

FACTORS AFFECTING ALLOCATION OF CZECH FDI IN EU COUNTRIES*

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Abstract

The main objective of this paper is to analyse which factors have an impact on the allocation of Czech foreign direct investment (FDI) in EU countries. Multivariate panel regression with general macroeconomic variables and time dummy variables using Eurostat data for the period 2013–2019 was performed. Indicators of a tax system promoting and/or enabling aggressive tax planning, and other more general indicators were included in the model. This paper provides the opposite view by analysing the flow of FDI from a transition economy to more advanced economies. The results suggest that Czech FDI is placed in developed countries with lower statutory corporate income tax rates, and with which the Czech Republic has a larger volume of foreign trade. Furthermore, it is confirmed that the factors affecting allocation of Czech FDI in the EU are the distance between the capital cities and the existence of the so-called patent box regime.

Keywords: Corporate taxation, FDI, tax factors, aggressive tax planning

JEL Classification: H26, F40, H21, D21

1. Introduction

Foreign investment has an impact on the domestic economy in many ways as suggested by Durani *et al.* (2021). It is also clear that the impact on the domestic economy may vary from country to country depending on possible factors affecting the allocation of FDI. Following this topic, international tax optimization and tax planning of multinational

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companies can be considered to be one of the most significant global macroeconomic problems. According to an IMF study (2015), losses from corporate taxation in OECD countries amount to about USD 509.2 billion. The OECD (2015) issued a final report on Action 11 of the Base Erosion and Profit Shifting project (BEPS), the main objective of which was to identify indicators that OECD countries could use to measure the extent and economic impact of profit shifting and erosion of tax bases. One of the indicators recommended to help identify the presence of aggressive tax planning is foreign direct investment (FDI) measured in relation to the gross domestic product (GDP). Based on the analysis of FDI, it is possible to identify which factors affect the allocation of FDI and which tax factors are favourable to investors. Thus, it is possible to identify the main indicators allowing tax optimization and/or base profit shifting.

FDI data are easily accessed from the balance of payments of individual countries. However, there are a number of factors, both tax and non-tax, that can affect the allocation and the volume of FDI in individual countries. According to Linhartová and Vávrová (2018), at the macroeconomic level these determinants may include “*general factors, business factors, national and local factors, infrastructure factors, labour factors, cost factors, cultural and environmental factors*”. In general, these determinants include market size, standard of living, inflation, salaries, interest rates, rate of unemployment, gross domestic product, bilateral and multilateral agreements, and tax system parameters.

The main objective of this paper is to analyse which factors affect the allocation of Czech FDI in EU countries and to compare the results of a panel regression analysis with other researchers’ publications. This paper focuses on outgoing FDI from the Czech Republic, which can be considered a transition economy. The majority of research performed, which is cited in the Literature Review, for example Bevan and Estrin (2000) and Martínez *et al.* (2012), has focused on analysis of FDI from developed countries. However, this paper gives the opposite view by analysing the flows of FDI from a less developed economy to more advanced ones. Moreover, this paper focuses on FDI outflows rather than inflows so that it is possible to analyse the motives of Czech investors and identify possible tax factors that might affect the decisions of Czech investors on where to invest. Bilateral outward FDI stock was analysed, e.g., by Martínez *et al.* (2012). Moreover, the relationship between outward FDI and domestic investments were examined by Durani *et al.* (2021).

FDI data are taken from the Eurostat database *European Union direct investments (BPM6)*. For the model analysing factors affecting the allocation of Czech FDI in EU countries, data on FDI stocks denoting the value of investment at the year-end for the reporting period from 2013 to 2019 are used. The first chapter describes research studies focusing on FDI stock and flow indicators. The second chapter shows the development of Czech

FDI in the top five countries measured by the volume of FDI stock. The third chapter describes the data and methodology used. It also shows the results of the panel regression analysis. The final chapter summarizes the results and makes a comparison with other studies.

2. Literature Review

Foreign direct investment is normally divided according to the direction of investment flow into inward foreign direct investment (“inward”) and outgoing foreign direct investment (“outward”). Furthermore, foreign direct investment is reported in statistics (*e.g.*, OECD, IMF, Eurostat) either as a stock of investments at the end of the reference period or as investment flows that capture newly created investments during the observed period, and can therefore be reported with a negative mark (Košťálová, 2018; Síbrtová, 2019). As the results of UNCTAD (2016) show, the stock of world FDI-to-GDP has increased over the last 25 years from 10% in 1990 to 33% in 2015.

