INFLUENCE OF INVESTMENT INCENTIVES ON DEVELOPMENT OF REGIONAL UNEMPLOYMENT IN THE CZECH REPUBLIC

Emil Adámek[1], Lucie Rybková[2]

[1] *Technical University of Ostrava*
[2] *Mendel University in Brno*

ABSTRACT

The aim of this paper is to assess the influence of investment incentives on development of regional unemployment in the Czech Republic and with proposal of recommendations related to utilization of investment incentives as an instrument for promoting employment and development of regions as well as for reduction of differences in economic activity of regions. Time series from 1998 to 2014 were used to solve the problem when regional unemployment was chosen as a dependent variable, for which econometric model was created using panel regression and including investment incentives. Results of testing prove that investment incentives have positive and statistically significant influence on regional employment.

KEY WORDS

regional unemployment, investment incentives, foreign direct investments, panel regression

JEL CODES

C23, E24, F21

1   INTRODUCTION

The unemployment was under government control in the Czech Republic till 1989. Since that time Czech economy has changed a lot. In the beginning of nineties the average level of unemployment was about 4.3%. The outflow of foreign investment led to growth of unemployment in the second half of nineties. Moreover regional disparities have become serious problem.

The aim of this article is to assess the influence of investment incentives on development of regional unemployment in the Czech Republic.

Investment incentives have been adopted in the Czech Republic in 1998. Despite the laws has changed several time the investment incentives are still frequently discussed and its influence on macroeconomic variables is disputant.

Paper is structured as follows. There are theoretical backgrounds in Chapter 2. There is explained theoretical relationship between investments and unemployment. You can find review of empirical literature in that chapter as well. Chapter 3 deals with used methods and data. There is explained how we construct our models and which econometric techniques we use. Also data used in our model are defined there. Chapter 4 summarizes results of our models. Outcomes of models are presented there by tables and figures. We conclude and discuss our results in the last chapter of this paper.

2   THEORETICAL FRAMEWORK

Investment incentives and its influence on real economy is widely discussed topic nowadays. Some authors claim that incentives lead to growth of investment and lower level of unemployment whereas others say that there is either no relationship between these variables or that there is even opposite relation. Theoretical approaches to investment incentives are described in the first part of this chapter. Then there is a review of empirical papers which deal with this topic in the second part of chapter.

2.1   Theoretical Backgrounds

Authors such as Kunešová, Cihelková et al. (2006) or Dobrylovský and Löster (2009) show number of positive effects of incentives such as:

- increase of economic growth,
- creating new jobs,
- lowering rate of unemployment,
- increasing domestic export or
- revitalization of region.

On the other hand, there are authors such as Blomström and Kokko (2003) who doubt influence of incentives on real economy. They claim that the question if benefits come from investment flow can outweigh their costs is at issue. Štěrbová et al. (2013) say that investment incentives are one of the most discussed and most controversial topics nowadays. She mentions that they influence competition in the country which adopts them. Schwarz et al. (2007) mention that most of incentives go to richer regions with lower level of unemployment. This fact even worsens regional disparity due to migration of workforce from poorer to richer regions. Košan (2013) states that incentives improve both employment and fiscal income.

On the other hand he claims that incentives cause appreciation of domestic currency (due to investment inflow) which worsens export possibilities. As another problem connected with incentives can be considered corruption, growth of government debt or environmental impact.

2.2   Review of Empirical Literature

As concerns other empirical papers they can be divided into two groups. The first group deals with investment incentives just like we do. The other group try to find relationship between foreign direct investment and unemployment. The first group contain authors such as Karaalp (2014) who use panel regression analysis to prove relationship between investment incentives and unemployment in Turkey; or Schalk and Untiedt (2000) who find that incentives reduce unemployment in Germany using error correction model.

