Lubor Lacina[*], *Luboš Střelec*[**]

THE IMPACT OF FOREIGN DIRECT INVESTMENT ON THE ECONOMIC GROWTH IN THE CZECH REPUBLIC[1]

Abstract. The aim of the paper is to analyse the impact of Foreign Direct Investment on the economic growth in the Czech Republic during the period of economic transition.

The first part summarises the Foreign Direct Investment inflow to the Czech economy during the period 1993–2006. The second part analyses the impact of Foreign Direct Investment on selected microeconomic variables. This analysis compares the "domestic" and "foreign" enterprises using the variables as the share on total production, number of employees, productivity of labour, export orientation etc. The last part of study presents results of multiple regression analysis and discusses the impact of Foreign Direct Investment and the other economic and financial variables on the economic growth in the Czech Republic.

Key words: Gross Domestic Product, Foreign Direct Investments, multiple regression analysis, the Czech Republic.

1. INTRODUCTION

If we look closely on the emerging economies we may identify that one of the biggest problem of those economies during the whole transition period is the lack of domestic savings (investments). At the same time those countries are in the process of transformation, which is capital demanding. The way how to saturate this need is to stimulate conditions for the inflow of foreign savings (investments). In this article we will look mainly to one type of capital inflow – Foreign Direct Investments (FDI). To analyse the effect of FDI inflow on economic growth we will use the case of the Czech Republic.

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[*] Ph.D. Ing., Mendel University of Agriculture and Forestry Brno, Czech Republic.

[**] Ing., Mendel University of Agriculture and Forestry Brno, Czech Republic.

The specific way of Czech transformation of state owned economy to the fully market economy via the voucher privatisation will allow us to show the non-substitutable role of FDI in the transformation process. The Czech economy was given as a good example of the country, which was able very quickly change the property ownership structure in the national economy. The problem is that the voucher privatisation made just the "statistical" changes in property holding and did not bring the additional capital, which was essential for modernising the economic structure. The Graph 1 shows the FDI inflow to the Czech economy during the period 1993–2006.
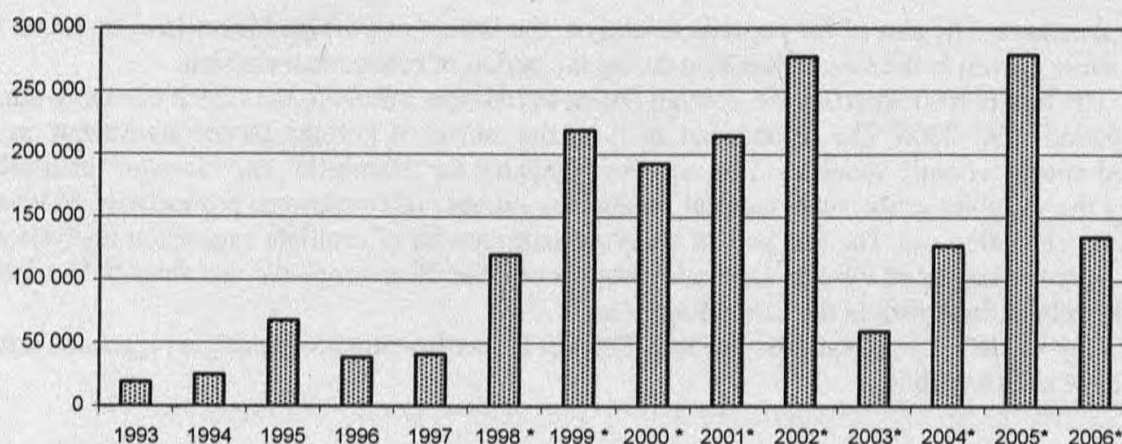
Until 1997 data included FDI in equity capital, starting from 1998 data on reinvested earnings and other capital have been included in FDI flows.
* Preliminary data

Graph 1. Inward FDI to the Czech Republic in 1993–2006 (in billion CZK)
S o u r c e: data provided by the Czech National Bank.

If we look on Graph 1 we can see the dynamic increase in FDI inflow after the year 1998. The yearly average inflow during 1998 – 2002 was almost 200 billions of CZK. This observed increase is the combination of several factors: introduction of investment incentives, devaluation of Czech crown after the financial crises in 1997, privatisation of state owned monopolies and increase of both green and brown field investments (MPO 2004). Since 2000 we can also observe significant increase of reinvested earnings on total inflow. For example in year 2006 this part of inflow consist more than 60 percent of total inflow.

