

# Foreign Direct Investment in Visegrad Four and the Main Trading Partners<sup>1</sup>

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## Abstract

This article is aimed at a comparison of the inflow of foreign direct investment per capita in the countries of the Visegrad four and their most important trading partners. For the comparison of countries there was exerted one statistical method - analyses of variance (ANOVA). It was found that there are statistical significant differences between the countries of the Visegrad four. It is shown that after the accession of Germany and Austria there is no statistically significant difference between all the countries. Germany and Austria are the geographically nearest countries of the Visegrad countries. After the inclusion of all trading partners who have ties to more countries, the Visegrad four is already evident that there are significant differences between countries. However, variances are statistically significant in the inflow of investment to all countries. In the work is shown that a country of the Visegrad four and its nearest trading partners are a compact unit in the inflow of foreign direct investment per capita.

## Keywords

*Foreign direct investment, population, ANOVA, the Visegrad four*

## JEL code

*E22, E24, F21*

## INTRODUCTION

Foreign direct investment (FDI) has gained significant importance over the past decade as tool for accelerating growth and development of economies in transition. It is widely believed that advantages that FDI brings to the standard of living and prospects for economic growth of the host nation largely outweigh its disadvantages. International trade and FDI can be very effective ways of stimulating technological progress for a less-developed country. It is well known that there are many factors affecting FDI, such as intellectual property rights protection, economic stability and the political climate, labor market, opening policy, foreign exchange rate, relative wages and income convergence, financial and tax policy, GDP in the host country, bureaucratic corruption, an environmental policy and so on (Xu, 2008).

In recent years, FDI is worshipped in many places blindly, which has become an increasingly serious problem. Local government only focuses on the promoting function of FDI to the economic growth,

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neglecting the negative effects of FDI, and does not understand the complex effect of FDI comprehensively. In the process of introducing FDI, the government pays attention to quantity rather than quality, and makes a clearance sale on natural resources, environment, market and even government tax in a competitive way. The bias of this policy and behaviour to attract foreign investment virtually increases the hidden trouble of immiserizing growth (Liu, 2011, p. 122).

For example, direct FDI effects in the Czech Republic are studied in many studies, which report that benefits are larger when investment comes in the form of FDI with direct foreign control rather than FDI in the form of a joint venture with a domestic company. In the Czech context, it is argued that the estimated positive effects of FDI on performance are in some cases unrealistically high, and that the lack of suitable variables leads to an unsatisfactory estimation of self-selection. Using a data set of Hungarian firms, authors show that firms with foreign ownership outperform domestic firms (Hanousek, 2011).

However, such interventions may prove sub-optimal or even counterproductive. For instance, firms may have little choice but to engage in outward FDI if exporting from the home base is no promising alternative because of impediments such as distorted exchange rates and trade-related transaction costs. The optimal approach would then be to remove such distortions and, thereby, enable firms to reconsider their choice between exports and outward FDI. Restricting FDI-related offshoring to lower-cost locations such as China would involve serious trade-offs: while it might sustain domestic production and employment in the short run, such interference runs the risk of undermining the overall competitiveness of firms in the longer run. It should be noted in this context that there is little reason to blame FDI in China for hollowing-out Taiwanese manufacturing as the quantitative impact turns out to be rather small. Directing outward FDI to technologically leading host countries would have little effect unless the investing firms have sufficient absorptive capacity to make efficient use of superior technologies (Liu, 2011).

As the World Trade Organisation (WTO) only deals with “trade”, the granting of incentives in the pre-production period and not for trade of goods creates problems in the measurement of adverse effects for other member states. By the time production and trade/exports have started, incentives given to attract investment have often ended (Oxelheim, 2008).

The paper is structured as follows. It begins with Section 1, which describes theoretical consequences. Section 2 includes methods and methodology including hypothesis. Section 3 provides results of research. Section 4 provides concluding remarks.

## 1 THEORETICAL CONSEQUENCES

Inflow of foreign direct investments in particular countries varies from country to country, however object of this article are the states of the Visegrad four (V4) and the main trading partners of the V4. The V4 includes the Czech Republic, Hungary, Poland and Slovakia.

The correlation between exports and FDI suggests that government support of the mobile resources that are not tied to the UK, such as subsidies to R&D, management or technical training, designed to enhance the competitiveness, may affect also the competitiveness of its immobile resources, as measured by the export performance (Nachum, 2001). Employees are great mobile sources in some economies, which can't be said for the Czech, who does not comply with these aspects. To support the mobility of employees are offered higher rewards.

