Foreign Direct Investment and Transport Serviceability – a Prerequisite for the Development and Stability of National and Regional Economies

Izravno strano ulaganje i sposobnost usluge prijevoza – preduvjet razvoja stabilnosti nacionalnih i regionalnih ekonomija

Summary
This article focuses on the development and impact of foreign direct investment (hereinafter referred to as “FDI”) in the V4 countries and in particular Slovakia, with a primary focus on the automotive and electronics industries. A detailed analysis is carried out in the Žilina Region, where the positive impact of FDI on the economic growth of the region and its stability is documented through regression analysis. In the following part, the influence of both foreign and domestic investment on transport serviceability and transport infrastructure development is analysed on the basis of the example of the Region of South Bohemia.

1. INTRODUCTION
The OECD defines foreign direct investment (FDI) as a category of investment that reflects the continuous interest of an enterprise (direct investor) in an enterprise (direct investment enterprise) residing in a different economy from that of the direct investor. The interest implies the existence of a long-term relationship between the direct investor(s) and the direct investment enterprise, and a corresponding degree of influence (not necessarily control) on the company’s management. The ownership of 10% or more of the voting rights of the enterprise residing in a different country from that of the direct investor is considered as proof of such a relationship. There can be many reasons for investing abroad. These reasons include the search for new business opportunities oriented towards customers’ specific needs, efforts to acquire new natural and human resources at a price which would be lower than in the domestic economy, and the search for new market opportunities for products. What it ultimately comes down is the desire for a growth in production efficiency and an increase in yields [1]. Identifying the determinants of the inflow of foreign direct investments depends on the specific conditions of a country or region.

Ensuring essential transport services in a region is considered to be a basic social right of all EU citizens. According to the Act No. 194/2010 Coll. (Czech Republic) on public passenger transport services and amendments to other Acts, transport serviceability refers to the provision of transport to schools and educational institutions, public authorities, places of work, health facilities providing basic health care, facilities that meet the cultural, recreational and social needs of the people, including return transport, every day of the week, and which thereby contribute to the sustainable development of an entire region. The network density and transport capacity of regular bus services and rail passenger services are significantly influenced by the combination of the financial capacity built...
into local budgets, foreign investment inflows and the efficient use of such resources in a regional economy. This article focuses directly on this issue.

a) The development of foreign direct investment in Slovakia and the other V4 countries

In 1998, the Slovak government did not support the arrival of foreign investors into Slovakia and made efforts to promote the development of “slovenskej kapitálotvornej vrstvy – Slovak capital-making layer”. Due to this policy, Slovakia, in terms of the volume of FDI, was in last place when compared to the V4 countries. On 31 December 1998, the volume of FDI in Poland was USD 22,479 million, in Hungary USD 20,733 million, in the Czech Republic USD 14,375 million, but in Slovakia only USD 4,174 million. A change in policy came after the 1998 elections. The newly elected government adopted measures which should reduce the domestic share of investment in GDP, open up the economy to the world and create the conditions for the inflow of FDI into the country. The result was the increased inflow of FDI in Slovakia, which grew at a faster pace than at any other time in the past. The inflow further increased after Slovakia’s accession to the European Union. In 2004, the total amount of FDI reached USD 28,185 million, rising to USD 50,416 million in 2008. Despite the fact that FDI in Slovakia is still growing, the growth dynamics slowed significantly after the financial crisis of 2008. In 2014, FDI in Slovakia amounted to USD 53,216 million, which is the lowest level in the V4 countries (see Figure 1).

The total volume of FDI faltered in 2008 – 2009 due to the economic crisis, but recovered and continued to grow in the subsequent years in all V4 countries, reaching a peak in 2012 – 2013. In 2014, all V4 countries experienced a slight decrease in FDI. When studying FDI, a more objective indicator of how beneficial FDI is for the host country is the volume of FDI per capita. In this case, the Czech Republic (USD 11,315 per capita) is in first place, followed by Hungary (USD 9,902 per capita), Slovakia (USD 9,757 per capita) and Poland (USD 6,414 per capita) (see Figure 2).