Voget (2014) claims that FDI flows are analysed quite often, as FDI data are easily available from a nation’s balance of payments. The factors influencing FDI were examined mainly by the following authors and their studies usually used multiple regression analysis.

Faeth (2009) summarizes the theoretical models of FDI, and each model suggests different variables explaining allocation of FDI. According to Faeth (2009), there is no single theory explaining allocation of FDI and a combination of several factors should be considered.

Normally analysed factors are main macroeconomic indicators, such as the size of the economy, current trends of the economy, market growth, *etc.* For example, Maniam (2000) focused his analysis on US outward FDI based in the United Kingdom, France and Germany. According to his results, a significant factor positively influencing FDI is the size of the economy measured by GDP in the case of all three countries studied. The same conclusion was reached by Bénassy-Quéré *et al.* (2007), who analysed FDI in OECD countries. In the case of the Czech Republic, FDI Linhartová and Vávrová (2018) examined inward FDI in 1998–2015; factors influencing the inflow of FDI include GDP, where an increase in GDP by CZK 1 billion will increase the inflow of FDI by CZK 0.4 billion. Market growth influence was examined and proved by Torrisi and Corbett (2014). Their analysis indicates that US outward FDI for the years 1986–2010 were affected by market growth and economic growth. Furthermore, the impact of GDP was measured by Linhartová and Owusu (2018). Thus, based on the mentioned studies, the trends of the economy measured by GDP per capita and higher economic and market growth measured by GDP are the main significant indicators positively influencing the flow of FDI.

Tax system and tax rates are also analysed in connection with FDI. Janíčková and Baranová (2013) examined the effect of effective marginal tax rates and effective average tax rates on the flow of FDI in EU countries on data for 1998–2011. They concluded that effective and average tax rates have a greater impact on inward FDI in the new EU member states than in the old EU member states. Their theory confirms the assumption that the new EU member states are attempting to attract investors by offering more advantageous tax systems. Furthermore, their research points out that it is possible to prove the negative impact of higher effective tax rates on the stock of FDI. Mainly the corporate income tax rate represents the indicator influencing stock of FDI negatively, according to research done by Torrisi and Corbett (2014), Tepperová and Pavel (2018), Durčáková and Mandel (2010), *etc.* Moreover, Hızarcı Beşer and Beşer (2018) dealt with the influence of the corporate tax rate on inward FDI located in countries that have so-called flat tax rates. The results of their panel regression analysis show a significant negative effect of corporate tax rates on the volume of FDI.

The topic of FDI is also related to tax optimization and international tax planning done by multinational companies in order to minimize their tax burden. Overesch and Wamser (2008) found that cost-oriented vertical FDI is influenced more by tax factors than horizontal FDI. Tax regimes were analysed further by UNCTAD (2012), Montero (2008), Weyzig (2012), Lawless (2013), Haberly and Wójcik (2014), Voget (2014), *etc.* According to Mintz (2006), one of the factors influencing the flow of FDI is the tax regime. Mintz (2006) states that higher FDI inflows are reported by countries that have lower tax rates, especially for financial transactions. German inward FDI was investigated by Buettner *et al.* (2014). The authors analysed FDI data for 1996–2007 focusing only on branches wholly owned by foreign investors and excluded from the research sample branches belonging to the financial sector and holding companies, to which a special tax regime applies. The authors examined whether restricting the two main channels of profit shifting, *i.e.*, debt financing and transfer pricing, would affect the flow of FDI. Their results show that if the tax deductibility of debt financing costs is reduced (*low capitalization rule*), there is a decline in the flow of FDI in countries that generally have higher than average tax rates. This can be understood as meaning that if countries whose corporate tax rate exceeds the average corporate tax rate by one standard deviation, FDI flow will decrease by 2.5%.

Moreover, Weyzig (2012) believes that international companies use so-called conduit countries to place FDI. As a rule, these countries have concluded many advantageous double taxation treaties and therefore, because of so-called treaty shopping, investors are permitted to minimize their tax burden. According to Weyzig (2012), the largest conduit country is the Netherlands, through which 600 billion euros of FDI “flowed” in 2009. This corresponds to about 13% of the global inward FDI. Weyzig (2012) claims that

the main determinants of the FDI flow in the Netherlands are contracts on the avoidance of double taxation. Based on his analysis, the diversion of FDI is higher if the home and host countries have a double taxation agreement with the Netherlands. Conversely, the diversion of FDI is lower if the home and host countries have a double taxation agreement directly between themselves. In addition, offshore direct investments were analysed by Haberly and Wójcik (2014), who examined the factors influencing so-called “offshore foreign direct investment”, which is the FDI of tax havens in countries that are not referred to as tax havens. Their study shows that at least 30% of global FDI “flow” is through tax havens. Furthermore, the authors state that FDI flows between colonial powers and their current colonies, and even that the former colonies are stronger. Likewise, Haberly and Wójcik (2014) concluded that the size of the Netherlands’ outgoing FDI is almost identical to the size of the United States’ FDI. Furthermore, the authors found that the FDI stock in Luxembourg is greater than the FDI stock in both Germany and France.