The accruing inflow of FDI is affected preferential trade agreement such as the NAFTA, CEFTA, etc., concerning about an integration region. The main capital inflow of FDI to Korea after the liquidity crisis should take the form of cross-border M&A rather than Greenfield investment. It was caused merging firms and the main reason was scarcity of liquidity. In this consequence concerns increased

distinct cross-border M&A (Kim, 2009). Czech Republic is a member of many partnerships, mainly EU, OECD, V4 etc.

### **1.1 Trading partners of the V4**

The main trading partners of the V4 are Russia, Ukraine, Italy, Great Britain, Germany, Austria and Romania. The main trading partner of the V4 is Germany, followed by Great Britain, France and Austria. These countries have the most linkages with countries of the V4. Russia, Ukraine and Romania have only one linkage with countries of the V4. These states were eliminated due to the only one linkage with countries of the V4 and this article is aimed to the remaining countries. These countries are Austria, Czech Republic, Germany, Hungary, Poland, Slovakia, France, Italy and Great Britain. The assessment of individual countries is referred in the following way:

The first areas are countries of the V4, then follow selected countries without France, Italy and Great Britain and at in the conclusions there are subsumed all the selected countries to illustrate the wider view of the analysis area. The reason for the second step was to determine whether the countries may differ, if there is included the distance between the individual countries, because the geographical distance between France, Italy and Great Britain is substantially higher than that between Germany and Austria, although on a global scale the distance between eliminated countries and the V4 including Germany and Austria is negligible.

### **1.2 Development of the population of the selected countries**

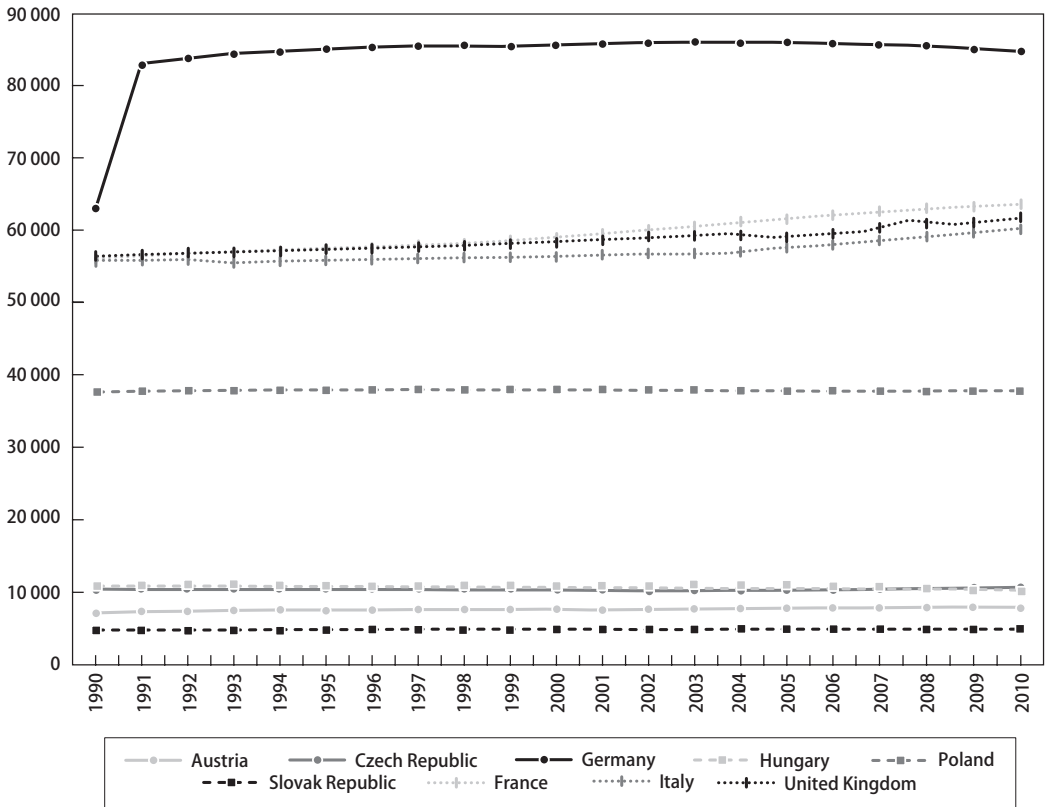
The market size also plays an important role on the pattern of FDI inflows. Countries with a larger market size appear to attract more FDI inflows (Mellahi, 2011). Market size is measured by the host country's total population (Barassi, 2012). Milner (2006, pp. 205–206) argues that firms taking labor intensive stages of the production process to a lower cost location and transporting final and semi-processed products back to the home market. There are additional incentives to invest abroad where there are special exporting advantages (e.g. preferential market access terms), but it is predominantly production for a non-host country market.