Dobrylovský and Löster (2009) focus on influence of foreign investments on unemployment in the Czech Republic. They find that foreign investment even worsen level of unemployment. On the other hand Domesová (2006) or Zamrazilová (2006) do not find any correlation between investments and rate of unemployment in the Czech Republic. It is obvious that choice of variables matters. Another reason why there are so many contradictory results might be neglect of lags. Craigwell (2006) analyses relationship between investments and employment in Caribbean. He finds significant relationship while using delays.

Finally, there are papers which claim that positive effect of investment can be found in

the short run only (see Balcerzak and Żurek, 2011 or Pinn et al., 2011). The problem in the Czech Republic is that investment incentives have existed no longer than 17 years yet.

3 METHODS AND DATA

At first graphical and correlation analyzes are made to assess the relation between investment incentives and unemployment. Then panel regression model is estimated using Weighted Least Squares Method (WLS). Model is based on Bondonio and Greenbaum (2006) and includes territorial and regional dummy variable, volume of incentives, lagged level of unemployment and variables specifying each region (e.g. number of crimes, population density, number of jobs in industry).

Model should include variables characterising particular regions of the Czech Republic. It is clear that unemployment is influenced by demographical trends. Higher number of inhabitants leads to higher level of unemployment, since there will be more applicants per position. Also there should be a negative correlation between GDP and unemployment in particular regions. Number of positions is another important variable influencing unemployment. The more jobs are available in region the lower level of unemployment should be. Neftçi (1978) claims, that there is positive correlation between salaries and unemployment as well. Next specialisation in particular sector limited applicants to find a job, so we expected that the more region is specialized the higher level of unemployment will be. The most important variable are investment incentives which should increase level of investment in regions and it should lower level of unemployment. The last variable is lagged level of unemployment according to Bondonio and Greenbaum (2006), capturing rigidity of unemployment.

To sum it dependent variable is unemployment expressed as number of job applicants (U) and independent variables are:

- volume of investment (I),
- new positions (N),
- maximum level of incentives (M),
- available positions (V),
- workforce (P),

- average monthly salary (A),
- gross domestic product (Y),
- number of inhabitants (O_s),
- population density (O_h),
- specialization of region (S).

Data for variables U, V and P are gathered from Czech Ministry of Labour and Social Affairs (MPSV). Monthly data were converted into quarterly. CzechInvest provide data for variables I, N and M. We converted data into quarterly. Variable A is full-time equivalent of average salary in each region provided by Czech Statistical Office (CSU, 2014). Variable Y represents nominal GDP in each region. Only yearly data are available in CSU (2014) regional account database so we converted them into quarterly assuming constant development of GDP during year. Similar problem appeared while computing variables characterising population (O_s and O_h). CSU (2014) provides yearly data only. Since the development of populations is constant during year we assume that converting data into quarterly form does not influence our results. The last variable S is based on RIS3 strategy document provided by Czech Ministry of Education Youth and Sports. This is a dummy variable where 1 means that investment is consistent with region's specialization, while 0 means that it is not. In the case that there are two investments (0 and 1) we consider it as 0. If there are more than two investments we use majority rule.

Quarterly data covers 1998–2014 periods (68 observations) for each of 14 regions in the Czech Republic. We expect that some of variables (such as number of inhabitants and population density) are multicollinear, so only one of them is included in the model. Another problem might be caused by heteroscedasticity which can be lower by logarithmical transformation. We use both semi-logarithm and logarithm model in this paper. It is also possible that depended variable (unemployment) responds

to changes in independent variables with a delay. That is why we use lagged values of unemployment in time t, $(t-1)$, $(t-2)$ and $(t-3)$. The number of lags was based on Mazouch and Fischer (2011) who claim that there is a half year delay and Miskolczi, Langhamrová and Fiala (2011) who identify delay in the Czech Republic in the length of 3 quarters. Furthermore we expect that the date when incentive was accepted does not match the date it can influence real economy. We was not able to find any theory which claims how long it can take, so we expect that this delay should not take more the 5 quarters and variables I, N a M are lagged by $0, 1, 2, \ldots, 5$ periods. Model is estimated using panel regression with fixed effects. The first estimating method is Generalized Least Squares method (GLS).