For the region or enterprise into which foreign capital is funnelled, FDI can serve as a source of technology transfer and the introduction of new processes [3], products, knowledge, organizational and managerial skills and abilities [4], [5], [6], which contribute to cost reductions [7] and is a tool for increasing efficiency, productivity and competitiveness. Through income tax, FDI contributes significantly to the budgets of host countries [8]. In addition, FDI helps in regions with serious demographic and socio-economic problems [9], [10] and has the ability to rectify regional imbalances in economic performance [11], [16].

b) The development of foreign direct investment in the Žilina Region

The Žilina Region is one of the eight administrative regions that make up Slovakia. It has a favourable geographical location and is therefore an important traffic junction between Western and Eastern Europe, and Northern and Southern Europe. The closest neighbouring countries are the Czech Republic and the Republic of Poland. The industrial character of the country is due to the lack of agricultural land. In terms of FDI, the Žilina Region is ranked in third place after the regions of Bratislava and
Trnava. Between 2000 and 2012, the volume of FDI in this region increased from EUR 283 million to EUR 2,523 million, which is almost a ninefold increase in twelve years.

Figure 3 Regions in the Slovak Republic [17]

2. MATERIAL AND METHODS

2.1. Analysis of foreign direct investment development in Slovakia and the Žilina Region

The impact of the role of foreign direct investment on the development of the Žilina Region can be analysed by looking at the evolution of FDI in the region and investigating the effect this has had on the utilization of production factors, labour productivity, the unemployment rate and GRDP (Gross Regional Domestic Product). In terms of FDI inflow, the majority is directly related to the automotive and electronics industries (Panasonic Electronic Devices Slovakia Co. Ltd., Punch Campus Námestovo Co. Ltd.). Other significant foreign investors can be found in the forest-based and paper industries (Mondi SCP plc.), mechanical engineering (ZTS Strojárne Co. Ltd., HACO Liptovské strojárne plus plc., INA Kysuce plc.), as well as in the energy industry (Stredoslovenská energetika plc.).

Figure 5 Development of FDI expressed in EUR (millions) in the Žilina Region and the share of FDI in SR in 2000 - 2012

The development of FDI in the Žilina Region has mainly been influenced by measures taken by the government. This has resulted in recent years, in a positive impact on the inflow
of FDI into the region. An important tool for attracting foreign investors is regional aid and related investment incentives. The highest level of state aid was extended to KIA Motors Slovakia Co. Ltd. The entry of the Korean automobile manufacturer represented a significant incentive for the influx of other foreign capital, especially from the company’s suppliers. The Žilina Region therefore has one of the highest levels of foreign direct investment.

2.2. Analysis of the impact of foreign direct investment on the unemployment rate

The level of unemployment is representative of the health of an economy. High levels of unemployment are indicative of the low efficiency of use of available production factors. Figure 7 shows the evolution of the unemployment rate and foreign direct investment in the Žilina Region. It shows a direct correlation between the decreasing rate of unemployment in the region and the growth in the volume of FDI. The unemployment rate has been decreasing since 2004 when the Slovak Republic joined the European Union and Kia started to operate in the Žilina Region. KIA Motors Slovakia Co. Ltd., INA Kysuce plc. and Stredoslovenská energetika plc. are among the largest employers in the Žilina Region. Together, the companies employ approximately 9,500 employees. Further decreases in the unemployment rate and increases in FDI were related to the arrival of subcontractors and production expansion. The increase in the unemployment rate after 2008 was due the economic recession caused by the global financial crisis.

![Figure 7 Development of FDI and unemployment rate in the Žilina Region in 2000-2012](Source: processed according to [13, 14])

The relationship between FDI and the unemployment rate will be investigated by means of correlation and regression analyses. For the analyses, the data collected for 2000 – 2012 were used. In this case, FDI (in EUR millions) represents the independent variable \( X \) and the unemployment rate (in %) is the dependent variable \( Y \).

2.3. Analysis of the impact of foreign direct investment on labour productivity

Labour productivity in the Žilina Region in 2011 was the third highest in Slovakia. Figure 8 shows that the development of labour productivity almost precisely replicates the developments in FDI. Foreign direct investment therefore has a significant impact on labour productivity growth calculated on the basis of GDP in the Žilina Region.

![Figure 8 Development of FDI and labour productivity (LP) in EUR (millions) in 2000-2011](Source: processed according to [13, 14])

This relationship will also be investigated by means of correlation and regression analyses. In the analyses, the dependent variable \( Y \) (response variable) is labour productivity on the basis of GDP in the region, and the independent variable \( X \) (explanatory variable) is FDI in the region. For the analyses, the data collected for 2000 – 2011 were used.

