

UDC 339.9

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## FACTORS AFFECTING THE INTERNATIONAL INVESTMENT POSITION OF THE CZECH REPUBLIC

In the article in order to study the impact of factors affecting on the international investment position of the Czech Republic regression models were constructed. Models research the impact of various independent variables on the main three dependent variables, such as foreign direct investments funds (liabilities), portfolio investments funds (liabilities), and other types of investments funds (liabilities). The emphasis is placed precisely on finding those independent variables, that in one way or another influence the inflow of foreign capital to the studied country. The models were developed on the basis of the annual statistical data for the period from 1996 to 2017.

**Key words:** foreign direct investment funds, portfolio investment funds, other types of investments funds, international investment position, direct dependence, income, yield.

**Problem statement.** The attraction of foreign capital is one of the most significant factors for the successful development of the Czech Republic. More than 87% of incoming investments in the Czech economy came from EU countries. The main investors in 2017 were: Germany (\$ 4.885 billion), Luxembourg (\$ 1.668 billion), France (\$ 669 million), Italy (\$ 630 million), Cyprus (\$ 384 million), Spain (\$ 275 million) and Sweden (\$ 280 million) [10]. One of the most significant factors for the successful development of the Czech Republic is precisely the attraction of foreign capital. FDI is an important component of the successful economic development of many countries, including the Czech Republic. The inflow of foreign capital in the form of direct investment contributes to the development of industries and the introduction of high technologies, creates new jobs and improves the skills of the workforce. A positive influence on FDI was made by the openness of the country to foreign trade. The main investors are the EU members. Many national industrial enterprises belong to German companies. It should be noted that the state is heavily dependent on foreign capital, since this is due to the admission of high technologies and distribution networks to the markets. Thus, attracting FDI has had a significant positive impact on the development and reconstruction of the country's economy. Thanks to investments, there were a stimulation of labor productivity and acceleration of economic modernization. Therefore, it was necessary to find which independent variables affect investment attraction. Based on the obtained results, it will be possible to understand how to make investment climate more attractive.

**Analysis of recent research and publications.** The research of theoretical aspects of comparative analysis and the direct study of the state's balance of payment, international investment position of the country, using regression models are carried out by many domestic and foreign scientists, including: Lomachynska I. [1], Boyd J., De Nicolo G., Rodionova T. [2], Sydorova Z. [3]. In addition to these scientists, the following international organizations are involved in studying and comparing economies of various countries: IMF, World Bank, Eurostat, OECD etc.

**The purpose of the article** is to find the factors affecting on the international investment position using regression analysis, and profitability of foreign investments in countries with transitive economies, on the example of the Czech Republic.

**Presentation of the main material of the study.**

The first model is influenced by independent variables on the foreign direct investment funds of the Czech Republic. The model was developed on the basis of the annual statistical data for the period from 1996 to 2017 [4; 5; 6; 8]. By removing all insignificant coefficients, i.e., their degree of influence tends to zero, it could be possible to draw up a regression model.

Student coefficients for each of the independent indicators correspond to the requirements (higher than 2.2 modulo). Based on the obtained table of coefficients, it can be seen that of all non-dependent variables, only GDP, income from direct investment, unemployment and portfolio investment funds (liabilities) affect the foreign direct investment funds – the expectations are confirmed.

The regression model is as follows:

$$FDI_t = 0,272 * GDP + 0,331 * d \text{ inc deb} + 0,057 * U + 0,443 * PORTF_t, \quad (1)$$

$$(t \text{ GDP} = 2,349), (t \text{ d inc deb} = 2,293),$$

$$(t \text{ U} = 2,312), (t \text{ Portf } t = 6,579).$$

Paying attention to the sign of the Beta coefficient, it is possible to analyze the direct dependence for all independent variables. Also Beta shows the degree of influence, significance. The greatest degree of influence on the foreign direct investment funds of the Czech Republic is provided by portfolio investment funds (liabilities). The following variables that have an impact on foreign direct investment are the income from direct investment of non-residents paid by the Czech Republic to non-residents (d inc deb), as well as the unemployment rate. Also, one of the most significant independent variable is GDP. The adequacy of the model is shown in the table 1.