What is more, Lawless (2013) examined the impact of the complexity of tax systems on the presence and volume of bilateral FDI among 16 OECD source countries and 57 OECD host countries as well as those outside the OECD. Lawless (2013) explained the complexity of the tax system as the ease of doing business in selected countries, taking into account legislation, statutory tax rates and other requirements to comply with the tax legislation. In particular, the author identified the variables in the number of payments that a tax entity must make in order to comply with the requirements of the tax system and the so-called “time to comply” as statistically significant. These independent variables negatively affected the stock of FDI in the models. Furthermore, the author tried to predict the economic effects of reducing the complexity of the tax system when she concluded that reducing the tax rate by 1 pp. leads to an increase in the total stock of FDI by less than 6%. At the same time, reducing the corporate tax rate by 1 pp. corresponds approximately to a 10% reduction in time to comply. Further, complexity of the tax system was investigated by Lawless (2013) and Hoppe *et al.* (2020); however, these authors divide the complexity of the tax system into the so-called “tax code complexity”, or the complexity of tax legislation, and the so-called “tax framework complexity”. On the contrary, the complexity of tax legislation had a positive effect on the stock of FDI. Alternatively, the complexity of the tax procedure had a negative effect on the stock of FDI, which was in line with the conclusions of Lawless (2013).

Tepperová and Pavel (2018) analysed the outward FDI of the Czech Republic. The results of their analysis in the absence of a so-called real owner test indicate that it is possible to identify larger FDI flows to conduit countries. The authors examined not only the volumes of FDI but also other items of the balance of payments related to FDI. Their results show that interest on portfolio investments, license fees and advisory services are paid more to countries with a lower effective corporate tax rate. Furthermore, the authors

are of the opinion that these payments flow more to countries which have less control over the taxation of tax non-residents.

As can be seen from the above-mentioned studies, FDI is affected by the effective corporate tax rate. In the event of a decline in the effective average tax rate, a larger inflow of FDI can be expected as this makes the country a more profitable location than other investment opportunities, as stated by Voget (2014). Differences in tax systems undoubtedly play an important role in investors' decisions regarding which countries they allocate their investments to. One of the first authors to examine the relationship between taxation and FDI was Hartman (1982), who examined the impact of the US tax system on inward FDI based in the United States.

It is therefore clear that individual countries are trying to encourage the inflow of FDI by offering favourable tax systems. Other authors claiming that individual states try to attract investors through tax benefits are Hristu-Varsakelis *et al.* (2011). However, Demekas *et al.* (2007) believe that tax benefits and the level of corruption have no effect on the flow of FDI. It is also important to emphasize the methodological question that is considered, for example, by Kersan-Škabić (2015), on how to measure the impact of taxes on foreign direct investment – whether total foreign direct investment flows should be considered or whether only bilateral flows should be considered (Sibrťová, 2019).

Last but not least, factors affecting flow and stock of FDI are represented by indicators such as political stability, language, trade balance, labour productivity, legislation, expenditures on specific areas, *etc.* Martínez *et al.* (2012) believes that there is increasing competition on the markets, which has changed the pattern of foreign trade and thus FDI, as they confirmed that there is a complementary relationship between trade and FDI. According to Hızarcı Beşer and Beşer (2018) and Faeth (2009), the size of the market, labour costs, market barriers, economic growth, market size, transport costs, the openness of the economy and the exchange rate are other possible determinants of flow of FDI. Maniam (2000) also suggested that political stability and tax incentives, as well as other factors influencing the inflow of US FDI, proved to be a statistically significant factor only in the case of France. Durčáková and Mandel (2010) considered the factors influencing the allocation of FDI to be: lower production costs and costs associated with foreign trade, more favourable tax conditions, lower foreign exchange risk, diversification and pursuit of business partners. Likewise, the UNCTAD study (2012) states that the primary factors influencing the flow of FDI include market size, access to raw materials and availability of skilled labour, while the fiscal environment is a secondary factor influencing the flow of FDI.