Model then looks as follows:

$$
\begin{aligned}
y_{it} &= \alpha + \beta X_{jit} + \epsilon_{it}, \quad (1) \\
&\quad j = 1, 2, \ldots, J, \\
&\quad i = 1, 2, \ldots, I, \\
&\quad t = 1, 2, \ldots, T,
\end{aligned}
$$

where y is dependent variable, denotes interception, is vector of parameters, X means value of variable, stands for error, i represents observation, j variable and t time. Since we expect heteroscedasticity we use also Weighted Least Squares method (WLS). It estimates parameters:

$$
\begin{aligned}
\text{WSSE} &= \sum_{i=1}^{n} w_i \left[y_i - \left(\hat{\beta}_0 + \hat{\beta}_1 x_{i,1} + \right. \right. \\
&\quad \left. \left. + \hat{\beta}_2 x_{i,2} + \ldots + \hat{\beta}_k x_{i,k} \right) \right]^2, \quad (2)
\end{aligned}
$$

where w denotes weights (based on variance of errors of each unit) and n is number of observations. As mentioned before we include lagged values of depended variables into the model as well:

$$
\begin{aligned}
Y_{it} &= \gamma y_{i,t-1} + \alpha + \beta X_{jit} + \epsilon_{it}, \quad (3) \\
&\quad j = 1, 2, \ldots, J, \\
&\quad i = 1, 2, \ldots, I, \\
&\quad t = 1, 2, \ldots, T.
\end{aligned}
$$

Then we estimate three forms of the model:

- linear form (with origin data):

$$
\begin{aligned}
U_{it} &= \gamma U_{i,t-1} + \alpha + \beta_1 I_{it} + \beta_2 V_{it} + \\
&\quad + \beta_3 P_{it} + \beta_4 A_{it} + \beta_5 Y_{it} + \\
&\quad + \beta_6 O_{s_{it}} + \beta_7 S_{it} + \epsilon_{it}, \quad (4)
\end{aligned}
$$

- semi-logarithm form:

$$
\begin{aligned}
U_{it} &= \gamma I_{i,t-1} + \alpha + \beta_1 \log I_{it} + \\
&\quad + \beta_2 \log V_{it} + \beta_3 \log P_{it} + \\
&\quad + \beta_4 \log A_{it} + \beta_5 \log Y_{it} + \\
&\quad + \beta_6 \log O_{s_{it}} + \beta_7 S_{it} + \epsilon_{it} \quad (5)
\end{aligned}
$$

- and logarithm form:

$$
\begin{aligned}
\log U_{it} &= \gamma \log U_{i,t-1} + \alpha + \\
&\quad + \beta_1 \log I_{it} + \beta_2 \log V_{it} + \\
&\quad + \beta_3 \log P_{it} + \beta_4 \log A_{it} + \\
&\quad + \beta_5 \log Y_{it} + \beta_6 \log O_{s_{it}} + \\
&\quad + \beta_7 S_{it} + \epsilon_{it}. \quad (6)
\end{aligned}
$$

We include only statistically significant variables into the final form of our model. The final form of model is selected depending on significance of variables, coefficient of determination, specification of model and Akaike information criterion.

4   RESULTS

In this chapter the results are interpreted. First we make graphical analysis followed by simple correlation analyses. Then the outcomes of several model are discussed.

4.1   Investment incentives and unemployment in the Czech Republic

There is development of unemployment and investment incentives depicted in the Fig. 1. We can see periods (such as 2000 or 2007) when level of unemployment lower after increase of incentives, but graphical analysis generally does not provide exact results. In the next steps we use more sophisticated techniques such as correlation and regression analyzes.

4.2   Correlation Analysis

We try to find relationship between unemployment and investment incentives expressed as volume of investment (I), new positions (N) and maximum level of incentives (M). The results depicted in Tab. 1 claim that there is no correlation between these variables on aggregate level. Hence we compute correlation coefficients in the individual level (for each region). Results are depicted in Tab. 2.

It is obvious that there is no correlation neither on regional level.