Since 2000 the structure of investments is changing. While we only saw simple investments in the first decade of transformation, like assembling halls for example, we now see new investments with higher added value. Companies have begun to locate their headquarters in the Czech Republic, not only for the CE [Central European] market but also for their global businesses. This is cru-
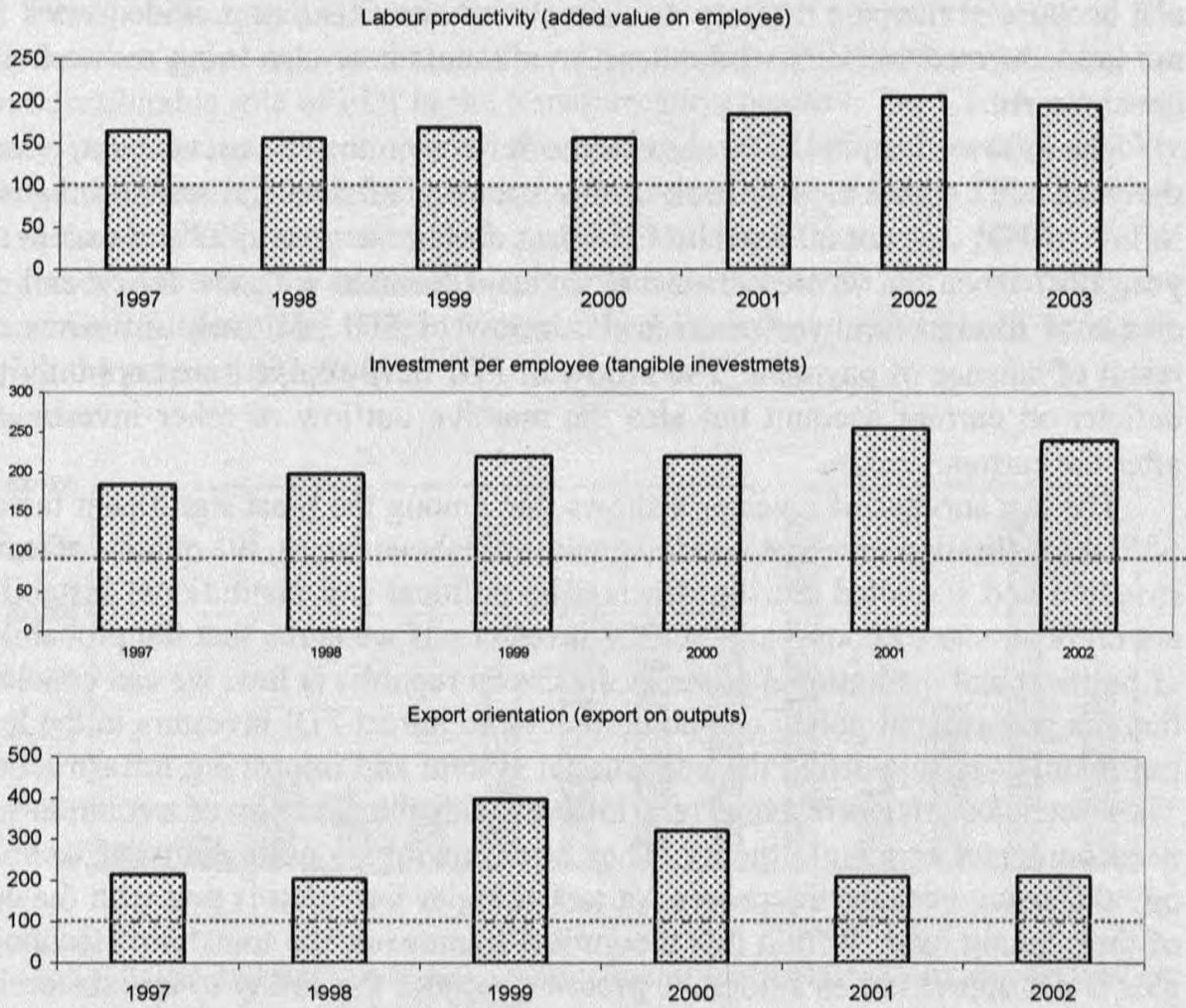
cial because in the past we only saw simple investments that provided work for the less educated workers while these investments now also bring research and development.

The inflow of capital fully absorbs the deficits on the current account, except the year 2003. If we closely look on the structure of financial account that the inflow of FDI was not effected by FX crises during the year 1997 and except the year 1997 when the whole balance of payment finished with the deficit and decrease of foreign turnover reserves the inflow of FDI positively influence the result of balance of payment. The inflow of FDI fully compensated not only the deficits on current account but also the massive outflow of other investments after the currency crisis.