Other macroeconomic, political and social determinants influencing the stock of FDI were examined; for example, Montero (2008) focused on FDI stock in Latin America. He noted that the political regime has an impact on inward FDI in Latin America and

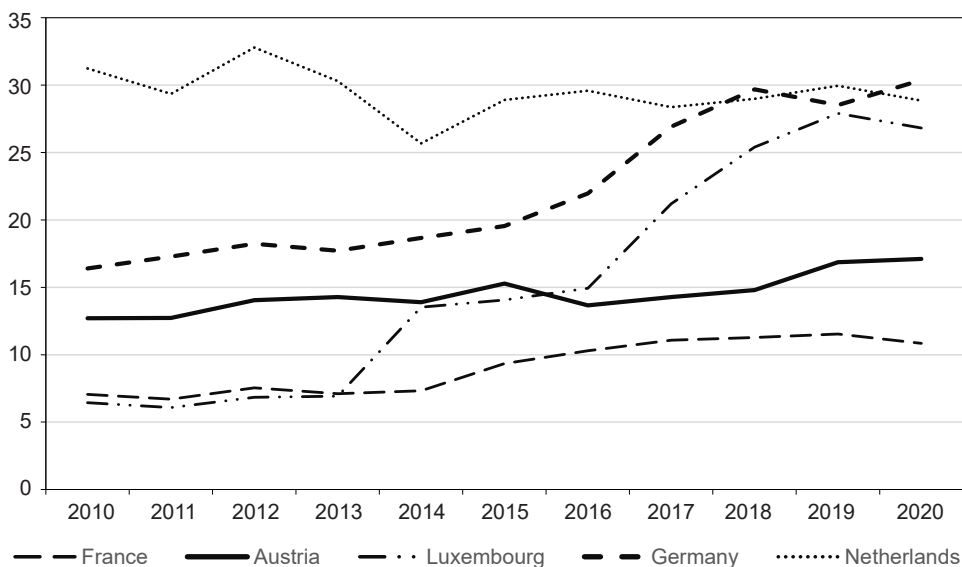
the risk level of the country as such, the level of corruption, the possibility of tax reform or political upheaval. However, it can be assumed that these determinants will be rather statistically significant in the case of developing countries with a less stable political situation. Nevertheless, Saengthien (2011) believes that political factors play an important role in investors' decisions about where to invest. Saengthien (2011) includes the level of democracy, political institutions, government regulations, government infrastructure and economic freedom among these political factors. According to the results of his regression analysis, the effectiveness, competence and stability of the government in the country in which potential investors want to invest are important factors influencing the allocation of FDI. Another statistically significant factor influencing flow of FDI is the size of the public sector, where the inflow of FDI decreases with the size of the public sector because according to Saengthien (2011), investors prefer to invest in countries that are not subject to major market or labour interventions. Furthermore, Saengthien (2011) claims that the level of corruption is significant, as the inflow of FDI decreases with an increasing level of corruption. This is the exact opposite of the study done by Bénassy-Quéré *et al.* (2007), who suggested that countries with high levels of corruption have a 7.9 times higher inflow of FDI. Furthermore, those authors determined that factors which positively influence inflow of FDI are common language, labour productivity and legislation. On the contrary, according to the authors, the determinants negatively affecting the inflow of FDI include the so-called employment protection (*i.e.*, legislation regulating working hours and remuneration of employees) and low concentration of capital. The negative influence of the corruption perception index on FDI was confirmed by Linhartová and Vávrová (2018) and Bevan and Estrin (2000). In addition, the authors feel that the so-called “localization factors” are also important in connection with the development of FDI, which can influence whether an investor will specifically invest in a given country. Concerning the Czech Republic, these favourable localization factors include geographical location and EU and NATO membership, education of the population, relatively lower labour costs, investment incentives and stable economic growth (Linhartová and Vávrová, 2018). Bevan and Estrin (2000) use the term “country risk”, which is affected according to them by corruption, government balance, industrial development and private sector development.

Lastly, the impact of the currency is examined quite often (Durčáková and Mandel, 2010; Torrisi and Corbett, 2014). For example, according to Torrisi and Corbett (2014), the pound sterling as the currency on outward US FDI in the United Kingdom had a negative effect. They also focused on membership in specific organizations and language. Their study showed that in the case of Belgium, membership in the Eurozone had a positive effect on the inflow of US FDI. In addition, the authors believe that outward US FDI in the UK may also be affected by having a common language.