4.3   Regression analysis

There are outputs of linear, semi-logarithm and logarithm form of model depicted in Tab. 5, 6 and 7. GLS method was used for these models. From linear model (Tab. 5) it can be seen that modifications 2, 3 and 5 provide best statistical results. Nevertheless variable A in model 2 has not right sign, variables Y and P are correlated (0.82) in model 3 and there is low value of R^2 in model 5, hence linear form does not seem as good one. As concerns semi-logarithm (Tab. 6) form model variable A still has not right sign. Model 1 provides higher R^2 than model 5 but after including incentives (variant 7) it can be seen that they are positive. Probably best modification of semi-logarithm form is variant 8 where all variables has a right sign and are significant. The weakness of this model is that R^2 is only about 20%. We try logarithm form (Tab. 7) as well but the results did not get better. Since the results of our models was not satisfying we compute next models with delays or using WLS.

4.3.1   Regression with lagged variables

First we make a model with lagged variables. We choose those connected with GDP (Y) and incentives (I, N, M). We focus on fact if delay of these variables enhances our model. We also exclude variable V, because it was found insignificant in previous models. Only important results are depicted in Tab. 3. All variables are significant and have a right signs. Nevertheless all models have low coefficient of determination. We are not able to say which of these models the best one is. In the last step we decided to use WLS method.

4.3.2   Panel regression – WLS

Since we have not found optimum model yet, it is possible that we did not use right estimation method. Results of WLS are presented in this part of paper. We use same variables as was described in part 4.3.1. Only semi-logarithm and logarithm form results are presented in table for, because all variants of linear form were worsen than before. It is obvious that logarithm form provides best results from Tab. 4. All variables connected to incentives (I, N, M) are significant and values od R^2 are high enough.
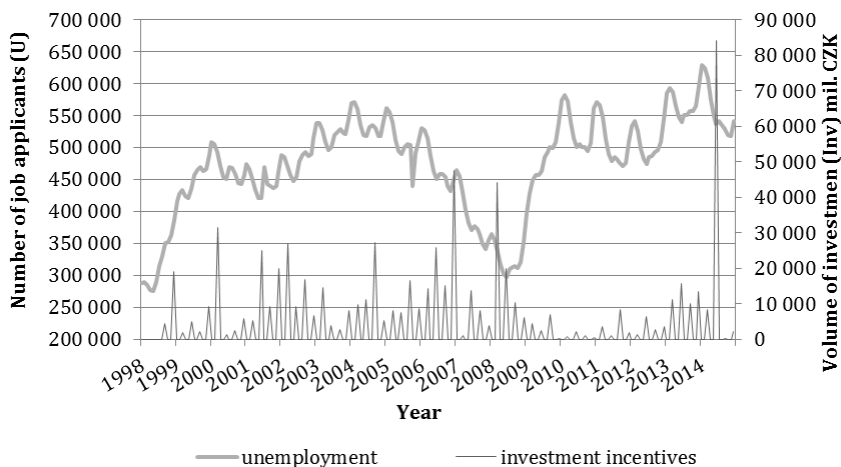
Fig. 1: Development of investment incentives and unemployment in the Czech Republic (1998–2014)

Tab. 1: Correlation coefficients (all regions)

	Unemployment (U)
Volume of investment (I)	0.242079
New positions (N)	0.24523444
Maximum level of incentives (M)	0.25112096

Tab. 2: Correlation coefficients (individual region)

Unemployment (U)	Volume of investment (I)	New positions (N)	Maximum level of incentives (M)
Hl. m. Praha	−0.03353	−0.03057	−0.02899
Jihočeský kraj	0.06902	0.04826	0.08837
Jihomoravský kraj	0.06959	0.07568	0.10165
Karlovarský kraj	−0.05193	−0.06860	−0.04019
Královéhradecký	−0.18125	−0.21239	−0.15322
Liberecký kraj	0.17177	0.17926	0.21622
Moravskoslezský kraj	−0.00317	−0.03175	0.02314
Olomoucký kraj	−0.00950	−0.03876	−0.03465
Pardubický kraj	−0.13007	−0.12745	−0.11810
Plzeňský kraj	0.06333	0.09637	0.06592
Středočeský kraj	−0.01377	0.05699	0.03472
Ústecký kraj	0.29530	0.24855	0.29838
Kraj Vysočina	−0.01988	0.05374	−0.01247
Zlínský kraj	0.13913	0.13373	0.14455

