from the individual regions. For the best possible economic development of the region, leading to the region's productivity growth, it can be said that the ideal state is the high level of both extensive and intense growth. Therefore, it is best for the region if both the RRTG and the IT indicator achieve high values.

2.3 Relative Regional Technology Gap Indicator and Transfer Intensity Indicator – Mutual Relations

Both the constructed indicators can complement each other very well. In the context of the results of both indicators, it is possible to make more appreciable and verifiable conclusions about how the examined region has managed or can

use the FP to increase its productivity. For the mutual relations between the two indicators, the following applies:

- a) If the values of RRTG are high and the values of IT low – the region grows extensively using FP. The growth of the region is caused by a broad representation of foreign companies and their high share of employment in the region. However, the region has gaps in the possible use of foreign opportunities, ie it does not have a strong ability to absorb the offered opportunities. This may be due to poor infrastructure, poor interconnection, a lack of cooperation between foreign and domestic companies, a concentration of the region only on how to attract investment in the region and lack of concentration on the subsequent use of the presence of foreign companies in the region. The region is particularly attractive for foreign investors by its absolute advantages – the low labour cost, the appropriate infrastructure, the location of the region, etc.
- b) If the values of RRTG are low and the values of IT high – the region grows intensively using FP. The region is failing to attract a large number of foreign companies, the creation of new jobs within FDI is low. By contrast, the region has the ability to make the most of this small number of technology transfer opportunities. The region is attractive thanks to its educational structure of employees, subcontracting links and business opportunities, or a unique factor of mutual consistency (suitability) of infrastructure and interest of foreign investors.
- c) If the values of both RRTG and IT are low – the region is unable to attract foreign investors and, at the same time, fails to intensively exploit the know-how that has been imported into its territory. The region does not seem to be attractive to foreign investors and at the same time has a very low potential for so-called synergy.
- d) If the values of both RRTG and IT are high – the region is able to attract foreign investors as well as to intensively exploit the imported technology potential. The productivity and economic growth in the region are driven by a FP in the region. The region is attractive for foreign companies by the appropriate absolute benefits of the investment, by a good structure of cooperation with

domestic companies, by subcontracting, by the educational structure of its inhabitants who are able to work in sectors with higher value added.

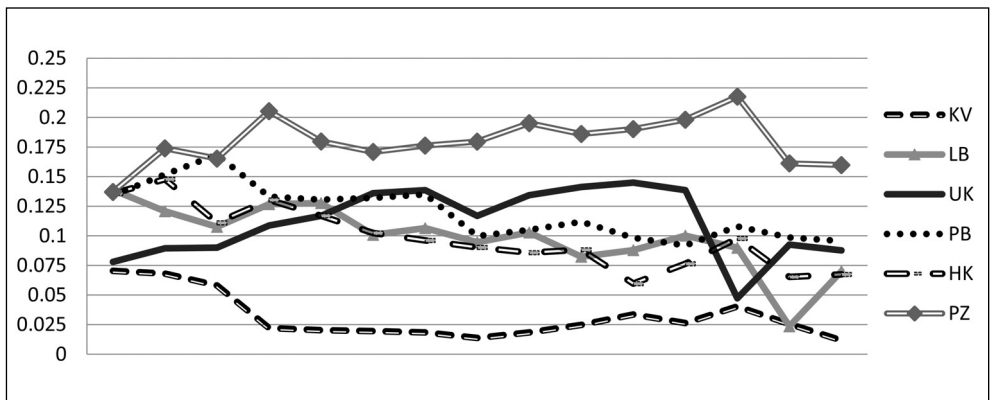
3. Technology Transfer in the Regional Business Environment