The obtained dependencies need to be explained from an economic point of view. As it was shown earlier in the article, there is a direct relationship with all independent variables. Considering the income from investments as an independent variable, it's obvious that the more income non-residents receive, the more they invest in the Czech economy. The situation with the unemployment rate at first glance is not clear. However, as for attracting foreign investment in addition to macroeconomic indicators, there are other indicators. The Czech Republic is attractive for foreign investors primarily by the availability of inexpensive and skilled labor, a stable economic and political situation, as well as

a good geographical position. A positive influence on FDI was made by the openness of countries to foreign trade. And in the future, after attracting investment, the relationship changes, and it is thanks to foreign investment, the development of economic sectors and the introduction of high technologies occur, new jobs are created, and as a result, one of the main macroeconomic indicators, unemployment, decreases. The positive effect is observed in the economy as a whole in such forms as: employment growth and productivity growth, export growth, as well as GDP. After these consequences, it is clearly seen that the direct dependence on exports, on GDP, and on the level of unemployment, the dependence is already the opposite, with an increase in foreign direct investment in the Czech Republic, the unemployment rate decreases.

Having considered the positive aspects of attracting foreign direct investment, it is necessary to identify if there are any negative ones. After all, investment is in any case liabilities for the country, and it was analyzed foreign direct investment funds, i.e. accumulation of investments for all years, besides the influence and loss of full control of residents, it is also necessary to pay dividends to non-residents. And in any case, there is a risk of deterioration of the current account of the balance of payments of the Czech Republic. In order to check the dependence, it is necessary to construct a model.

The following model will explore the impact of cumulative foreign direct investment on the current account of the Czech Republic. In this case, direct investment will be considered as an independent variable. Also the exchange rate, as an independent variable. As a dependent the current account of the Czech Republic (CA) will be considered. It is necessary to construct a model and compare expectations with the actual effect of independent variables on the current account of the Czech Republic.

The obtained results show that foreign direct investment funds as well as the exchange rate have an impact on the current account. Analyzing the table, paying attention to the sign of the Beta coefficient, it is clear that the exchange rate is directly related to the current account. Foreign direct investment funds are inversely related to the current account of the Czech Republic. Foreign direct investment funds have negative consequences for the current account in the long run. The following regression model will be constructed in order to find out the degree of negative impact on the current account.

**Regression model of factors affecting the current account of the Czech Republic**

$$CA = 0,883 * ER - 0,829 * FDI \quad (2)$$

(t ER = 2,207), (t FDI = -2,071).

The model clearly shows the inverse relationship of foreign direct investment funds and the current account of the Czech Republic. The model suggests that with an increase in foreign direct investment funds, the current account of the Czech Republic will also decrease, which is evidence of the deterioration of the current account in the long term due to the inflow of foreign direct investment.

The same Beta coefficient shows the degree of influence, significance. An equally important indicator is the exchange rate, which has a direct impact on the current account of the country. Consequently, if this indicator increases in this case the increase implies more than the national currency per unit of foreign currency (devaluation of the Czech koruna) will lead to an increase in

the current account. It is important to note that not for all countries; export growth is expected after a devaluation of the national currency. The main criterion is the Marshall-Lerner condition. However, for the Czech Republic the Marshall-Lerner condition is fulfilled, according to which the sum of price elasticity of demand for export and import is more than one. Therefore, with the depreciation of the Czech koruna, the following processes occur, which need to be considered both in the short and long term.

In the short term, exports and imports remain unchanged, but prices for imported goods have increased, both for firms and for households, which is a negative consequence. So, the first effect of devaluation is the price effect, which worsens the trade balance, and later the current account in the short term (import becomes more expensive). The second effect is an increase in the volume of exported goods. That is, in the long-term period, exports are increasing, as it becomes more competitive, namely, cheaper for foreign importers. Regarding imports, in connection with the rise in price, the country reduces volumes, which leads to an improvement in the current account.

After analyzing the factors affecting foreign direct investments funds, as well as the impact of direct investment funds on the current account of the Czech Republic and on the economy as a whole. It is possible to conclude that an increase in foreign direct investment funds leads to a deterioration of the current account, as well as an increase in foreign debt in the long run. On the other hand, at the macroeconomic level, it is recommended for the resilience of the national financial system.