Tab. 3: Panel regression with lagged variables

Depended variable	(1) U	(2) U	(3) U	(4) $\ln U$
const	−602,253*** (−7.191)	−595,938*** (−7.267)	−594,381*** (−7.271)	−1.5884 (−0.674)
$\ln P$	72,724.9*** (9.946)	70,995.8*** (9.93)	70,718.1*** (9.919)	1.3679*** (6.66)
$\ln A$	24,675.4*** (7.858)	23,440.2*** (7.616)	23,267.7*** (7.582)	0.7976*** (9.021)
$\ln Y_1$	−47,836.6*** (−12.77)	−45,340.9*** (−12.41)	−45,003.3*** (−12.35)	−1.20*** (−11.44)
$\ln M$	−135.143* (−1.753)			
$\ln I$		−164.81** (−2.559)		−0.0076*** (−4.098)
$\ln N_2$			−261.4*** (−3.245)	
within R^2	0.273	0.2631	0.2671	0.2179
AIC	14,194.9	14,609.4	14,605.4	−617.05

Note: There are semi-logarithm and logarithm form, numbers depict length of delay; *, **, *** symbolizes 10%, 5% and 1% significance, t-values are in brackets.

Tab. 4: Panel regression – WLS

Depended variable	(1) U	(2) U	(3) U	(4) $\ln U$
const	−241,124*** (−21.81)	−1.58630*** (4.675)	1.58843*** (4.683)	1.69411*** (4.883)
$\ln Y$	−56,726.6*** (−31.52)	−1.73721*** (−34.95)	−1.73771*** (−35.00)	−1.73576*** (−34.25)
$\ln P$	42,303.8*** (43.67)	1.28984*** (59.02)	1.29108*** (58.89)	1.28860*** (58.49)
$\ln A$	37,505.4*** (20.35)	1.19085*** (20.4)	1.18953*** (20.4)	1.17978*** (19.6)
$\ln I$	−81.9346 (−1.134)	−0.00646*** (−2.740)		
$\ln N$			−0.00829*** (−2.773)	
$\ln M$				−0.00623** (−2.222)
within R^2	0.727299	0.832481	0.832454	0.83443
AIC	1,990.367	2,067.39	2,067.553	2,007.902

Note: There are semi-logarithm and logarithm form, numbers depict length of delay; *, **, *** symbolizes 10%, 5% and 1% significance, t-values are in brackets.

Tab. 5: Linear form of model (depended variable: number of jobs applicants − U)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Const	38,805.3***	36,373.2***	−816.34	12,161.2***	−1,945.5	32,046.5*	36,586***	−2,804.6	−2,502.4	15,781.9
	(108.6)	(39.64)	(−0.166)	(3.178)	(−0.462)	(1.69)	(37.76)	(−0.555)	(−0.581)	(0.991)
V	−1.2024***	−1.3752***	−1.1458***	−1.313***			−1.398***	−1.142***		−1.677***
	(−16.82)	(−22.36)	(−16.43)	(−18.25)			(−22.39)	(−16.09)		(−14.11)
A		0.2172***	−0.2447***		0.3477***	0.206	0.205***	−0.251***	0.344***	−0.778***
		(4.829)	(−3.268)		(2.869)	(0.729)	(4.364)	(−3.243)	(2.771)	(−3.183)
Y			−0.0854***					−0.103***		
			(−2.779)					(−3.26)		
P			0.1268***	0.0517***	0.1359***	0.175***		0.135***	0.141***	0.1503***
			(8.174)	(4.236)	(9.937)	(5.19)		(8.471)	(10.07)	(5.358)
Y_o			0.0875***	−0.3105***	−0.454***				−0.326***	−0.065
			(4.463)	(−8.330)	(−5.361)				(−8.516)	(−0.813)
O_h						−229.3				−67.9931
						(−1.475)				(−483)
S						−909.5				−986.19
						(−1.041)				(−1.397)
M							0.4398	0.135	−0.634	−0.029
							(1.457)	(0.407)	(−1.568)	(−0.068)
Within R^2	0.2319	0.3865	0.4318	0.3348	0.1453	0.2165	0.3935	0.4414	0.1589	0.5687
AIC	19,344.8	16,765.8	14,420.1	16,887.3	14,715.3	6,730.6	16,354.5	14,010.7	14,298	6,139.7