This chapter is focused on the calculations and evaluation of the RRTG development in the selected group of regions. In terms of countries of origin, FDI investors in the analysed regions are dominated by Germany and the United Kingdom (UK). Investors from these two countries were represented in all the examined regions. FDI in the Plzeň Region comes mainly from Germany, France, Belgium, Switzerland, Spain, Austria, Italy, the UK, Japan, and the US; in the Karlovy Vary Region from Germany, the Netherlands, the UK, Switzerland, Sweden, and Japan; in the Ústí nad Labem Region Germany, France, the UK, Switzerland, Spain, Austria, Italy, Norway, Sweden, Israel, the Netherlands, Luxembourg, Mexico, Japan, the US, and China; in the Liberec Region from Germany, France, Belgium, the UK, Switzerland, Spain, Denmark, Japan, and the US; in the Hradec Králové Region from Germany, France, Belgium, the UK, Austria, the Netherlands, Luxembourg, and the US; in the Pardubice Region from Germany, France, the UK, Switzerland, Spain, Italy, the Netherlands, Denmark, India, and Japan.

The calculations and analyses have proved the excellent position of the Plzeň Region in the studied set of regions. The Plzeň Region, which neighbours the advanced Bavarian Region, can benefit from its strategic geographical position as well as its historical industrial tradition. In comparison with other examined regions, the Plzeň Region reached significantly higher RRTG values. The investments from Germany have been reflected with the highest volume. The high values of RRTG shown in Fig. 1 were achieved mainly thanks to the productivity effect and the employment effect. They both contributed positively, but with different dynamics.

The productivity effect in general decreased slightly over time (see Fig. 2), while the employment effect dynamically increase in the Plzeň Region. The decline of the productivity effect in the Plzeň Region was due to a relatively higher dynamic of labour productivity growth in the benchmark. The growing development of the RRTG values was due to a relatively large foreign involvement in the region and a significant spread of FP with an interest in investment incentives in the region. In this respect, the position of the region and its industrial tradition also play an important role. At the same time, a direct correlation between the development of RRTG and labour productivity has been identified. Compared to the most successful region in terms of RRTG, the unfavourable position of the neighbouring Karlovy Vary Region intensified.

Fig. 1: Development of RRTG in all the examined regions



Source: own construction based on own calculations and data from OECD, CZSO and annual reports of examined FDI

In terms of comparison with other regions, the calculated values of RRTG of the Karlovy Vary Region were the lowest. The development of the values was, to a certain extent, specific. It can be said that while the other regions have undergone a relatively turbulent development, the Karlovy Vary Region's RRTG development curve is relatively (in comparison with other regions) consistent in the form of a nearly flat parabola. The size of the technology gap, expressed by the RRTG indicator, in the Karlovy Vary Region has gone through a period of initial decline that reached its minimum in the period that culminated in the European and global financial and economic crises. This corresponds to a global decline in MNCs' investment activities due to perceived uncertainty in this period. Since 2010, the RRTG in the Karlovy Vary Region has been increasing, including a notable fall in 2013 caused by a decrease in the proportion of employees in foreign companies with investment incentives. Specifically, this was the departure of a German investor operating in the plastics and rubber industry (CzechInvest, 2018).

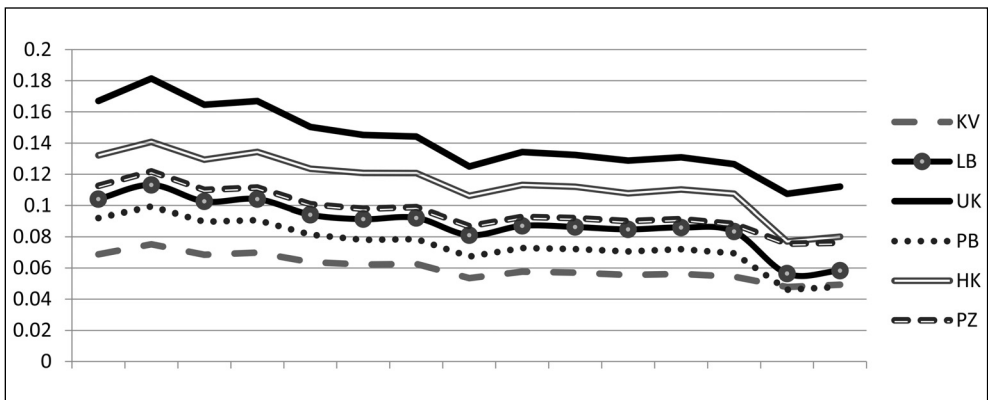
Although investment incentives represent a unified system of investor support for the Czech Republic, the amount of financial support depends on the economic development of the regions. The weaker the economically weaker region (Ústí nad Labem region), the higher the percentage of support. The Ústí nad Labem Region is often discussed because of