2.4. Analysis of the impact of foreign direct investment on gross domestic product

Figure 9 shows the development of FDI and gross regional domestic product in current prices in EUR (millions) and the percentage FDI share in GRDP. In 2011, the FDI share in GRDP was up to 35%. This was due to a higher growth in FDI. The development of FDI imitates the development of GRDP, the only difference being in the impact of the economic crisis which in 2009 resulted in a larger drop in GDP than the drop in foreign direct investment.

![Figure 9 Development of FDI and GRDP in EUR (millions) in 2000-2011](Source: processed according to [13, 14])

To analyse the impact of FDI on GRDP, correlation and regression analyses were carried out on the basis of the data collected in 2000 – 2011. For the analyses the foreign direct investment was represented by the independent variable \( X \), while GRDP by the dependent variable \( Y \).

2.5. Analysis of transport infrastructure in the Region of South Bohemia

The current infrastructure in the region is gradually improving. However, the general level and quality of the infrastructure in the Czech Republic is below the EU average. The favourable transport location of the region and the existing transport
In order to ensure good transport services in the region, public transport is preferred to individual car use. Integrated transport systems are being developed and public transport systems (MHD) are being extended.

- In order to ensure good transport services in the region, public transport is preferred to individual car use. Integrated transport systems are being developed and public transport systems (MHD) are being extended.

- Investment in construction of the north – south route (Section 4 of the transit railway corridor Prague – Linz, in accordance with the parameters set for European transit corridors, will contribute to the higher utilisation of the rail network.

- Local authorities in and around České Budějovice, as well as at regional level, are endeavouring to increase the use of the former military airfields in Bechyňe and Planá near České Budějovice (currently known as České Budějovice Airport) for national and international civil air traffic.

- Making the River Vltava navigable from Černá v Pošumaví to Třebetice, as well as the extension of the rail network into the Šumava (Railway line 195 Rybník – Lipno nad Vltavou – extension of the track to – Černá v Pošumaví) will contribute to the further development of tourism in the region.

- At present, the further economic development of the region is largely influenced by the transport infrastructure and its parameters. The Region of South Bohemian particularly lacks external transport links (links to surrounding regions and countries). In contrast, there is fairly dense well established internal transport network which ensures basic transport serviceability.

- An extensive network of various categories of roads places heavy demands on their maintenance and renovation. The renovation of local roads or 2nd and 3rd class roads is therefore an important budgetary issue for local authorities in the region. The absence of external transport links in the region gives the impression that the region is less accessible and subject to frequent traffic congestion (e.g. the north – south road where it runs into Tábor).

The data in Table 1 provides an overview of the investment in the development of the region between the years 2007 and 2013. It clearly shows the priority given to investments in transport infrastructure - representing more than 50% of all regional investment.

### 3. RESULTS AND DISCUSSION

#### 3.1. Impact of foreign direct investment on the rate of unemployment

The negative covariance coefficient value \( \text{cov}_{\text{unemployment}} = -2128 \) indicates the inverse proportionality between the variables. This means that the rate of unemployment in the Žilina Region decreases with the growing volume of FDI. Pearson’s correlation coefficient \( r_{xy} = -0.73 \) in the interval of \(-0.7<|r_{xy}|<0.9\) confirms the negative correlation with a high degree of linear dependence between the variables. Based on these findings, regression analysis can be carried out. The resulting regression line is represented by the following equation:

\[
Y = 19.1857 - 3.3884 \times X
\]

The decreasing trend of the regression line is shown in Figure 10. In this case, the result can be considered to be positive because an increase in foreign direct investment results in a decrease in the rate of unemployment by 3.39%.