Horstmann and Markusen, 1992 and Brainard, 1993 aimed to explain the high level of FDI between similar or even identical countries, and assume that the primary motivation for MNEs is to gain market access rather than to take advantage of differences in factor endowments. This stream of theory predicts that the host country's market size and trade cost would be vital in determining the level of FDI.

The development of the population of the selected countries is characterized by significant differences between countries. The absolute population size cannot be compared because Germany has 80 mil inhabitants. France, Italy and Great Britain have over 60 mil inhabitants, Poland has 38 mil, Czech Republic and Hungary have about 10 mil, Austria about 8 mil and Slovakia has roughly 5 mil inhabitants.

The following figure shows the development of population since 1993 to 2010. From the figure it is clearly perceptible that the development of population is constant during the period, nevertheless in Germany number of inhabitants between 1990 and 1991 grew. The cause of the population increase was the unification of the former West and East Germany. In the other countries population has grown since 1990, nevertheless Hungary is an exception, because population in this country was continuously falling down. In 1990 Hungary had 10.374 mil inhabitants but in 2010 only 10 mil inhabitants.

**Figure 1** Population in the selected countries (in thousands USD)



Source: OECD

In the analysis there aren't handled absolute numbers of inhabitants, but the relative ones, in order to get a comparison between countries with a higher explanatory value.

### 1.3 Development of inflow of foreign direct investment

Cuervo-Cazurra (2011) argued that firms choose states that are important physical and psychical distance and market attractiveness.

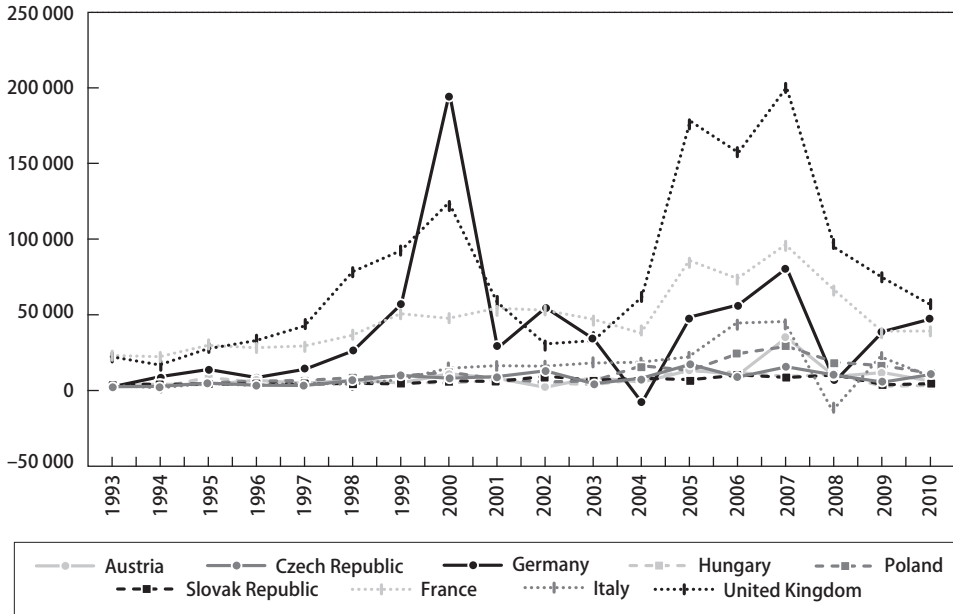
Altomonte (2003) argued that the Central and Eastern European countries (CEECs) display a great capacity in the attraction of FDI flows that this is likely due to the high degree of integration achieved among the CEECs: this structural characteristic of the Central and Eastern European region enhances the access to markets MNEs can serve from a location in the CEECs. From these states are generated increasing FDI inflows in the area.

Data from the Organisation for Economic Co-operation and Development (OECD) implies that the inflow of FDI is most pronounced in the United Kingdom (average is 65.634 billion USD per year), France (average is 39.521 billion USD per year) and Germany (average is 33.155 billion USD per year). To a lesser extent in Italy (average is 11.260 billion USD per year) and on the contrary in the remaining countries inflows of FDI are negligible in comparison with above mentioned countries. From the remaining selected countries has Poland the largest inflow of FDI (average is 7.537 billion USD per year).