its economic and social development. The monitoring of this region could also provide a response to the often discussed question of whether the use of investment incentive policies is successful in attracting foreign investment in problematic regions, where the investment incentives should play a key role in improving the situation in the region, especially in the labour market but also in the overall economic development of the region.

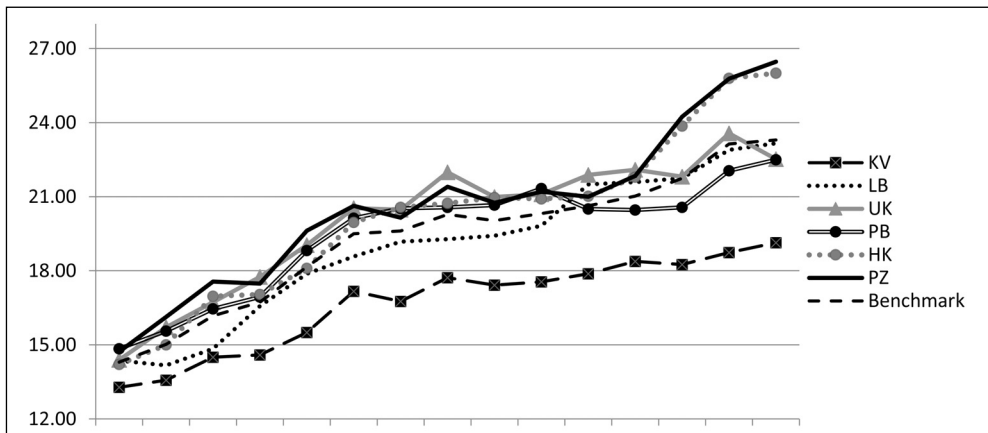
Looking at Fig. 1 of the RRTG development, it is possible to mention quite a positive finding – the region has been able to increase the value of the RRTG over the entire monitored period. Only in the last monitored year did the RRTG fall sharply. The explanation is the correspondingly sharp fall in FP due to a change in the recruitment of new employees (HR outsourcing is a current trend). FDI supplies employees through specialised agencies, though these employees are employees of the agency, not of the FDI subject. They are not reported in annual reports as ad hoc employees and they cannot be fully included in FP.

The region's productivity growth shown in Fig. 3 is mainly driven by a highly out of proportion over-representation of employees of foreign companies with investment incentives. This means that productivity is driven extensively. As a result, and as expected, the region does not attract companies from high-productivity countries that want to introduce high value-added production in the region and

Fig. 2: Development of RRTG productivity effect in all the examined regions



Source: own construction based on own calculations and data from OECD, CZSO and annual reports of examined FDI

Fig. 3: Development of the labour productivity in the examined regions


Source: own construction based on own calculations and data from OECD, CZSO and annual reports of examined FDI

thus cause intensive growth in the region. In the character of their production, investors respect the composition of the educational structure of the region. Compared to other regions, the Ústí nad Labem Region reports a lower average education level of the population (CZSO, 2018). The results of the overall development of the RRTG and the development of its components, to some extent, eventually confirm the possible expectations, both in terms of investment needs in a region such as the Ústí nad Labem Region and the structure of these investments (foreign companies are looking for a cheaper rather than highly qualified workforce).