The last surveys of investor's shows that among the most significant factors of FDI localisation are: cost and the quality of labour forces, the quality of infrastructure and so called cluster effects. The political and institutional instability are on other site discouraging the FDI investors. If we agree that the probability of political and institutional crises in the Czech republic is low, we can conclude that the government policy can do quite a lot to attract FDI investors in the long run mainly via supporting the educational system and improving infrastructure. These conclusions correspond (are in line) with the findings of evolution and neoschumpeter economic theory. They stress mainly conditionality of technology diffusion, because the process of technologies imitation is tied with the cost of their taking over. Within this theoretical framework the transfer of technologies is not apprehend as automatic process, because the ability to absorb foreign technologies requires investments to the domestic research potential, human capital and infrastructure, generally improvement of the technological absorption capacity of the economy.

2. IMPACT OF FDI ON MICROECONOMIC VARIABLES

We will use several points of view to compare differences between the firms under foreign and domestic control. The graph 2 shows that productivity of labour was in firms with foreign owners 50% higher a that the gap is even increasing during last few years. The difference is even more significant if we compare the investment activity measured as tangible investments per employee. The firms under foreign control had this variable almost twice higher. Third variable compared in Graph 2 is the export orientation. As we can expect form the theory of FDI cycle we can expect that the export orientation of firms under foreign control will be very significant. The extreme case was year 1999 when the gap between domestic and foreign firms was almost 300%. We can also see that during the whole period existed the gap in profitability in favour of firms under foreign control (see Graph 3).

Labour productivity (added value on employee)

Investment per employee (tangible inevestmets)

Export orientation (export on outputs)

Graph 2. Labour productivity, investment activity, export orientation in firms with foreign capital in the Czech Republic (domestic firms = 100)

S o u r c e: Srholec (2004).
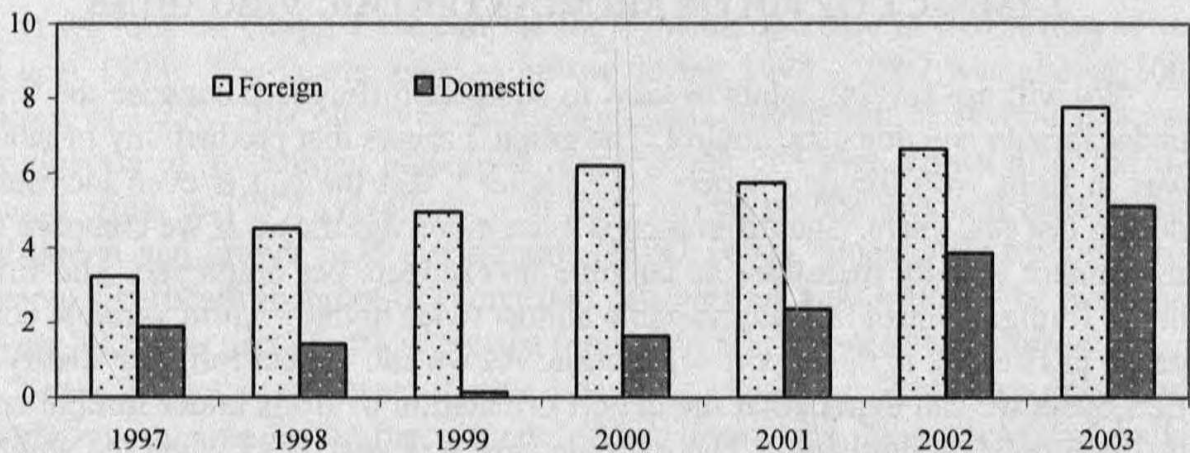
Graph 3. Profitability in domestic firms and firms with foreign capital in the Czech Republic
S o u r c e: Srholec (2004).