Next, it is necessary to consider the impact of all the previously selected independent variables on the portfolio investment funds of the Czech Republic. By removing all insignificant coefficients, i.e., their degree of influence tends to zero, it is possible to draw up a regression model. The model was developed on the basis of the annual statistical data for the period from 1996 to 2017 [4; 5; 7; 9].

Obtained coefficients show that all non-dependent variables, the interest rate and the income of non-residents on portfolio investments influence on portfolio investment funds. The first component is inversely related to portfolio investment funds, and incomes of non-residents on portfolio investments are directly dependent.

It is necessary to construct a regression model and, after analyzing, find out the extent to which each independent variable affects the portfolio investment funds.

The regression model is as follows:

**Regression Model of Portfolio Investment Funds (liabilities) of the Czech Republic**

$$Portf \ l = 0,806 * p \ inc \ deb - 0,218 * IR, \quad (3)$$

(t p inc deb = 8,704), (t IR = -2,359).

The greatest degree of influence on the portfolio investment funds of the Czech Republic is exerted by non-resident income from portfolio investment, i.e. this means that with an increase in this indicator, it will lead to an increase in the portfolio investment funds of the Czech Republic. Further, the most significant independent variable, that is also an important indicator of attracting portfolio investment, is the interest rate. If this indicator decreases, it will lead to an increase in the portfolio investment funds of the Czech Republic.

The model indicates that the interest rate is inversely related to the portfolio investment funds of the Czech Republic. This dependence is explained by the influence of the interest rate on the profitability of investments, and ultimately on the costs of investments. Further, the greater the return on investment, and the lower the costs, the more investment flows into the country. There is a suspicion that with a decrease in the interest rate, incomes of non-residents from portfolio investments increase. In order to be confident in the forecast, it is necessary to build another model and check what effect the interest rate has on non-residents income from portfolio investments. For this, the interest rate will be taken as an independent variable, as well as the exchange rate, as a dependent income of non-residents on portfolio investments.

After analyzing the obtained results, it could be concluded that the expectations are confirmed. Indeed, there is an inverse relationship between the interest rate and portfolio investment funds, and the dependence is quite strong. As regards the exchange rate, the dependence is inverse, which is also explained in terms of return on investment. The regression model will look like this:

$$p \text{ inc deb} = -0,221*IR - 0,694*ER, \quad (4)$$

(t IR = -2,046), (t ER = -4,547).

It is clear from the model that with a decrease in the interest rate, it will lead to an increase in the income of non-residents from the portfolio investments of the Czech Republic. Regarding the exchange rate, a decrease of this indicator (the national currency becomes more expensive) will lead to an increase in non-residents' income from the portfolio investments of the Czech Republic. It means that when the national currency appreciates in relation to other currencies (revaluation), the attractiveness of the economy for attracting portfolio investments grows, and investments also increase, and therefore portfolio investment funds.

Next, can be considered the impact of all the previously selected independent variables on the funds of other types of investments of the Czech Republic. Before drawing up the model, it is necessary to comment on the results obtained during the analysis.

Having considered the results of calculations, it could be drawn the following conclusion. Student coefficients for each of the independent indicators correspond to the requirements (higher than 2,1 modulo). Based on the obtained table of coefficients, it can be seen that of all the independent variables, only the interest rate, the current account of the balance of payments, as well as government spending, affect the funds of other types of investments. Moreover, the interest rate and the current account of the balance of payments are inversely related to the funds of other types of investments of the Czech Republic. Government

spending is directly dependent on funds of other types of investments of the Czech Republic.

#### Regression model of Other Types of Investment funds (liabilities) of the Czech Republic

$$O \text{ I} = 0,570*GOV - 0,302*IR - 0,133*CA, \quad (5)$$

(t GOV = 4,413), (t IR = -2,961), (t CA = -2,198).

The greatest impact on the funds of other types of investments in the Czech Republic is provided by the variable – GOV. Next, the most significant independent variable is the interest rate. The next significant variable is the current account of the balance of payments, are inversely related to funds of other types of investments. Decreasing of this variable will lead to an increase in funds of other types of investment.