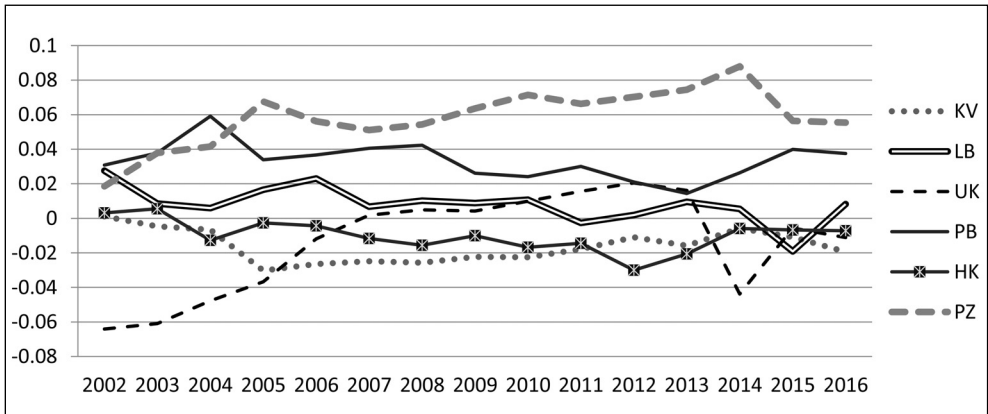
In the Liberec Region, the RRTG values fluctuated around the benchmark level during the studied period. In the case of the Liberec Region, the RRTG development curve could be called a decreasing sinusoid – see Fig. 1. However, this statement of the decreasing trend of the indicator is relatively unfavourable – it can be said that the region was the best at the beginning of the period under review and has been gradually losing its position. At the beginning of the period, it was even the region with the highest RRTG indicator values (see Fig. 1).

The employment effect in the Liberec Region had been increasing up to 2006 (see Fig. 4), but at the beginning of the economic crisis it fell sharply before growing for the following three years and again declining at

the end of the study period. In addition to the development of employment in foreign companies with investment incentives, the development of the RRTG indicator also influenced the development of the benchmark values – they mostly increased more dynamically than the corresponding indicators (productivity, employment) of the Liberec Region. Thus, the development of the RRTG indicator was influenced not only by the development of the absolute indicators of the region, but also by the change in the position of the region compared to the regions in the benchmark – the change in relative comparison, ie the different dynamics of the employment and productivity development compared to the examined regions. Consequently, the Liberec Region maintains an average level of economic indicators, but it has a below-average and highly volatile technology absorption capability that could steadily maintain growth dynamics. This means that it does not use its potential as much as it could.

Regarding the decomposition of the RRTG indicator, it can be stated that the productivity effect had a higher share on the growth of the Hradec Králové Region. The employment effect has been negative since 2004. This is not a surprising result due to the very low share of workers employed by individual foreign companies with investment incentives in the region (ie low FP value).

Fig. 4: Development of the RRTG employment effect in the examined regions



Source: own construction based on own calculations and data from OECD, CZSO and annual reports of examined FDI

The Pardubice Region reached the highest values of the RRTG indicator at the beginning of the studied period, the very highest value was recorded in 2004. However, it can be stated that the Pardubice Region experienced a decline in interest from foreign investors applying for investment incentives, but this decline was lower than the one seen in the otherwise comparable Hradec Králové Region (CzechInvest, 2017). Due to their joint economic development, where both regions were part of the East Bohemian Region in the past, similar developments of the RRTG indicator curves are not too surprising. At the beginning of the period under review, the Pardubice Region recorded the highest labour productivity of all the examined regions, but at the end of the period it lost its top position and fell to the penultimate place. This confirms the mutual direct dependence between the growth of labour productivity in the region and the growth of the RRTG indicator, respectively this decreasing development of labour productivity in the region was signalled by the development of the RRTG in the monitored period.