3. Czech FDI

This paper deals only with an analysis of factors influencing the allocation of outward Czech FDI (*i.e.*, outflow and stock of outgoing FDI). Figure 1 shows the development of the stock of outward Czech FDI in selected countries of the European Union based on the volume of outward Czech FDI invested in other EU countries. Figure 1 shows that the largest volume of outward stock of Czech FDI is invested in the Netherlands; however, for the Netherlands the stock of inward Czech FDI represents only a negligible part. For example, in 2015 the total FDI stock placed in the Netherlands amounted to EUR 1,178,404 million, while in 2015 Czech FDI located in the Netherlands amounted to only EUR 25,287 million (*i.e.*, approximately 2% of the total FDI stock placed in the Netherlands). However, according to the graph, it can be observed that in general the volume of Czech FDI in these countries has been constant over time.

Figure 1: Development of Czech FDI in top 5 EU countries based on amount of FDI (EUR billions)



Source: Own calculations, based on data from Eurostat (2017)

In the case of Luxembourg and the Netherlands, it can be assumed that investments are located there precisely because of the favourable tax regimes. As follows from Weyzig's research (2012), the Netherlands is a so-called "conduit country", through which the largest volume of FDI flows. On the other hand, in the case of France, Germany and Austria, it can

be assumed that Czech FDI is placed there because of the stable and well-developed economies and markets. Furthermore, in the case of Austria and Germany the historical development and geographical location can be assumed to play a significant role as well. Based on the abovementioned items, it can be assumed that Czech FDI will be allocated by investors to advanced and large economies and to countries that offer more favourable tax systems allowing investors to optimize their tax and reduce their tax burden.

Moreover, based on data from the Eurostat database, Czech investors place their investments in Switzerland (EUR 7.2 billion in 2020), Cyprus (EUR 5.7 billion in 2020), United Kingdom (EUR 5.7 billion in 2020) as well as in Slovakia (EUR 5.8 billion in 2020). Switzerland and Cyprus can be assumed to be countries with favourable tax regimes. In the case of Slovakia, there are also historical and demographical reasons why Czech investors place their FDI there.

4. Regression Analysis of CZ FDI Model

A multivariate panel regression analysis with time dummy variables was used to identify tax factors influencing the allocation of Czech FDI in EU countries (FDI stock) and outflow of Czech FDI in EU countries (FDI flow). Regression analysis has been used by other economists in research dealing with factors influencing flow and stock of FDI, *e.g.*, Lawless (2013), Haberly and Wójcik (2014), Tepperová and Pavel (2018), Sírťtová *et al.* (2019). According to Bevan and Estrin (2000), there is no agreed model which would provide a basis for empirical work.

Panel regression with fixed or random effects would not be the correct method as the key independent variables used, *i.e.*, patent box (ATP indicator) and distance between the capital cities, do not change within the covered time period. Further, the statutory corporate tax rate¹ does not change significantly over time. Based on those factors, multivariate panel regression with time dummy variables is considered to be the most suitable method as it also allows for intercept factors related to the economic cycle which change over time. One type of dependent variable in the regression equation was the stock (cumulative amount) of outgoing Czech foreign direct investment located in other EU countries. The second dependent variable considered was the net outward FDI (for all FDI activities) of the Czech Republic in other EU countries.

1 Statutory corporate tax rate used over the effective corporate tax rate as ATP indicators might already include and consider the effect of the effective corporate tax rate.

4.1 Data description

Data for the regression analysis were taken mainly from the Eurostat database, specifically from the database *European Union direct investments (BPM6)*². The Eurostat data are consistent with the definition of FDI in the IMF database. The data collection methodology is in accordance with OECD (1996). The source of the data is the balance of payments of individual EU member states. Those data are reported to Eurostat by each EU member state on a quarterly basis and on an annual basis with the revision up to $t - 2$.

There are several statistics recorded by Eurostat on inward and outward FDI. Inward FDI represent data on FDI in the reporting economy, and on the other hand, outward FDI represent FDI abroad. Further, data on FDI flows, stocks and income are collected by Eurostat. Those data are reported by the partner country. FDI stocks by partner country represent the value of the direct investments at the end of the reporting period in the specific country. FDI flows by the partner country represent the net value of outflow of the direct investments during the reporting period in the specific country.

Specifically, outward FDI stocks data which represent assets of the reporting economy, *i.e.*, the Czech Republic and FDI outflow data were used in this paper. Annual data of Czech FDI for 2013 to 2019 were used. A new standard for the measurement of data on direct investments was introduced in 2013; thus, to eliminate the potential impact of the change in data collection, data prior to 2013 were not used. Further, the data prior to 2013 might be affected by the consequences of the economic crisis in 2008. Moreover, data are reported for the period t and adjusted for the periods $t - 1$ and $t - 2$ if needed, and data for 2019 represent the latest data available.