Poland is followed Austria (average is 5.488 billion USD per year), Czech Republic (average is 4.821 billion USD per year), Hungary (average is 3.441 billion USD per year) and Slovakia (average is 1.732 billion USD per year).

The following figure shows development of inflow of FDI since 1993 and composes view on FDI in selected countries. The flow of investment is significantly different in individual countries and United Kingdom and Germany have the highest inflow of investment, by contrast, other countries have a significantly reduced inflow of investment.

**Figure 2** Inflow of FDI into the selected countries (in USD)



Source: OECD

**2 METHODS AND METHODOLOGY**

The relevant data for the research was obtained from OECD statistics. For the testing of assumptions there must be used a methodology of consistent data acquisition, because obtained results wouldn't have any value in different methodologies. Therefore, the data, which were published on web pages, year-books and official statistical records of the OECD have been selected. The same methodology to collect data is a pre-requisite for relevant results emanating from the data.

The main method is analysis of variance (ANOVA). This method serves as a tool for a comparison of the inflow of FDI per capita in selected countries. This analysis has many advantages. In the described method is mainly on the assessment of the impact of factors on the mean value of random variables, but its own analysis of the variance relates to the observed values, so it can talk about the analysis of variance, whose acronym was mentioned above. Analysis of variance can be distinguished by the number of influencing factors. For one character A is discussed about the analysis of variance with simple classifiers, in the case of two characters A and B on the analysis of variance for the dual classification, either with or without interaction. However, is significant whether these characters concur or not (Marek, 2007).

The analysis of variance with simple classifiers is based on model, which includes independent random variables with normal distribution  $N(\mu, \sigma^2)$ ;  $\mu, \sigma^2$  are unknown parameters. The hypoth-

esis that sign A has not an influence on observed random quantity X, correspond to the conjugate hypothesis  $H_0 : \alpha_1 = \dots = \alpha_i = 0$  with an alternative hypothesis  $H_1$ , that at least one  $\alpha_i$  is different from the other  $\alpha_k$ , i.e. that sign A has influence on observed random quantity X. For the testing a decomposition of sum of squares is used, where:

$$S_t = \sum_{i=1}^I \sum_{j=1}^{n_i} x_{ij}^2 - \frac{(x_{..})^2}{n}, \quad (1)$$

$$S_A = \sum_{i=1}^I \frac{(x_{i.})^2}{n_i} - \frac{(x_{..})^2}{n}, \quad (2)$$

$$\sum_{i=1}^I \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_{i.})^2 = S_t - S_A. \quad (3)$$

Hypothesis H is tested at the significant level  $\alpha$  with help of test criterion:

$$F = \frac{\frac{S_A}{I-1}}{\frac{S_e}{n-I}}. \quad (4)$$

After the rejection of the hypothesis at the chosen significant level there follows a testing of contrasts i.e. differences of the average values of pairs, if null (conjugate) hypothesis is rejected. Statistic is described below.

$$F = \frac{\frac{(x_i - \bar{x}_k)^2}{I-1}}{\frac{S_e}{n-I}} \frac{n_i n_k}{n_i + n_k}. \quad (5)$$

Continue to testing the equality of groups variances i.e. Bartlett's test. Statistic is described below.

$$B = \frac{1}{1 + \frac{1}{3(I-1)} \left( \sum_{i=1}^I \frac{1}{n_i-1} - \frac{1}{n-I} \right)} [(n-I) \ln s^2 - \sum_{i=1}^I (n_i-1) \ln s_i^2]. \quad (6)$$

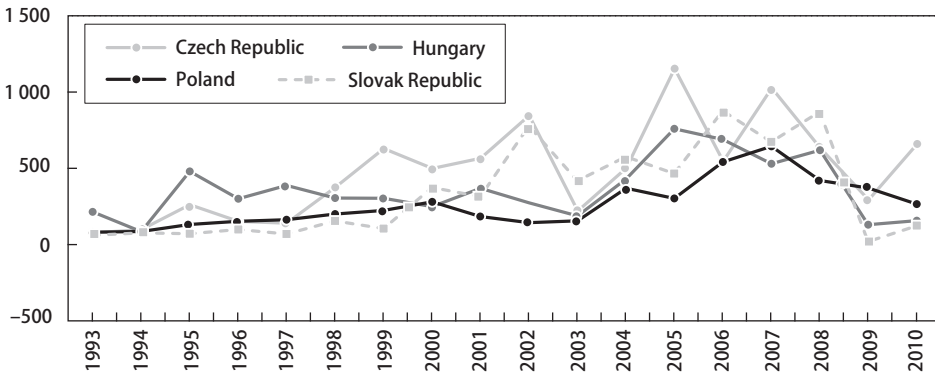
From the results of that analysis it is clearly evident which variable affects the observed random quantity X. Results of the analysis are shown in the following parts of the text (Karpíšek, 2007).