Throughout the examined period, the Pardubice Region maintained the share of employees of foreign companies with investment incentives at a practically constant level. This means that this region went through a different development than the other examined regions, which did not allow for an increase in the depth of technology transfer or

the exploitation of the possibilities of transferring productivity and consequently to significantly increase labour productivity. This is confirmed by the development of the RRTG indicator of the Pardubice Region (Kotíková & Čuhlová, 2016).

It is possible to say that in regions where a growing trend of the RRTG indicator was recorded, it is possible to see above-average growth in labour productivity. Conversely, the regions which report a decreasing or low level of the RRTG indicator show below-average growth in labour productivity (the Hradec Králové Region alone breaks this rule).

At this point it is necessary to note that the dependence of the RRTG indicator and labour productivity is both mutual and positive. It means that the growth of the RRTG indicator can trigger labour productivity growth in the examined region and by contrast, the increase in labour productivity in the region can create favourable conditions for the further transfer of technology knowledge.

In summary, it can be said that the examined regions are able to use the emerging technology gap for their economic growth. On the contrary, regions that are unable or unwilling to attract investors from advanced foreign countries into their region are unnecessarily losing the possibility of economic growth from the transfer of technology knowledge.

3.1 Transfer Intensity Indicator – Comparison of the Analysed Regions

The development of the transfer intensity and the absorption of the technology level of foreign companies in the examined regions does not fully duplicate the results of RRTG. While in terms of the RRTG indicator the Plzeň Region was clearly the best at using the region's technology gap, from the point of view of the IT indicator the Hradec Králové Region took first place.

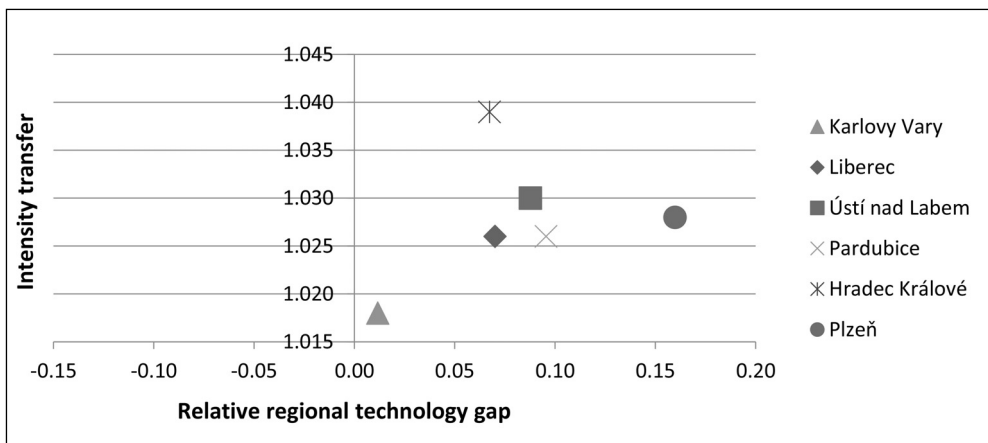
This difference is due to the fact that in both regions there is a relatively high level of monitored productivity (compared to other regions) but both of them are pulled by another component of RRTG. In the case of the Plzeň Region, the high productivity is caused by the high level of FDI in the region and also by the high number of employees of these companies as a share of the total number of employees in the region – it is an extensive growth. In the case of Hradec Králové Region, the productivity growth is recorded mainly due to the intensity of the use of a relatively small number of foreign companies operating in the region and employing a relatively small proportion of employees.

The overall results of the indicators including the positions of individual regions are illustrated in Fig. 5. It can be understood

that a high IT indicator value occurs primarily in regions where RRTG has been pulled by the productivity component, and lower IT levels then reach regions in which RRTG value has been pulled by the employment component. The lowest IT values are found in regions that had no RRTG components at a sufficient level.