![Figure 10. Regression line showing the impact of FDI on the rate of unemployment in the period 2000-2012](image)

Source: processed according to [13, 14]

By investing EUR 1 billion (FDI), the rate of unemployment in the Žilina Region decreases by 3.39%. Without any investment, the rate of unemployment would be 19.18%. Tests of significance confirmed the significance of the model and its parameters. FDI therefore contributes to a decrease in the rate of unemployment in the Žilina Region. The percentage of the variation explained by the regression model is 59.25%. The percentage is due to the exclusion of all variables which influence the rate of unemployment. The regression analysis showed that with the growth of FDI by EUR 1 billion, the rate of unemployment decreases by 3.39%. It follows that FDI plays a role in reducing the rate of unemployment, but that it is

### Table 1 Overview of regional investment by sector in the period 2007 – 2013 (in CZK millions)

<table>
<thead>
<tr>
<th>Area</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport – infrastructure</td>
<td>396.9</td>
<td>596.7</td>
<td>678.0</td>
<td>765.7</td>
<td>772.8</td>
<td>774.5</td>
<td>881.7</td>
</tr>
<tr>
<td>Health care – establisher</td>
<td>100.0</td>
<td>98.7</td>
<td>121.3</td>
<td>129.9</td>
<td>150.0</td>
<td>150.0</td>
<td>160.0</td>
</tr>
<tr>
<td>and founder</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social affairs – est.</td>
<td>61.2</td>
<td>61.9</td>
<td>47.2</td>
<td>47.6</td>
<td>48.0</td>
<td>48.4</td>
<td>55.0</td>
</tr>
<tr>
<td>Education – est.</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>Culture – est.</td>
<td>38.0</td>
<td>38.0</td>
<td>38.0</td>
<td>38.0</td>
<td>38.0</td>
<td>38.0</td>
<td>43.0</td>
</tr>
<tr>
<td>In total</td>
<td>636.1</td>
<td>835.3</td>
<td>924.5</td>
<td>1 021.2</td>
<td>1 048.8</td>
<td>1 050.9</td>
<td>1 179.7</td>
</tr>
</tbody>
</table>

Source: [15] (without socio-economic profile of the region – investment)
not the only factor affecting the rate of unemployment in the region. This conclusion is also confirmed by the low value of the coefficient of determination ($R^2 = 0.5925$).

3.2. Impact of foreign direct investment on labour productivity

The correlation test of the relationship between FDI and labour productivity by means of the covariance coefficient ($\text{cov}_{xy} = 3.935$) and sample correlation coefficient ($r_{xy} = 0.983$), confirmed the existence of a direct linear relationship and the very close links between them. Squaring the correlation coefficient enabled the calculation of the coefficient of determination ($R^2 = 0.966$), which shows that 96.6% of empirical data values were explained by the linear regression model (see Figure 11). The basis of the model is the regression line, which has a significant upward trend and is expressed as follows:

$$
\text{cov}_{xy} = 3.935
$$

$$
r_{xy} = 0.983
$$

$$
R^2 = 0.966
$$

The regression analysis showed that the growth of FDI tends to be accompanied by a growth in labour productivity. An increase in labour productivity of EUR 5,800 requires an increase in foreign direct investment of EUR 1 billion. The significance of the model is confirmed by $F$-statistics. The calculated value of $F$-statistics ($F = 286.3$) is greater than the tabular value ($F_{(2,0.1;10)} = 4.965$) at significance level ($\alpha = 0.05$), which confirms the significance of the model as a whole. Labour productivity in the Žilina Region is very high. The growth in FDI stimulates the growth in labour productivity. According to the results of the regression analysis, by increasing the volume of FDI by EUR 1 billion, labour productivity increases by EUR 5,800. The significance of the model is also confirmed by the fact that by changing the volume of FDI, it is most likely that the value of labour productivity will change as well.

3.3. Impact of foreign direct investment on gross domestic product

The covariance coefficient indicates whether the variables are positively or inversely related, or there is no dependence between them. The covariance coefficient takes the value 1276610, which means there is a linear relationship between FDI and GRDP. To measure the intensity of the linear relationship between the two variables, Pearson’s correlation coefficient ($r_{xy} = 0.985$) was used i.e. $r \geq 0.9$, which indicates a very close relationship between the variables. The basis for regression analysis was the specific regression equation:

$$
\text{FDI in EUR (millions)} = 331.668 + 4.965 \text{Labour Productivity in EUR (millions)}
$$

shows the rising tendency of the line. This means that in the period 2000 – 2011, the growth in the volume of FDI significantly contributed to the growth of GRDP.