Having considered all types of investments in the economy of the Czech Republic identified, and also analyzed the most significant indicators affecting the international investment position of the Czech Republic, it is necessary to determine the impact of all three types of investments on the total amount of assets controlled in the Czech Republic by foreign investors. In order to define this, the empirical method and construction of trivial regression model could be used. It should be noted that the model will include an indicator that has not previously been considered, such as the total amount of assets controlled in the Czech Republic by foreign investors (L). All three types of investments were selected separately as independent variables. The results of the analysis were as follows. The share of all types of investments in the total amount of assets controlled in the Czech Republic by foreign investors: foreign direct investments – 52%, portfolio investments – 20% and other types of investments – 28% [4].

Based on the obtained coefficient table, it can be seen that foreign investors control the assets of the Czech Republic to the greatest extent by means of foreign direct investments, therefore, this article is the most significant of all independent variables that affect the dependent variable – liabilities of the Czech Republic to foreign investors. The next most important item in terms of influence is other types of investments (liabilities). The least significant of all three types of investment is portfolio investment (liabilities). All three types of investments are directly dependent on the total liabilities of the Czech Republic.

Non-residents of the country receive income from investments, By investing in the economy of the Czech Republic, if direct investment, as was proved above, has the greatest influence, as well as the largest share compared to all liabilities of the Czech Republic. Therefore, the income that the Czech Republic pays for all three types of investments to non-residents, should prevail directly on direct investment. Also, income from direct investments should have the greatest impact on the amount of income received by non-residents. In order to

Table 1

#### The adequacy of the models

	Dependent variables		
	FDI I	Portf I	Other I
Student's t-test	t > 2,2	t > 2,2	t > 2,1
R-squared form	0,995 (99,5%)	0,945 (94,5%)	0,955 (95,5%).
F-statistics	597,720	75,288	81,413
Durbin-Watson Test (critical value)	1,701	1,532	1,655

Source: by the authors



verify this, it is necessary to find and designate the amount of income paid by the Czech Republic to non-residents (inc deb), and take this indicator as a dependent variable.

Having considered the results, it is clear that in this case the incomes for all three types of investments were chosen as independent variables. After analyzing, it is possible to come to the following conclusion: income from direct investments paid by the Czech Republic to non-residents prevail over income from other investments (90%), and also has the greatest degree of influence on the income of non-residents in general. Based on the obtained table of coefficients, it can be seen that the following influential indicators are portfolio investment income (6%), and then income from other types of investment (4%) [7].

Having considered the degree of the influence of income on various types of investments on the income of non-residents as a whole, the most significant indicator will be found out as income on direct investment. Also analyzing the total amount of liabilities of the Czech Republic, it is turned out that direct investments are also the most influential and have the largest share comparing with portfolio or other types of investments. Despite this, assessing the profitability of investments may turn out to be another type of investment, according to which foreign investors receive a greater return (estimated in this case in %). In order to define this, it is necessary to measure the total profitability for all three types of investments (inc deb / L), and then measure the profitability separately for each type of investment. After that, using the program, it is necessary to find, which of the three types of foreign investment in the Czech Republic, have the greatest profitability.

Denote the variables as follows: (the variables could be denoted as follows):

d inc deb / d l is the yield on foreign direct investment,

p inc deb / p l – yield on portfolio investment,

o inc deb / o l – yield on other types of investments.

So the assets that foreign investors control in the Czech Republic, through foreign direct investment, along with a specific weight, as well as obtaining a larger income in the sum (which is quite logical, because whatever the yield, direct investment is much more prevalent over other types of investments. ). FDI also have the highest yield compared to the two other types of investments.