Within the examined set of regions, the highest value of the indicator in terms of the relative comparison of the regions was reached by the already mentioned Hradec Králové Region, while the lowest value was recorded in the Karlovy Vary Region, where both the absolute value of the IT indicator and the relativised (modified) value of the indicator were low. The Ústí nad Labem Region also recorded a relatively high IT value (the average IT growth coefficient was 1.03), while the surprisingly low value was reached by the Pardubice Region (1.026). However, all the regions achieved positive values of the average IT growth coefficient. It can be said that they are able to use still more and more intensively the opportunities of potential technology growth brought by the representation of foreign companies operating in the region. This result is probably due to the growing experience of the regions in terms of cooperation with branches and parent companies abroad as well as the penetration of foreign companies; this statement also corresponds to the increasing values of the FP curves.

Fig. 5: Overall results of RRTG and IT indicators in the analysed regions



Source: own construction based on own calculations and data from OECD, CZSO and annual reports of examined FDI

Conclusions

Using an example of six regions of the Czech Republic, the size of technology gap between FDI and the local business environment and the local environment's absorptive capacity were quantified. This quantification was based on shift-share analyses of the principle of benchmarking, and the data used in this research paper came from the Czech Statistical Office (2018), OECD (2018), and the annual reports of the analysed companies.

Regarding the development of the total value of RRTG over the whole examined period (see Fig. 1), the greatest technology gap was recorded in the Plzeň Region. The RRTG values of the other regions decreased over time, reaching their minimum value between 2007 and 2010, the period of the Eurozone financial and debt crisis. At the end of the study period (from 2013), a signal of a renewal growth began to be detected. Positive results were observed in larger regions. Gutierrez-Portilla, Maza and Villaverde (2019) point out that the larger the market size, the more attractive the region and the more indirect effects may take place.

The best results were achieved by regions with larger market sizes, which correspond to the results of Garretsen and Peeters (2009) and Regelink and Elhorst (2015). The regions with agglomeration effects have a greater potential for assuming effects of FDI. Similar conclusions were also reached by Wu and Burge (2017), who analysed the effects of FDI localisation in Chinese provinces supported by government policies.

Finally, after the RRTG indicator have been introduced, it is also possible to mention the flexibility of the constructed indicator. The indicator is modifiable – by changing the content of its components, it would be possible to modify the created indicator which might be appropriate for addressing some specific issues. Among these possible modifications, the following approaches can be included:

- a) In the productivity component, it would be possible to compare the productivity of a foreign company with the productivity of the region (instead of the productivity of the benchmark).
- b) To simplify this approach, it would be possible to work with the average productivity of foreign companies operating in the region (instead of the productivity of each individual company by its country of

origin). On the other hand, when looking at the country of origin, the research provides more comprehensive information on the behaviour of MNCs by country of origin. As reported by Li et al. (2018), the country of origin of FDI plays an essential role in locating and maintaining investments in the host region.

The constructed IT indicator complements the RRTG indicator. The IT indicator evaluates the degree of utilisation (intensity) of the opportunity to absorb the technology level of foreign companies by individual regions.

As Prokop and Stejskal (2018) reported, results of absorptive capacity and knowledge transfer spillovers can be seen over the long term. The calculations showed that all the regions achieved positive values of the average IT growth indicator, ie all of group of regions was able to absorb, to greater or lesser extents, the opportunities of technology growth brought by the representation of foreign companies in the region. Within the examined regions, the Hradec Králové Region recorded the highest value of the indicator in relative terms. On the contrary, the lowest values were recorded in the Karlovy Vary Region.

These results correspond with research dealing with absorptive capacity and and FDI inflow by Shevelova and Plaskon (2018) at the regional level in Ukraine. They indicate the complementary relationship between FDI inflow and absorptive capacity of technological transfer connected with FDI inflow. But attention must be paid to the significant limits of the Ukrainian regions to absorb localised foreign capital.