In this article there will be verified hypothesis H: Inflow of FDI per capita for V4 and their selected trading partners is the same in all countries.

### 3 RESULTS

This section describes the results of analyses, which were discussed in the previous section. The data was extracted from development of the inflow of FDI per capita in V4. From data obtained, that V4 have the similar development of inflow of FDI per capita. From 1993 to 2007 increased inflow of FDI per capita in all countries, but in 2008 and 2009 marked decline is declared. This decline is caused by difficulties in world economy, which proved after 2008 and are evident even in the following years, by contrast, in 2010 an investment growth is obvious.

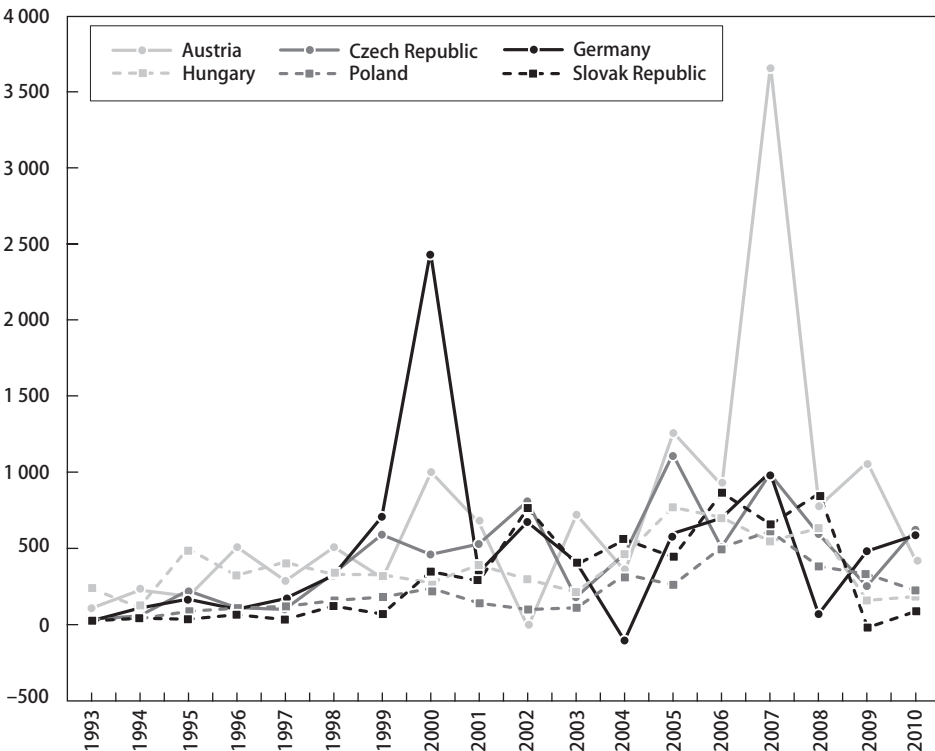
**Figure 3** Inflow of FDI per capita into the V4 (in USD)



Source: OECD, own calculation

After the extension by Germany and Austria: The development of inflow of FDI per capita in those countries identical, however, Germany logged the largest fluctuation in 2000 and Austria in 2007. The value of these countries highly exceeded the other included countries. The development of inflow of FDI per capita has rising character, nevertheless in 2008 there was a significance decrease in flows to all countries.