Furthermore, general macroeconomic data (GDP per capita) were used, which were also taken from the Eurostat (2020) database for the years 2013–2019. Data on the statutory corporate tax rate for 2013–2019 were taken from the study *Taxation trends in the European Union* from the section *Data on Taxation* (EC, 2020). In the case of GDP per capita, those data represent an independent variable changing over the selected period. On the other hand, the statutory corporate tax rate more likely represents the variable that does not change significantly over the selected period. The distance between the capital of the Czech Republic and other capitals was set as another independent variable. These data were taken from the website³ and measured in km.

Moreover, data on the foreign trade turnover were taken from the balance of payments of the Czech Republic. This independent variable represents the sum of the outgoing

2 Eurostat (2017).

3 Distance calculator (2022). Czech Republic Driving Distance Calculator. Pune: GlobeFeed.com. Available from: distancecalculator.globefeed.com

payments and incoming payments for services and goods from the data on current account of balance of payments per partner. The data were taken from the CNB database, balance of payments statistics (CNB, 2021). Other determinants such as market size, trade conditions, local business conditions, labour market conditions, lower production costs and costs associated with foreign trade were considered, e.g., by Hızarcı Beşer and Beşer (2018), Maniam (2000), Durčáková and Mandel (2010), and Alam and Zulfiqa Ali Shah (2013). However, those suggested variables were not used in this paper as they might be correlated with the foreign trade turnover variable and could have potentially caused multicollinearity in the final model.

Last but not least, the presence of a patent box tax regime, which represents a so-called indicator of aggressive tax planning identified by the EC (2015), was used in the regression analysis. There are a total of 33 indicators, which can be divided into 14 areas and by category into active and passive indicators and the absence of rules against abuse. These indicators focus mainly on the rules of those tax systems enabling tax planning through the main optimization channels – namely interest, dividends, and licensing fees. Indicator no. 17 (patent box or other preferential tax treatment of income from intellectual property was used in the regression analysis as a dummy variable). This patent box regime represents the independent variable that is unchanged over time. For an overview of variables used in the model, refer to Table 1 below.

Table 1: Overview of variables used

Name of variable	Factor	Expected impact	Data source
Stock of Czech FDI	Dependent variable	–	Eurostat database – European Union direct investments (BPM6)
Flow of Czech FDI	Dependent variable	–	Eurostat database – European Union direct investments (BPM6)
GDP per capita	Development of economy	positive	Eurostat database
Statutory corporate tax rate	Tax burden	negative	Taxation trends in the European Union
Trade balance	Volume of foreign trade	positive	CNB database – statistics of balance of payments
Distance between capital cities	Accessibility	negative	Distance calculator – distancecalculator.globefeed.com
Patent box regime	Tax burden	negative	EC

Source: Own calculation

4.2 Methodology

Multivariate panel regression with time dummy variables was used and, based on existing studies (see Chapter 2), possible determinants of FDI were identified, including GDP per capita, which measures trends of the economy, and the statutory tax rate.

Furthermore, the distance between capital cities was chosen as the quantitative variable. Last but not least, the patent box regime (indicator of aggressive tax planning) was chosen as the independent variable. This indicator was used by Tepperová *et al.* (2020), Síbrtová (2019), Mintz (2006), Manian (2000), *etc.*

The other quantitative variable chosen was the balance of the foreign trade between the Czech Republic and the selected country.

A panel regression model for the factors influencing Czech FDI stock allocation was constructed. The model was estimated using the least-squares method. This panel regression model with time dummy variables allows the consideration of determinants that change over time and also those that do not change. The final regression model could be shown as follows:

$$\ln FDI_{jt} = \alpha + \beta_1 \ln GDP \text{ per capita}_{jt} + \beta_2 STR_{jt} + \beta_3 \ln trade_{jt} + \beta_4 \ln distance_j + \beta_5 Patent \ box_j + \varepsilon_{jt}, \quad (1)$$

where FDI_{jt} is the stock of the Czech Republic's investments in the host country j in the year t . $GDP \text{ per capita}_{jt}$ is the gross domestic product per capita of the host country. STR_{jt} represents the statutory corporate tax rate in the host country. $Trade_{jt}$ represents the sum of the outgoing payments and incoming payments for services and goods of the home and host countries. $Distance_j$ measures distance between capital cities. Finally, $Patent \ box_j$ represents the dummy variable of the presence of a patent box in the host country.