In addition to the positive impact of FDI on GRDP, the regression analysis also showed that if the volume of foreign direct investment were to increases by EUR 1 billion, GRDP at current prices would increase by EUR 1,872 million. The coefficient of determination and $F$-statistics were used to confirm the significance of the data. The coefficient of determination takes the value 0.971, which means that with a change in the volume of FDI, the GRDP value will change with 97% probability i.e. the significance level of the model is 97%. The calculated value of the $F$-statistics ($F = 331.668$) is higher than the tabular value ($F_{(2,0.1;10)} = 4.965$) at significance level ($\alpha = 0.05$). It follows from the above, that the coefficient of determination is statistically significant and therefore the model as a whole too. In 2011, foreign direct investment accounted for 35% of GRDP. Compared to the previous year, the FDI share of GRDP increased by approximately 5%. The results of the correlation analysis indicate a very strong relationship between FDI and GRDP.

3.4. Transport infrastructure in the Region of South Bohemia

When comparing the amount of investment between 2014 and 2016, it can be stated that it increased significantly. In 2016, regional expenditure on transport infrastructure totalled CZK 11.7 billion broken down into current, capital and investment expenditure. The volume of current expenditure is CZK 9.791 billion, the equivalent of 84 % of total expenditure, and is, inter alia, influenced by subsidies from the Ministry of Education, Youth and Sports (MŠMT) to the amount of CZK 5.5 billion. According to MŠMT, current expenditures includes CZK 1.046 billion for ensuring transport serviceability, which in South Bohemia is facilitated through regular bus services and passenger trains. Of this amount, CZK 186 million is a subsidy from the Ministry of Transport. Capital expenditure totals CZK 1.9 billion i.e. 16% of total expenditure. This amount is lower than in 2015, which reached a record CZK 2.5 billion. It is a reasonable and realistic level of investment. Unlike this year, two thirds of those expenditures are covered by the financial resources of the region, with lower subsidies. The priority of the region is the modernisation of the regional road network (2nd and 3rd class roads) and the gradual modernisation of hospitals and social care facilities.
On the basis of these findings, it is possible to define the following objectives and priorities in the development of transport infrastructure in the Region of South Bohemia:

- To improve external transport links within the Region of South Bohemia, as well as improve and optimize the internal transport links and logistics within the region while ensuring sustainable, good quality, appropriate links to the technical infrastructure network that would increase the competitiveness of the regional economy as well as improve the life of the population of the region.

- To improve external transport links to neighbouring regions and countries, which is likely to increase the competitiveness of the regional economy and increase the capacity and safety of main roads passing across the region.

- To increase the safety and quality of the internal road network and transport serviceability in the region and individual municipalities, as well as to encourage the development of non-motorised modes of transport in order to meet the cultural, recreational and social needs of the residents and visitors to the region.

- To improve, develop and increase accessibility to the technical infrastructure network with respect to the territorial and socio-economic development of the Region of South Bohemia, as well as ensuring the safe, considerate and sustainable use of resources.

4. CONCLUSION

This article has demonstrated the positive impact of FDI on transport serviceability and the quality of the transport infrastructure, as well as on sustainable regional development. It can be stated that a mutual relationship exists, especially with regards to the cross-compliance of those parameters. Without adequate transport serviceability and an adequate level of transport infrastructure, the inflow or effective use of foreign direct investment in the region cannot be assumed. Conversely, it can be stated that foreign direct investment will play an increasing role in the development of the automotive, transport and communications industries, as well as related economic sectors in the region. It can also be stated that the growth of GDP and labour productivity increases with the inflow of foreign direct investment. Based on the obtained results, it can be said that this statement is generally true in nature. It is evident that in the future, FDI will flow into the development of individual economic sectors, and that the volume of investment into the technical infrastructure, in particular transport, will increase as well. This investment will be focused on the gradual improvement of the internal transport links with an emphasis on their socio-economic optimization and efficiency, as well as on the improvement of the external transport links between regions by the means of traditional modes of transport (road, rail, air and waterway transport). In connection with these objectives, it will also be important to develop logistics and external logistics links in regions. A significant part of transport is non-motorised modes of transport, especially cycling in urban and suburban areas (cycle tourism). All the proposed measures in the field of transport services aim to increase the competitiveness of regional economies and improve living conditions for residents and visitors. These principles can be designated as fundamental to regions in both the Czech Republic and Slovakia with respect to their specific features.

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