Graph 4 shows international comparison of the gap in the productivity of labour. The highest gap can be observed in Ireland, where the productivity of labour in firms under foreign control is 6 times higher than in domestic firms. We can identify the systematic relation between the economic level of the country and the productivity gap. In Turkey and Hungary the gap is almost 200% percent, in case of the Czech Republic only 100% and in case of Finland there is even positive gap in favour of domestic firms (Srholec 2004, p. 171).
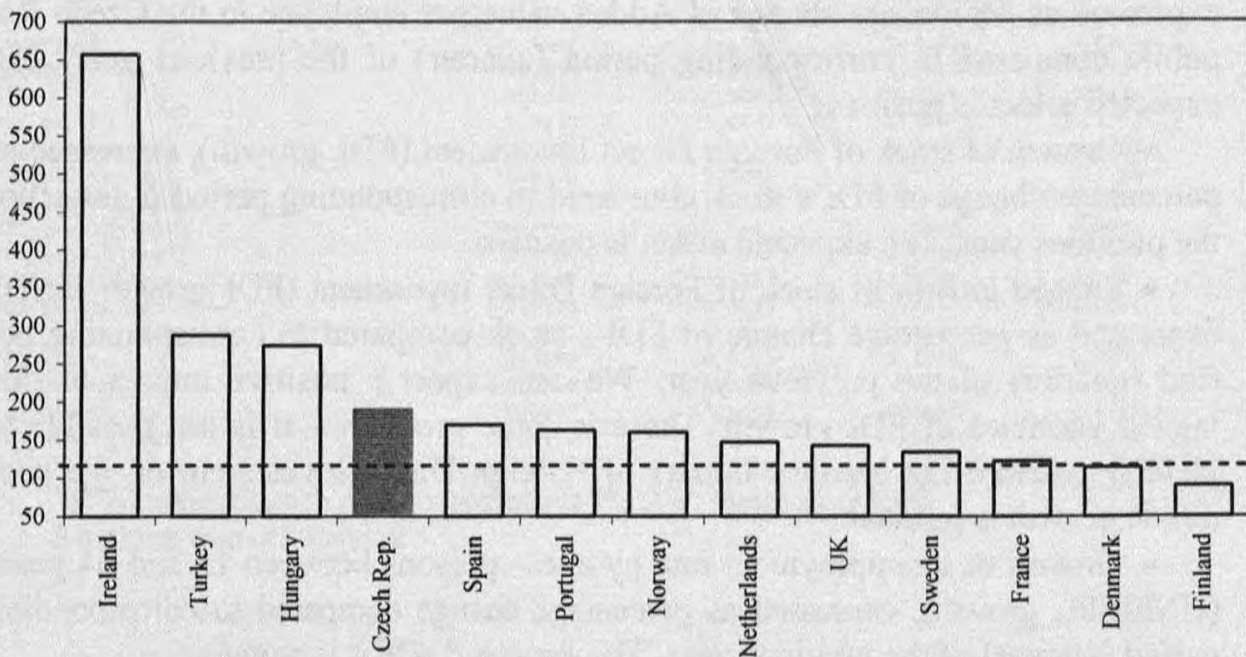
Graph 4. Interval between the labour productivity in enterprises under foreign and domestic control – international comparison (added value per employee, domestic firms = 100)

S o u r c e: Srholec (2004).

3. EMPIRICAL ANALYSIS OF THE IMPACT OF FOREIGN DIRECT INVESTMENT ON THE ECONOMIC GROWTH IN THE CZECH REPUBLIC

This section is devoted to the presentation of econometric estimation results aimed at impact of FDI on the economic growth in the Czech Republic in 1996-2006 period (based on the quarterly data). In our case, we use the multiple regression analysis, where real growth of GDP is dependent variable (real growth of GDP is expressed as percentage change of GDP at constant (1995) prices compared to corresponding period of the previous year) and following variables are used as independent variables:

- Real growth of GDP of EU 15 (GDPEU_growth), expressed as percentage change of GDP at constant (1995) prices compared to corresponding period (quarter) of the previous year. This variable should serve as an indicator of the economic climate in the main export area for the Czech Republic. The expected effect of this variable is positive.

- Lagged Real growth of GDP of EU 15 (GDPEU_growth_lag(t)), expressed as percentage change of GDP at constant (1995) prices compared to corresponding period (quarter) of the previous year. The expected effect is positive.

- Real growth of Labour productivity in the Czech Republic (LP_growth), expressed as percentage change of Added value per employee in the Czech Republic compared to corresponding period (quarter) of the previous year. The expected effect is positive.

- Growth of stock of Foreign Direct Investment (FDI_growth), expressed as percentage change of FDI´s stock compared to corresponding period (quarter) of the previous year. The expected effect is positive.

- Lagged growth of stock of Foreign Direct Investment (FDI_growth_lag(t)), expressed as percentage change of FDI´s stock compared to corresponding period (quarter) of the previous year. We can expect a positive impact of this lagged variables of FDI growth. There is some problem – it is not possible to identify relevant lag because Impact of Foreign Direct Investment on the economic growth is gradual.