As already mentioned, the dependent variable was the stock of outward Czech FDI. The stock values were taken from individual EU member states for the years 2013–2019. Furthermore, the panel regression analysis uses the logarithm of the outward stock of Czech FDI for individual EU member states as a dependent variable; thus, the results of the panel regression analysis must be interpreted as elasticities. A total of 189 observations were considered for the panel regression model, *i.e.*, 27 EU member states (including the United Kingdom) during the 7-year period.

Similarly, the GDP per capita, statutory corporate tax rate, trade balance and distances between capitals were logarithmized. The values of GDP were reported at constant prices. The resulting regression model is described in the following chapter.

4.3 Regression analysis results

Based on the observations and the resulting regression model, it was found that the following factors are among the statistically significant ones influencing the allocation of FDI from the Czech Republic to other EU countries:

- GDP per capita,
- trade balance,
- distance between capitals,
- statutory corporate income tax rate (STR), and
- patent box regime.

The two types of dependent variables that were considered were: (1) the net flow of Czech FDI (outflow) and (2) the stock of outward Czech FDI. The data on FDI stock are more stable over time than the flow of FDI. However, data on FDI stock might be skewed as the volume of stock might be affected by the past, *i.e.*, FDI might have been placed in the reporting economy in the past and not due to the current favourable tax regime.

The condition for compiling a panel econometric model, which is formed by time series, is that all panels (dependent and independent variables) must be of the same order of integration. Therefore, a test of individual panels was performed using Levin, Lin, and Chu test (Levin *et al.*, 2002). The results (see Table 2) of this test confirmed that all quantitative panels are non-stationary except the FDI flow, and thus the model for FDI flow was not constructed.

Table 2: Levin, Lin, Chu *t*-test results

	t-stat	p-value	I(d)
FDI stock	4.9433	1.0000	I(1)
FDI flow	-5.4022	0.0000	I(0)
GDP per capita	-1.0765	0.1409	I(1)
Foreign trade	6.8803	1.0000	I(1)
STR	0.5207	0.6987	I(1)

Source: Own calculations

Based on the Levin, Lin, Chu *t*-test it was confirmed that all the quantitative panels except the FDI flow are non-stationary and thus the panel regression was performed only for FDI stock. Further, VIF factors show an accepted level of collinearity between the independent variables: *ln trade* 1.533, *ln distance* 1.719, *ln GDP per capita* 1.134, *Patent box* 1.247, *STR* 1.360.

Descriptive statistics of individual variables are shown in Table 3. The results of the regression models are shown in Table 4.

Table 3: Descriptive statistics of variables

Variable	Maximum	Minimum	Mean	Median	Standard deviation
ln stock of FDI	10.319	−0.916	6.336	6.924	2.832
ln flow of FDI	8.089	−2.303	3.246	3.509	2.576
ln of GDP per capita	5.606	3.829	4.549	4.511	0.357
STR	44.400	10.000	22.614	22.000	7.218
ln of trade	14.600	7.410	11.108	11.023	1.571
ln of distance	7.721	5.525	6.734	6.825	0.606

Source: Own calculations

Table 4: Panel regression model results

Dependent variable: logarithm of Czech FDI (stock of FDI) in EU countries ($n = 187$)⁴

	Coefficient	Standard error	t-stat	p-value
c	−15.5308***	0.9839	−15.7900	<0.000001
ln of GDP per capita	3.4790***	0.0554	62.8100	<0.000001
ln of trade	0.9192***	0.0237	38.7400	<0.000001
ln of distance	−0.6822***	0.0961	−7.0980	0.0004
STR	−0.0167*	0.0073	−2.2920	0.0618
Patent box	2.2744***	0.0772	29.4500	<0.000001
R²	0.7832	–	–	–
Adjusted R²	0.7785	–	–	–
F (4, 182)	164.3940	–	–	–
p-value (F)	<0.000001	–	–	–

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Source: Own calculations

⁴ Robust standard errors (HAC).

As follows from the results of the coefficients of individual variables in Table 4, and if the provided circumstances remain unchanged, stocks of outward Czech FDI are influenced by the economic development, measured by GDP per capita. In the case of a 1% increase in GDP per capita, the volume of FDI in a given country will increase by 3.479%. As mentioned in the Literature Review, GDP has been used as an independent variable in several studies. It has been confirmed that it positively influences incoming FDI, for example, by Maniam (2000), Bénassy-Quéré *et al.* (2007), and Linhartová and Vávrová (2018). However, those authors tend to use an absolute level of GDP that shows the size of a country's economy rather than economic development. This variable was also considered in the model; according to results, however, it was not statistically significant and was correlated with GDP per capita used.