The size of the technological gap and the absorptive capacity of the regional business environment are important variables of a country's institutional diversity, which reflect economic, political (investment incentives), and cultural institutions in which FDI operates (Goerzen & Beamish, 2003). All these determinants (variables) affect FDI and the footprints of its internationalisation into regions (countries). The Country Institution Diversity reinforces the liability of foreign presence, reinvestment activity, and the establishment and building of business relationships between FDI and host economic subjects (Asmussen & Goerzen, 2013). In other words, monitoring the variables of a country's institutional diversity contributes to the evaluation of regional

integrations that affect FDI location (Arregle et al., 2018).

This research paper provides some recommendations for economic policymakers who deal with investment support and specifically attracting foreign investment. It also shows which regions are able to benefit from the presence of FDI in their territory. For as Fonseca and Liamosas-Rosas (2019) and Jordaan (2008) agree, understanding of the determinants of FDI helps to modify future public strategies toward regional development.

Conclusions contribute to the current political discussion about the forthcoming amendment to Act No. 72/2000 Coll. on investment incentives, which is to come into effect in the final quarter of this year.

The value and the originality of this paper is methodological and empirical as well. This study presents an original methodological approach with an appropriate sample and original application of the benchmarking method base on the shift-share analysis. In terms of the scientific field, the main contribution of the presented approach is the proposed methodology of the effects identification, the construction of indicators and the assessment of the monitored effect at the regional level of NUTS 3. This paper contributes to the existing scholarship by more explicitly dealing with the complexity of the relationship between the localisation of FDI and the ability of regional business environments to deal with such internationalisation activities. A certain filling of the current gap in the existing economic research focused on the identification of the FDI effects at the lower regional level can also be considered a contribution to the scientific field. This approach allows virtually unlimited expansion of the set of the examined and monitored regions. All the constructed indicators are applicable not only to the regions of the Czech Republic but also to other regional units in other countries.

Future research should be focused on examining not only groups of regions within one country but also on evaluating other regional units from special geographical areas. In so doing, it may be possible to offer more complex recommendations and comparisons of the investment incentives systems of analysed countries, which could reflect or indicate comparative advantages. However, the problem with extending research in this

direction continues to come in the form of a lack of data.

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Abstract

POTENTIAL OF THE CZECH BUSINESS ENVIRONMENT ASSUMES THE EFFECTS OF FOREIGN DIRECT INVESTMENT**Sylvie Kotíková**

The localisation of foreign capital affecting both the immediate and future situation of the host locality in a number of ways. The positive effects of the location of FDI are welcomed all over the world, and their emergence is supported by the granting of investment incentives. The question is how to correctly measure these effects, but also the potential of specific areas to accept them. The aim of this contribution is to determine the size of the technology gap between FDI supported by investment incentives and the business environments in a group of six regions of the Czech Republic as well as to determine the absorption capacity of the technology transfer of these regions.

Based on shift-share analyses, an indicator quantifying the size of the technology gap at the regional level of NUTS 3 has been constructed. This indicator has been supplemented by an indicator of technology transfer intensity. The benchmarking method illustrates the absorption capacity of the Czech business environment in an interregional comparison reflecting the strong and weak sides of the Czech regions in terms of absorbing the benefits of locating multinational corporations in their territories.

The calculations and analyses have proved the leading position of the Plzeň Region, which takes advantage of its geographical position as well as its historical industrial tradition. At the same time, the high absorption capacity of the Hradec Králové Region, a region with a high potential for intensive growth, has been identified. On the other hand, the Karlovy Vary Region has been an outsider in the examined set of regions. In the long run, this region has not been and will not be able to attract at least a satisfactory level of foreign presence from which the region could positively benefit and start its economic growth.

Keywords: Foreign direct investment, foreign presence, labour productivity, technology gap.

JEL Classification: E22, E24, F21, F23, F43.

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