- Growth of unemployment rate by age – persons between 15 and 64 years (UNEMPL_growth), expressed as percentage change compared to corresponding period (quarter) of the previous year. The expected effect is negative.

- Real growth of CZK/EUR turnover rate (CZKEUR_growth), expressed as percentage change compared to corresponding period (quarter) of the previous year. Expected effect is positive.

- Harmonized indices of consumer prices (HICP_growth), expressed as percentage change compared to corresponding period (quarter) of the previous year.

- Official lending rates of Central Bank of the Czech Republic (IR), expressed as percentage rate of current quarter. Expected effect is negative.

- The current + capital account deficit of the Czech Republic (CCA), expressed in euro. We can expect a negative impact of this variable.

Source data for empirical analysis are taken from DSI Full Campus Solution – section EUROSTAT. Results of empirical analysis present following tables.

F-ratio of this model is 76.38 with p-value 0.000 – there is a statistically significant relationship between the variables at the 99 % confidence level. R^2 for this model is 0.9962 (adjusted R^2 = 0.9832). Durbin-Watson statistic tests (DW = 2.0932) shows that there is probably not any serious autocorrelation in the residuals. Some variables are not statistically significant – this model can be simplified.

Table 1

Complete model

Parameter	Significant level	Estimate	Standard Error	T Statistic	P-Value
CONSTANT	(**)	2,9660	0,8345	3,5541	0,0093
GDPEU_growth		-0,1395	0,1431	-0,9748	0,3621
GDPEU_growth_lag1		0,0719	0,1335	0,5384	0,6070
GDPEU_growth_lag2		0,2344	0,1867	1,2556	0,2496
GDPEU_growth_lag3	(*)	0,3006	0,1128	2,6662	0,0322
GDPEU_growth_lag4		0,1985	0,1477	1,3438	0,2209
HICP_growth		0,1190	0,0769	1,5480	0,1655
CZKEUR_growth		0,0483	0,0606	0,7964	0,4520
IR	(*)	-0,7972	0,3174	-2,5120	0,0403
LP_growth	(*)	0,5321	0,1595	3,3356	0,0125
UNEMPL_growth		-0,5584	0,3551	-1,5727	0,1598
CCA		0,0000	0,0001	0,3348	0,7476
FDI_growth	(*)	0,0447	0,0163	2,7440	0,0287
FDI_growth_lag1		0,0017	0,0125	0,1372	0,8948
FDI_growth_lag2		-0,0112	0,0145	-0,7712	0,4658
FDI_growth_lag3		-0,0109	0,0133	-0,8194	0,4395
FDI_growth_lag4		-0,0009	0,0147	-0,0601	0,9538
FDI_growth_lag5		0,0088	0,0142	0,6179	0,5562
FDI_growth_lag6		-0,0174	0,0137	-1,2747	0,2431
FDI_growth_lag7		-0,0124	0,0140	-0,8818	0,4071
FDI_growth_lag8		0,0206	0,0168	1,2227	0,2610
FDI_growth_lag9		-0,0185	0,0130	-1,4244	0,1973
FDI_growth_lag10		-0,0086	0,0139	-0,6154	0,5577
FDI_growth_lag11		-0,0099	0,0066	-1,5018	0,1768
FDI_growth_lag12		0,0112	0,0066	1,6870	0,1355

* (**) denotes rejection of the hypothesis at 5% (1%) significance level

S o u r c e: own calculations.

Table 2

Simplified model

Parameter	Significant level	Estimate	Standard Error	T Statistic	P-Value
IR	(**)	-0,6894	0,0884	-7,7967	0,0000
LP_growth	(**)	1,0737	0,0300	35,7668	0,0000
GDPEU_growth_lag3	(**)	0,2967	0,0919	3,2282	0,0034
UNEMPL_growth	(**)	-0,7400	0,0800	-9,2553	0,0000
FDI_growth	(**)	0,0189	0,0050	3,7793	0,0008
FDI_growth_lag12	(**)	0,0078	0,0016	4,7583	0,0001

* (**) denotes rejection of the hypothesis at 5% (1%) significance level

S o u r c e: own calculations.

F-ratio of this simplified model is 1047.67 with p-value 0.000 – there is a statistically significant relationship between the variables at the 99% confidence level. R^2 for this model is 0.9959 (adjusted R^2 = 0.9951) and Durbin-Watson statistics DW = 1.3174.