**Figure 4** Inflow of FDI per capita into the selected countries without France, Italy and UK (in USD)

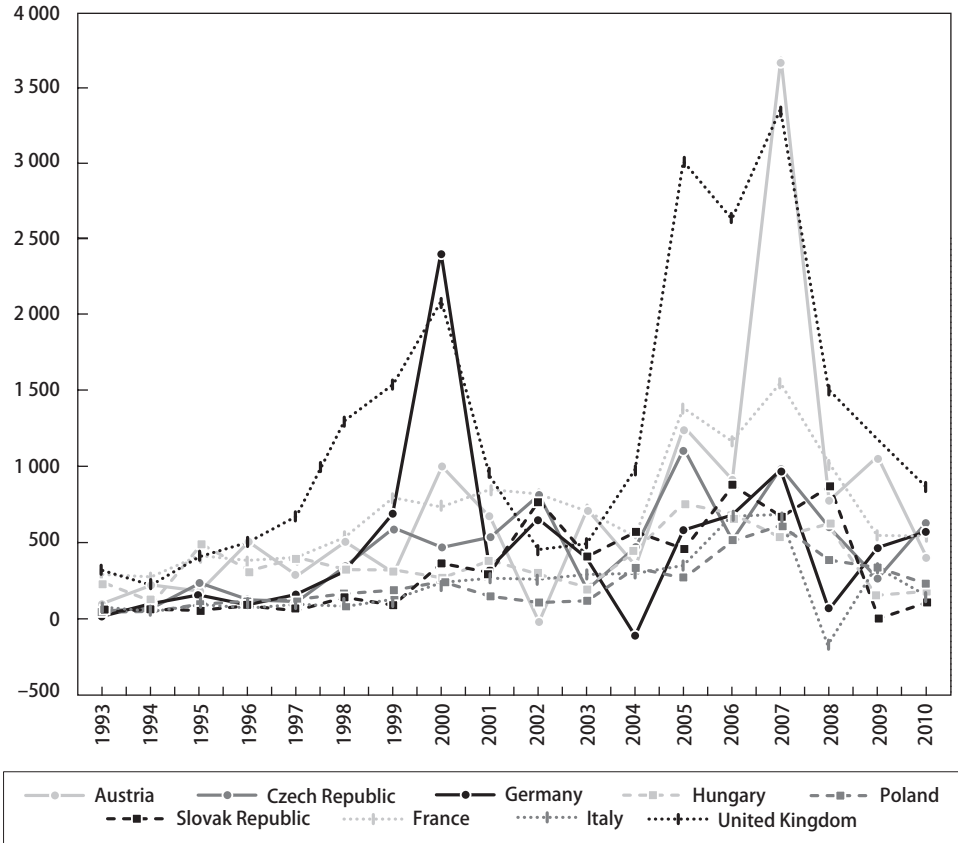


Source: OECD, own calculation

After the inclusion of all selected countries we see that investments substantially fluctuate and it is apparent that inflow of FDI per capita has two peaks. First peak was from 1999 to 2000. Those years point out that inflow of FDI per capita from previous years was significantly higher. Second peak was from 2005 to 2007. After these years came a fast and precipitate fall in 2008. However Germany and United Kingdom exceeded other countries in inflow of FDI per capita in 2000.

United Kingdom exceeds the remaining countries in the flow of investment from 2005 to 2007 and Austria exceeds the remaining countries in 2007.

**Figure 5** Inflow of FDI per capita into the selected countries (in USD)



Source: OECD, own calculation

From the results of ANOVA it is evident, that the countries of V4 aren't the same on  $\alpha = 5\%$  significant level (Table 1), but the value of statistics exceeds the critical value by only 0.12 and detailed results demonstrated that there is no statistically significant difference between individual countries which is opposite to the results of the ANOVA. Figure 6 points out this contention.