The allocation of Czech FDI measured by stock of FDI is further positively influenced by the balance of foreign trade. With an increase in trade with a given country, the stock of FDI will increase approximately by 1%. A similar variable was used by Martínez *et al.* (2012). They calculated the variable "commercial integration" as the sum of exports plus the sum of imports divided by GDP, and according to their results there is a positive impact of commercial integration and trade openness. Moreover, Bevan and Estrin (2000), Hızarcı Beşer and Beşer (2018), and Durčáková and Mandel (2010) consider the positive effect of other variables, such as market size, labour costs, openness of the market, *etc.*, correlated with the variable used in this model.

On the contrary, the distance between capital cities and the statutory corporate tax rate have a negative effect on the stock of FDI. When longer distances exist, there is a decrease in the stock of the outward Czech FDI by approx. 0.68%. When STR increases by 1 pp., then the stock of FDI decreases by approx. 1.7%. Distance between capital cities was also considered by Martínez *et al.* (2012) and Bevan and Estrin (2000), and according to their results the distance represents an obstacle to foreign trade and thus negatively impacts FDI. The negative effect of STR was also confirmed by Lawless (2013). Voget (2014) and Tepperová and Pavel (2018) used effective corporate tax rate instead of statutory tax rate. However, they confirmed that higher effective corporate tax rates also negatively impact the inflow of FDI.

Lastly, according to the regression model, it was confirmed that another statistically significant variable is the presence of a patent box or similar tax-advantageous regime for intangible rights, which represents an indicator of aggressive tax planning. The patent box regime positively influences the stock of outward Czech FDI with an increase of 227%. The positive impact of the presence of a patent box regime was also confirmed by Tepperová *et al.* (2020) and Sibrťová *et al.* (2019).

The diagnostic check of the model indicates that the non-systematic components of the model are not autocorrelated, are homoscedastic, and have no normal distribution.

5. Conclusions

It is clear that FDI plays an important role in the economic growth of a country. This paper focused on the outward FDI of the Czech Republic to other EU countries, so it provides a different perspective on this issue when compared to previously published research, because it investigates this topic from the perspective of a transition economy. As for the volume of Czech FDI allocated to other EU member states measured by stock, it was assumed that the factors influencing the allocation of Czech FDI would be similar to those influencing US FDI because, based on previous research, Czech investors usually invest in the same or similar countries as American investors (Síbrtová, 2019).

According to the regression analysis results, it was determined that even Czech investors invest more in developed countries with a lower statutory corporate tax rate, those that are closer in distance to the Czech Republic, and that have higher volumes of foreign trade with the Czech Republic. The regression analysis found that the presence of a patent box regime is a key explanatory variable for Czech FDI. The same was true of the factors influencing the allocation of outward US FDI (Síbrtová, 2019). The patent box regime is usually used as part of the structures of aggressive tax planning undertaken by multinational corporations. According to the EC (2015), this particular ATP structure allows the use of favourable tax treatment of intellectual property income. This might be represented by a patent box regime in one country, and at the same time the other country allows a deduction of license fees and does not impose any withholding tax on the outgoing payment of license fees. The positive influence of the presence of a patent box regime was also confirmed by Tepperová *et al.* (2020) and Síbrtová *et al.* (2019).

Furthermore, Czech outward FDI is influenced by similar factors as US outgoing FDI placed in EU countries (Síbrtová, 2019). However, as Faeth (2009) mentioned, there is no general model that is applicable to all countries, and the specifics of each economy should be considered. Thus, not all possible variables mentioned in the Literature Review were used in the model presented in this paper. For example, variables such as political stability, legal system and language have been used in models focusing on investments in less developed countries but were not considered appropriate for the model presented in this paper. Other variables such as GDP, effective tax rate, market size, transaction costs, *etc.*, were not demonstrated as statistically significant and/or correlated with other statistically significant variables used in this model.

The conclusions of this article are relevant both for individual EU member states seeking to attract new investors and for tax legislators, as they point to the importance of the patent box regime, which represents preferential tax treatment of income from IP and highlights a potential problem with aggressive tax planning. Further, the research could be

extended to other EU countries as FDI data are easily accessible from balance of payment statements. When considered in the context of other indicators such as aggressive tax planning, it can be assumed that it will be possible to make country-specific recommendations on how to adjust tax systems to avoid any abuse of the tax planning rules that can cause countries to lose out on tax revenues due to shifting tax bases and profits.

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