The opposite picture is observed with portfolio and other types of investments, as it was said earlier, the returns on portfolio investments were the following after direct investments, according to the degree of influence on the income of non-residents from investments in general. Exploring the yield of investment, it is clearly seen that portfolio investment has a higher yield than other types of investment. But after analyzing the total number of investments, other types of investments are much more than portfolio

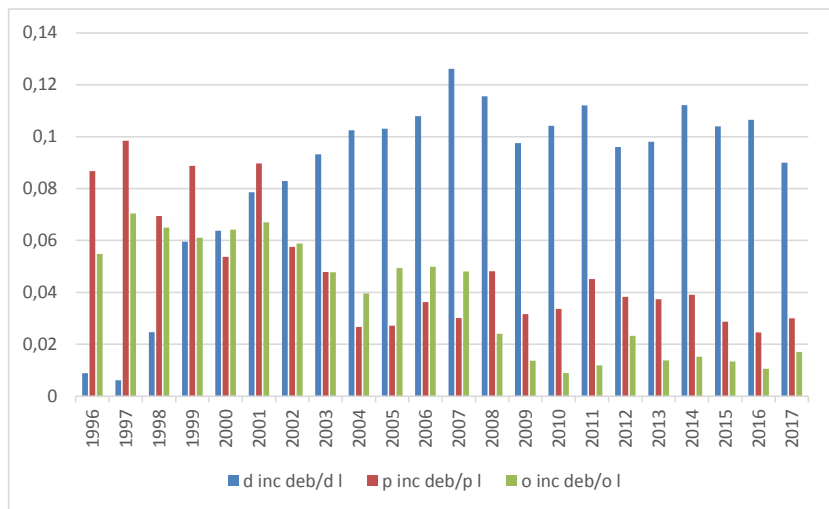


Figure 1. Yield for all three types of foreign investments 1996–2017  
Source: [4; 5]

ones. This proves once again that the profitability on portfolio investment is higher than on other types of investment. In 2017, the yield on all three types of investments was as follows: on foreign direct investment – 9%, on portfolio investment – 3,1%, on other types of investments – 1,7%.

The Czech Republic pays dividends by a foreign investor with the highest yield on direct investments. After analyzing which type of Czech investment has the highest yield, it is clear that the return on other types of investments of the Czech Republic has the most effect on total profitability of Czech investments, if it is considered the average for 1996-2017 (fig. 2).

It can be seen from the diagram, after 2010 the situation changed and the assets of Czech investors abroad, controlled by foreign direct investment, began to have the highest return. It is also important to note that Czech investments have much lower returns than foreign investments in the Czech Republic. In 2017, the yield on all three types of investments was as follows: on foreign direct investment – 4,1%, on portfolio investment – 1,5%, on other types of investments – 2,1%.

**Conclusions.** Paying attention to direct investment funds of the Czech Republic, the greatest degree of influence on them is provided

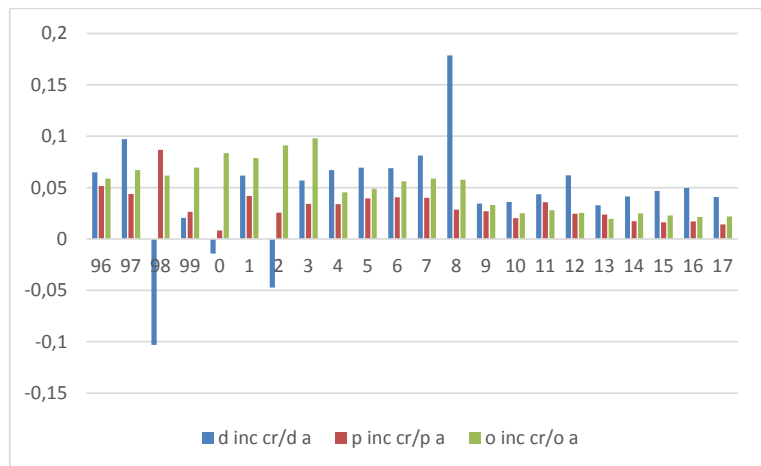


Figure 2. Yield for all three types of Czech investments 1996–2017  
Source: [4; 5]

by portfolio investment funds (liabilities), by the income from direct investment of non-residents paid by the Czech Republic to non-residents (d inc deb), by unemployment rate and by GDP.