4. INTERPRETATION OF THE EMPIRICAL ANALYSIS

We estimated the statistically significant model for real growth of GPD of the Czech Republic. The final model is following:

$$GDP\_growth = -0.6894 \cdot IR + 1.0737 \cdot LP\_growth +$$
$$+ 0.2967 \cdot GDPEU\_growth\_lag3 -$$
$$0.7400 \cdot UNEMPL\_growth + 0.0189 \cdot FDI\_growth +$$
$$+ 0.0078 \cdot FDI\_growth\_lag12$$

Model results interpretation:
−   The increase in interst rate has negative impact on real GDP growth.
−   There is positive impact of labour productivity growth on real GDP.
−   The GDP growth of the Czech Republic is positively depend on real economic growth of EU 15 with lag of 3 quarters.
−   There is significant relationship between FDI inflow and real GDP growth. Statistically significant are variables FDI_growth and FDI_growth with 12 lag (12 quarters = 3 years). We cannot conclude that the effect is fully visible after 12 quarters. The impact of FDI on real GDP growth is distributed gradually. The following Table 3 show the result of the model without lags.

Table 3

Estimation results of the GDP growth model

Parameter	Significant level	Estimate	Standard Error	T Statistic	P-Value
GDPEU_growth_lag3	(**)	0,3359	0,1157	2,9038	0,0074
CZKEUR_growth	(*)	-0,0544	0,0224	-2,4279	0,0224
IR	(**)	-0,6313	0,1075	-5,8748	0,0000
LP_growth	(**)	1,0801	0,0374	28,9089	0,0000
UNEMPL_growth	(**)	-0,4283	0,1424	-3,0088	0,0058
FDI_growth	(*)	0,0149	0,0064	2,3484	0,0267

* (**) denotes rejection of the hypothesis at 5% (1%) significance level
S o u r c e: own calculations.

F-ratio of this model is 685.48 with p-value 0.000 − there is a statistically significant relationship between the variables at the 99 % confidence level. R^2 for this model is 0.9937 (adjusted R^2 = 0.9925) and Durbin-Watson statistics DW = 1.1975.

5. CONCLUSION

The aim of the paper was to analyse the impact of Foreign Direct Investment on the economic growth in the Czech Republic during the period of economic transition. Graph 1 summarise the total inward FDI to the Czech Republic in period 1993–2006. Authors than identify the changes in the structure of inflow and also stress positive impact of FDI inflow on balance of payment equilibrium. The graphs 2 and 3 show significant differences among the enterprises financed by FDI and those financed and owned by domestic capital. Results of empirical analysis are presented in terms of complete model in Table 1. Only the statistically significant variables are included to the simplified version of the model. The results are introduced in Table 2. Finally authors estimated the statistically significant model for real growth of GPD of the Czech Republic. The results of the model show that there is significant relationship between FDI inflow and real GDP growth. Statistically significant are variables FDI_growth and FDI_growth with 12 lag (12 quarters = 3 years). We cannot conclude that the effect is fully visible after 12 quarters. The impact of FDI on real GDP growth is distributed gradually. The Table 3 shows the result of the model without lags for the purpose of comparison.

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Database of CNB – FDI Statistics

Database of times series ARAD

Database DSI Full Campus Solution – section EUROSTAT

Lubor Lacina, Luboš Střelec

WPŁYW BEZPOŚREDNICH INWESTYCJI ZAGRANICZNYCH NA WZROST GOSPODARCZY W REPUBLICE CZESKIEJ

Celem autorów jest analiza wpływu bezpośrednich inwestycji zagranicznych na wzrost gospodarczy Czech w okresie transformacji. Część pierwszą stanowi charakterystyka napływu bezpośrednich inwestycji zagranicznych do Czech w okresie 1993-2006. W części drugiej analizowany jest wpływ BIZ na wybrane zmienne o charakterze mikroekonomicznym. W analizie tej porównujemy przy tym „krajowe” i „zagraniczne” przedsiębiorstwa wykorzystując takie czynniki jak udział w produkcji globalnej, wielkość zatrudnienia, produktywność pracy, kierunki eksportu itp. W ostatniej części zaprezentowane zostały wyniki analizy regresji oraz podjęto dyskusję nad wpływem BIZ i innych ekonomicznych i finansowych zmiennych na wzrost gospodarczy w Republice Czeskiej.

Słowa kluczowe: PKB, bezpośrednie inwestycje zagraniczne, analiza regresji wielorakiej, Republika Czeska.