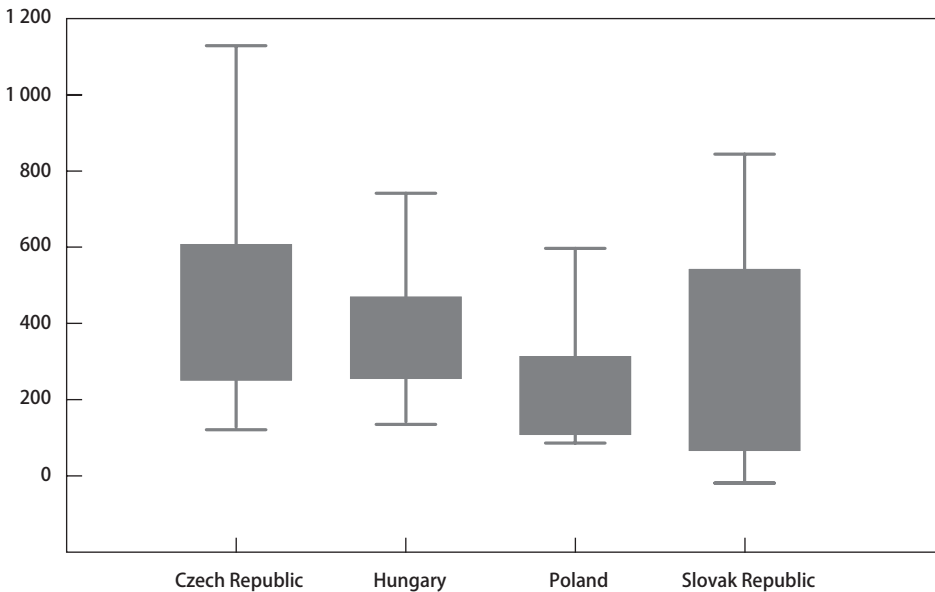


**Table 1** ANOVA table for the V4

ANOVA $\alpha = 5\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	543 955.18	3	181 318.39	2.85	0.04	2.73
All selections	4 319 505.10	68	63 522.13			
Total	4 863 460.28	71				
ANOVA $\alpha = 1\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	543 955.18	3	181 318.39	2.85	0.04	4.08
All selections	4 319 505.10	68	63 522.13			
Total	4 863 460.28	71				

Source: Own construction

**Figure 6** Box-and-Whisker Plot A (in USD per capita)



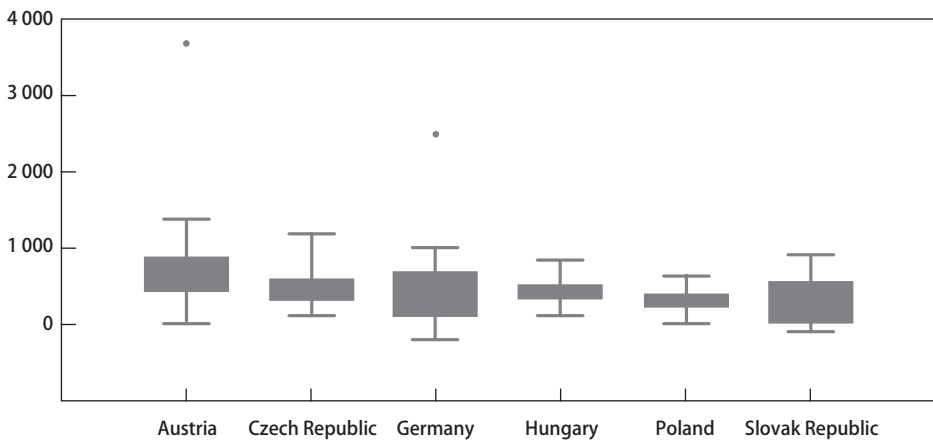
Source: OECD, own calculation

From the results of ANOVA is evident, that the countries of V4, Austria and Germany aren't the same on  $\alpha = 5\%$  significant level (Table 2), but the value of statistics exceeds the critical value by only 0.57 and the detailed results demonstrated (Table 4) that there was found a statistically significant difference between Austria and Poland. Figure 7 points out this contention.

**Table 2** ANOVA table for the selected countries without France, Italy and UK

ANOVA $\alpha = 5\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	3 028 914.81	5	605 782.96	2.87	0.017	2.30
All selections	21 476 329.14	102	210 552.24			
Total	24 505 243.95	107				
ANOVA $\alpha = 1\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	3 028 914.81	5	605 782.96	2.87	0.017	3.20
All selections	21 476 329.14	102	210 552.24			
Total	24 505 243.95	107				