Note: All variables are at origin units except for Yo, which denotes GDP per capita; *, **, *** symbolizes 10%, 5% and 1% significance, t-values are in brackets.

Tab. 6: Semi-logarithm form of model (depended variable: number of jobs applicants − U)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Const	−475,407***	−646,958***	−0.00***	−264,352***	−632,026***	−643,407***	−455,630***	−626,385***	−705,719***	−0.00***
	(−8.432)	(−9.815)	(−8.525)	(−4.405)	(−7.360)	(−9.75)	(−7.872)	(−7.151)	(−10.67)	(−7.206)
$\ln Y$				3,461.6***						
				(2.888)						
$\ln Y_o$					−31,734***	−3,139.1		−33,046***	−6,948.2**	−13,255***
					(−9.341)	(−1.079)		(−9.441)	(−2.327)	(−2.614)
$\ln V$	−7,824.4***	−8,450.8***				−8,273.4***	−8,441.6***		−8,555.3***	−9,317.3***
	(−19.82)	(−25.31)				(−4.198)	(−20.57)		(−22.36)	(−15.19)
$\ln P$	44,758.5***	67,956.5***			70,929.9***	68,591.8***	43,535***	71,385.1***	116,468***	167,633***
	(10.13)	(11.86)			(9.462)	(11.91)	(9.612)	(9.317)	(11.58)	(8.716)
$\ln A$		−12,156***	−3,691.4***		11,669.0***	−9,909.7***		12,056.7***	−10,151***	−14,924***
		(−10.93)	(−3.186)		(4.167)	(−4.198)		(4.205)	(−4.281)	(−15.19)
$\ln O_s$			115,529***							
			(8.692)							
$\ln O_h$				52,777***					−101,116***	−151,126***
				(4.06)					(−5.466)	(−4.757)
S										−1,025.1
										(−1.595)
$\ln M$							370.325***	−170.397*	143.688**	147.26
							(5.017)	(−2.114)	(2.272)	(0.467)
Within R^2	0.3675	0.5199	0.0902	0.0458	0.1871	0.5207	0.3941	0.2038	0.5544	0.6399
AIC	16,842.9	14,295.4	15,928.1	18,190.1	14,678.8	14,296.3	16,025	14,259.2	13,852.9	6,084.45

Note: All variables are at origin units except for Yo, which denotes GDP per capita; *, **, *** symbolizes 10%, 5% and 1% significance, t-values are in brackets.