Positive and negative aspects of attracting foreign direct investment were also found. The positive effect is observed in the economy as a whole in such forms as: employment growth and productivity growth, export growth, as well as GDP. After these consequences, it is clearly seen that there is the direct dependence on exports, on GDP, and on the level of unemployment, the dependence is already the opposite, with an increase in foreign direct investment in the Czech Republic, the unemployment rate decreases. The negative aspects: that an increase in foreign direct investment funds leads to a deterioration of the current account, as well as an increase in foreign debt in the long run.

It is considered the impact of all the previously selected independent variables on the portfolio investment funds of the Czech Republic. Of all the variables, the interest rate and the income of non-residents on portfolio investments have the real impact. The first component is inversely related to portfolio investment funds, and incomes of non-residents on portfolio investments are directly dependent. Also the effect of the interest rate on non-residents income from portfolio investments has been proven. There is an inverse relationship between the interest rate and portfolio investment funds.

The greatest impact on the funds of other types of investments in the Czech Republic is provided by the variable – GOV. Next, the most significant

independent variables are the interest rate and current account of the balance of payments. They are inversely related to funds of other types of investments.

All types of investments in the total amount of assets controlled in the Czech Republic by foreign investors and the share of each type separately as well as the share of income of all three types of investments to non-residents in the total amount of income paid by the Czech Republic to foreign investors were analyzed.

The yield for all three types of foreign investments 1996-2017 was found and compared. Foreign direct investments have the largest share, as well as the highest yield. Portfolio and other types of investments, the returns on portfolio investments were the following after direct investments, according to the degree of influence on the income of non-residents from investments in general. Exploring the yield of investment, it is clearly seen that portfolio investment has a higher yield than other types of investment. But after analyzing of the total number of investments, other types of investments are much more than portfolio ones.

Paying attention to profitability, it is also necessary to note that Czech investments have much lower returns than foreign investments in the Czech Republic. In 2017, the yield on all three types of investments was as follows: on foreign direct investment – 4,1%, on portfolio investment – 1,5%, on other types of investments – 2,1%. And the foreign investors in 2017 have the yield on all three types of investments: on foreign direct investment – 8,6%, on portfolio investment – 4%, on other types of investments – 3,1%.

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## ЧИННИКИ, ЩО ВПЛИВАЮТЬ НА МІЖНАРОДНУ ІНВЕСТИЦІЙНУ ПОЗИЦІЮ ЧЕСЬКОЇ РЕСПУБЛІКИ

### Резюме

У статті для вивчення чинників, що впливають на міжнародну інвестиційну позицію Чеської Республіки, побудовано регресійні моделі. Вони досліджують вплив різних незалежних змінних на основні три залежні змінні, такі як фонди прямих інвестицій (зобов'язання), портфельні інвестиційні фонди (пасиви) та інші види інвестиційних фондів (зобов'язання). Акцент робиться саме на виявленні тих незалежних змінних, які так чи інакше впливають на приплив іноземного капіталу до досліджуваної країни. Моделі розроблено на основі річних статистичних даних за період із 1996 по 2017 р.

**Ключові слова:** прями іноземні інвестиції, портфельні інвестиційні фонди, інші види інвестиційних фондів, міжнародна інвестиційна позиція, пряма залежність, дохід, дохідність.

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## **ФАКТОРЫ, ВЛИЯЮЩИЕ НА МЕЖДУНАРОДНУЮ ИНВЕСТИЦИОННУЮ ПОЗИЦИЮ ЧЕШСКОЙ РЕСПУБЛИКИ**

### **Резюме**

В статье для изучения факторов, влияющих на международную инвестиционную позицию Чешской Республики, построены регрессионные модели. Они исследуют влияние различных независимых переменных на три основные зависимые переменные, такие как фонды прямых иностранных инвестиций (обязательства), фонды портфельных инвестиций (обязательства) и другие виды инвестиционных фондов (пассивы). Акцент делается именно на поиске тех независимых переменных, которые так или иначе влияют на приток иностранного капитала в исследуемую страну. Модели были разработаны на основе годовых статистических данных за период с 1996 по 2017 г.

**Ключевые слова:** фонды прямых иностранных инвестиций, портфельные инвестиционные фонды, другие виды инвестиционных фондов, международная инвестиционная позиция, прямая зависимость, доход, доходность.