Source: Own construction

**Figure 7** Box-and-Whisker Plot B (in USD per capita)

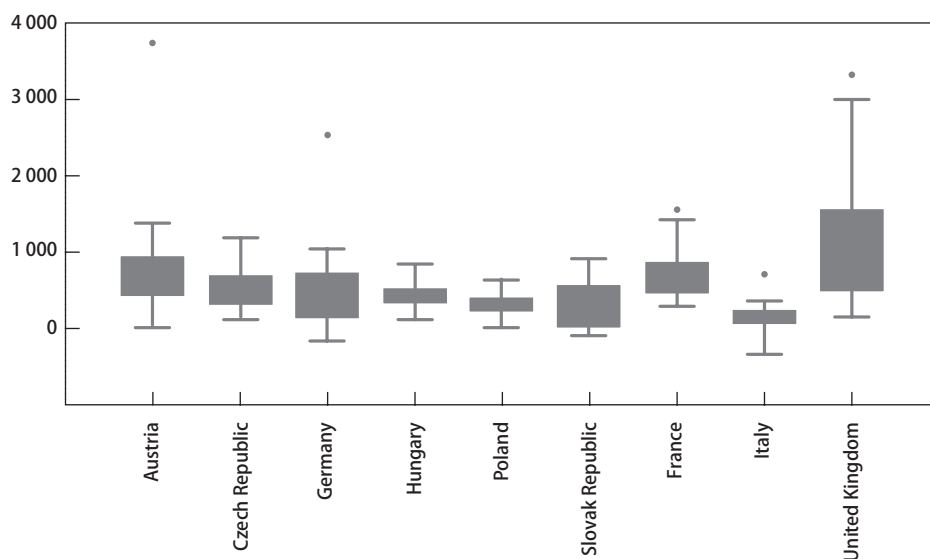
Source: OECD, own calculation

From the results of ANOVA is evident, that selected countries aren't the same on  $\alpha = 5\%$  significance level (Table 3), and the statistics has substantially exceeded the critical value and that in the detailed analysis of relation between countries (Table 4) statistically significant differences were revealed between Czech Republic and United Kingdom, Germany and United Kingdom, Hungary and United Kingdom, Poland and United Kingdom, Slovak Republic and United Kingdom and Italy and United Kingdom. Figure 8 points out this contention.

**Table 3** ANOVA table for the selected countries

ANOVA $\alpha = 5\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	15 021 642.20	8	1 877 705.27	7.16	$4.86 \times 10^{-8}$	1.99
All selections	40 096 492.37	153	262068.57			
Total	55 118 134.57	161				
ANOVA $\alpha = 1\%$						
Source of variation	SS	DF	MeanSq	Fratio	Pvalue	Fkrit
Between selections	15 021 642.20	8	1 877 705.27	7.16	$4.86 \times 10^{-8}$	2.62
All selections	40 096 492.37	153	262068.57			
Total	55 118 134.57	161				

Source: Own construction

**Figure 8** Box-and-Whisker Plot C (in USD per capita)

Source: OECD, own calculation

**Table 4** Significant differences between selected countries

Countries without Italy, France, UK	Test criterion	Critical value	Hypothesis
AU-PL	2.43769753	2.303493035	Reject
Selected countries	Test criterion	Critical value	Hypothesis
CZ-UK	2.446273772	1.999389853	Reject
GE-UK	2.453257862	1.999389853	Reject
HU-UK	3.069702354	1.999389853	Reject
PL-UK	4.243634936	1.999389853	Reject
SK-UK	3.489976782	1.999389853	Reject
IT-UK	4.363219568	1.999389853	Reject

Source: Own construction

For a detailed view results of variances of selected countries must still be given. From the analysis it can be argued that variances vary statistical significantly in all three investigated areas (for V4, for selected countries without France, Italy and United Kingdom and for all selected countries). The empirical results are shown in Table 5.

**Table 5** Results of Bartlett's test

Bartlett's test	Test criterion	Critical value	Hypothesis
The Visegrad countries	11.43160439	7.815	Reject
Selected countries without Italy, France, UK	64.10817693	11.070	Reject
Selected countries	105.32065490	14.067	Reject

Source: Own construction

## CONCLUSION

Foreign direct investment (FDI) has gained significant importance over the past decade as the tool for accelerating growth and development of economies in transition. It is widely believed that the advantages that FDI brings to the standard of living and prospects for economic growth of the host nation largely outweigh its disadvantages. International trade and FDI can be very effective ways of stimulating technological for a less-developed country. It is well known that there are many factors affecting FDI, such as intellectual property rights protection, economic stability and the political climate, labor market, opening policy, foreign exchange rate, relative wages and income convergence financial and tax policy, GDP in the host country, bureaucratic corruption and environmental policy and so on (Xu, 2008).

This article has compared countries of the V4 and their main trading partners. The object of comparison was to find out whether the inflow of FDI per capita in countries of V4 is similar and therefore it can be argued that inflow of FDI per capita to these countries is identical for all countries.

Further emerged that the V4 countries, Germany and Austria have a similar inflow of FDI per capita. Difference between Austria and Poland was only one distinction in this section, however, this distinction wasn't large. Germany and Austria are the closest geographical neighbours of selected countries of V4. For future studies it will be centre of many researches. This factor may influence inflows of FDI into the selected countries.

In comparison of all selected countries including France, Italy and United Kingdom it was found that distinction between selected countries is statistically significant. The most important element which significantly affected results of all selected countries was the United Kingdom. United Kingdom significantly exceeds inflow of FDI per capita compared with Czech Republic, Germany, Hungary, Poland, Slovakia and Italy. To illustrate the analysis results of the analysis have been displayed in a Box-and-Whisker Plot. These results confirmed conclusions mentioned above.

Variability of inflow of FDI per capita is considerable in all selected countries and all countries show a marked difference. Variability is dependent on a number of factors for example economic growth, GDP, unemployment, competition etc. This factors weren't subsumed in this article.

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