Tab. 7: Logarithm form of model (depended variable: number of jobs applicants in logarithm form − $\ln U$)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Const	−3.029*	−2.818	−3.211**	−3.252	−3.362**	−3.552**	−2.309	−4.429***	−4.484***	−4.199
	(−1.897)	(−1.137)	(−2.014)	(−1.237)	(−2.072)	(−2.193)	(−0.92)	(−2.76)	(−2.795)	(−1.453)
$\ln Y_o$		−0.826***	0.161**			0.165**	−0.833***		0.094***	0.0593
		(−8.422)	(2.29)			(2.281)	(−8.298)		(1.297)	(0.569)
$\ln V$	−0.276***		−0.285***		−0.284***	−0.294***		−0.286***	−0.292***	−0.303***
	(−34.16)		(−31.75)		(−33.5)	(−31.13)		(−34.39)	(−31.43)	(−23.99)
$\ln P$	1.334***	1.382***	1.302***	1.138***	1.379***	1.346***	1.348***	2.3999***	2.33***	2.2905***
	(9.606)	(6.389)	(9.35)	(4.979)	(9.761)	(9.503)	(6.137)	(10.08)	(9.547)	(5.793)
$\ln A$	−0.154***	0.476***	−0.269***	−0.102**	−0.173***	−0.29***	0.479***	−0.216***	−0.281***	−0.3421***
	(−5.696)	(5.889)	(−4.711)	(−2.247)	(−6.178)	(−4.96)	(5.829)	(−7.546)	(−4.881)	(−3.840)
$\ln O_h$								−2.320***	−2.204***	−2.0204***
								(−5.271)	(−4.911)	(−3.093)
S										−0.006
										(−0.447)
$\ln M$				−0.011***	0.0037**	0.004**	−0.009***	0.003	0.003*	0.0217***
				(−4.596)	(2.379)	(2.409)	(−3.776)	(1.633)	(1.684)	(3.352)
Within R^2	0.6374	0.1292	0.6401	0.0706	0.6465	0.6491	0.155	0.6602	0.661	0.7343
AIC	−1,178.8	−540.86	−1,182.1	−465.8	−1,147.2	−1,150.5	−531.14	−1,173.2	−1,172.9	−520.4

Note: All variables are at origin units except for Yo, which denotes GDP per capita; *, **, *** symbolizes 10%, 5% and 1% significance, t-values are in brackets.

5   DISCUSSION AND CONCLUSIONS

Our final model was constructed in logarithm form and we used WLS. Model of regional unemployment includes GDP per capita, which growth lowers unemployment. As we expected average salaries also have a negative effect on rate of unemployment. This influence can be seen with one quarter delay. On the other hand higher values of workforce cause growth of unemployment. The last variable included into model is investment incentives. The aim of this article was to assess its influence on unemployment. We find significant relationship between all variables connected to incentives and rate of unemployment. The higher values of incentives are the lower level of unemployment will be.

Investment incentives seem to be proper instrument of economy policy and it is one of the key factors which decrease unemployment and improve regional productivity. We consider Investment incentives important for development of Czech economy.

As a problematic aspect of incentives we consider granting process which is overcomplicated. Since income taxes are related to performance of company, which can be influenced by business cycle while wage costs are constant, we suggest some form of discount of total wage costs as suitable form of investment incentives. It enables firms to employ job applicants even in depressions.

We also think that incentives should be designed not just for large companies, but for small and medium businesses too. It should lead to lowering of bureaucracy costs as well.

Based on positive relationship between incentives and employment we assume that volume of successful investments outbalances unsuccessful ones. We recommend focusing on investments with high added value. These investments reduce unemployment and also contribute to competitiveness of Czech economy.

Moreover we suggest creating independent report about system of investment incentives which should include detailed analyse and which should assess influence of incentives on Czech economy.

Our findings are consistent with Karaalp (2014) or Schalk and Untiedt (2000). Most of authors who claim that there is no relationship deal with foreign direct investment instead of incentives. The results also depend on which econometric technique is used. We were not able to find significant relationship using GLS for example. The truth is that some negative aspects of incentives can be seen in long run only. We are not able to find long run relationship between incentives and unemployment in the Czech Republic yet.

6   ACKNOWLEDGEMENTS

7   REFERENCES

Balcerzak, A. P. and Żurek, M. 2011. Foreign Direct Investment and Unemployment: VAR Analysis for Poland in the Years 1995–2009. *European Research Studies*, 14 (1), 3–14.

Blomström, M. and Kokko, A. 2003. The Economics of Foreign Direct Investment Incentives. *NBER Working Paper Series*, February, no. 9489, 25 p.

Bondonio, D. and Greenbaum, R. T. 2006. Do Business Investment Incentives Promote Employment in Declining Areas? Evidence from EU Objective 2 Regions. *European Urban and Regional Studies*, July 2006, 13, 225–244. ISSN 0969-7764.

Craigwell, R. 2006. *Foreign Direct Investment and Employment in the English and Dutch-Speaking Caribbean.* Port of Spain: International Labour Office, 57 p.

CSU. 2014. *Public database.* [online]. Praha: Czech Statistical Office. Available at: `https://www.czso.cz/csu/czso/home`.

Dobrylovský, J. and Löster, T. 2009. Makroekonomické účinky toků PZI do a z ČR. *Ekonomika a Management*, 2009, 4, 9 p. ISSN 1802-8470.

Domesová, M. 2006. *Přímé zahraniční investice v České republice.* [online]. (Diploma Thesis.) Brno: Mendelova univerzita v Brně. Available at: `http://is.mendelu.cz/zp/portal_zp.pl?podrobnosti=17333;lang=cz`.

Karaalp, H. S. 2014. The Effect of Public Investment and Firm-Based Investment Incentives on Employment: a panel data analysis for Turkey. *Journal of Economic and Social Development*, March 2014, 1 (1), 74–85. ISSN 1849-3327.

Košan, P. 2013. *Investiční pobídky a jejich vliv na ekonomiku ČR.* CEVRO, Liberálně konzervativní akademie.

Kunešová, H., Cihelková, E. et al. 2006. *Světová ekonomika: nové jevy a perspektivy.* 2nd ed. Praha: C. H. Beck, 319 p. ISBN 8071794554.

Mazouch, P. and Fischer, J. 2011. *Lidský kapitál – měření, souvislosti, prognózy.* 1st ed. Praha: C. H. Beck, 116 p. ISBN 978-80-7400-380-6.

Miskolczi, M., Langhamrová, J. and Fiala, T. 2011. Unemployment and GDP. *International Days of Statistics and Economics.* Prague: VŠE, 407–415. ISBN 978-80-86175-77-5.

Neftçi, S. N. 1978. A Time-Series Analysis of the Real Wages-Employment Relationship. *Journal of Economy*, April 1978, 86 (2), part 1, 281–291. ISSN 0022-3808.

Pinn, S. L. S. et al. 2011. Empirical Analysis of Employment and Foreign Direct Investment in Malaysia: An ARDL Bounds Testing Approach to Cointegration. *Advances in Management & Applied Economics*, 1 (3), 77–91. ISSN 1792-7544.

Schalk, H. J., Untiedt, G. 2000. Regional investment incentives in Germany: Impacts on factor demand and growth. *The Annals of Regional Science*, July 2000, 34 (2), 173–195. ISSN 0570-1864.

Schwarz, J. et al. 2007. *Analýza investičních pobídek v České republice.* [online]. Praha: Národohospodářská fakulta Vysoké školy ekonomické v Praze, 81 p. Available at: `http://www.mpo.cz/dokument34235.html`. [Accessed 2015, March 4].

Štěrbová, L. et al. 2013. *Mezinárodní obchod ve světové krizi 21. století.* 1. vyd. Praha: Grada, 364 p. ISBN 978-80-247-4694-4.

Zamrazilová, E. 2006. *Přímé zahraniční investice v ČR: makroekonomické souvislosti.* Praha: Vysoká škola ekonomie a managementu. Centrum ekonomických studií, 56 p. Working papers [CES VŠEM] [2006]; 7/2006. Available at: `https://www.vsem.cz/data/data/ces-soubory/working-paper/gf_WPNo706.pdf`.

AUTHOR'S ADDRESS

Emil Adámek, Department of National Economy, Faculty of Economics, Technical University of Ostrava, Sokolská třída 33, 701 21 Ostrava, Czech Republic, e-mail: emil.adamek@vsb.cz

Lucie Rybková, Department of Finance, Faculty of Business and Economics, Mendel University in Brno, Zemědělská 1, 613 00 Brno, Czech Republic, e-mail: RybkovaLucie@seznam.cz