

# FDI AND THE LIBEREC REGION: THE CASE OF THE LABOUR MARKET

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## Introduction

Foreign direct investment has accelerated considerably as a result of the process of globalisation and liberalisation. This has seen a change in the operation of developed economies and, at a far broader level, has influenced undercapitalised transition economies after the fall of the communist regimes of Central and Eastern Europe. FDI fundamentally influences the national element of transition economies and the regions it flows into.

Based on this supposition, the first part of the paper focuses on the theoretical background of FDI, looking at the effects of FDI within a transition economy at a national and regional level and especially and its effect on the labour market. We consider labour market conditions to be a key when taking decisions on FDI investment in terms of the duration and size of such an investment. The second part then analyses labour market development in the Liberec region, where the authors are based, and follows its development over the long term. We analyze structures in the Liberec region, for example sectoral or educational, and compare these with national figures. The final section focuses on a dependence analysis, which applies a statistical method to describe the correlation between FDI and employment in the Czech Republic and in the Liberec region.

The aim of the paper is to compare the labour market situation in the Liberec region and in the national economy in order to demonstrate the specifics of particular regions and to analyze the impact of FDI on the regional labour market. The statistical data used in the paper is mainly taken from the databases of the Czech Statistical Office, the Czech National Bank and CzechInvest.

## 1. Theoretical Background

Foreign direct investment is defined as investment in another country with the intention of obtaining a stake in ordinary shares and decision-making powers of a minimum 10 % or such a stake as providing the investor with decision-making powers [15]. FDI takes the form of a stake in registered capital, re-invested profit or loans from a parent company. This definition is used by such international organisations as IMF or OECD and also by the European Union. In the Czech Republic FDI is defined in the Czech Foreign Exchange Act of 1995.

In many respects, however, foreign direct investment has an essential and indisputable influence on the region of the country in which it is made. Among those authors analyzing its role in transition economies are, for example, Bevan and Estrin [3], who describe the determinants of FDI, Ballock and Gertler [4], who focus on the spillover effects of technology transfers on local suppliers, Carsten and Toubal [5] and Hunya and Geshecker [18], who analyze the effects of foreign direct investment on employment.

As far as transition or transformation economies are concerned, Dunning's theory [14] is often applied, focusing as it does on the correlation between FDI inflow and outflow and the economic level of the country. At the beginning of the transformation process, an economy only receives FDI and local companies are not able to invest abroad due to a lack of capital, information etc. Economic convergence stimulates subsequent FDI inflow and, at later stages, local companies can begin investing abroad, despite the fact that inflow is still much higher than outflow. The Czech Republic currently finds itself at this stage. The most advanced economies are major FDI beneficiaries and FDI investors with high volumes of FDI in their balance of payments.

The effects of FDI on the Czech economy are described by many authors, for example Benáček [2], Havránek and Irsová [16], Dinga [13], Srholec [22], Munzi [20], Carter [6], Sojková [21], Zempelinová and Benáček [23] and Žižalová [25], most of these authors focusing on the spillover effects of FDI. Other topics discussed include investment incentives, [19] and [12], which in the Czech Republic are closely connected to the rapid growth of FDI inflow after 1998. The investment incentives which we mention in the paper are based on Government Resolution 298 of 29. 4. 1998 and other legislative measures such as Act No. 72/2000 Sb. on investment incentives, Act No. 453/2001 Sb., Act No. 438/2003 Sb., Act No. 19/2004 Sb. and Act No. 280/2004 Sb. All details of the form and size of incentives and of the other conditions required to obtain these incentives are found here.

In the event that we focus on papers to consider similar subject-matters, there are three papers which we should mention in more detail. Dinga [11] focuses on the effect of the TPCA automotive investment in Kolín, which was subsidised by the government, as the largest investment incentive in the automotive industry. By 2010 TPCA directly employed around 3600 people and was one of the biggest employers in the region. FDI in general and investment incentives are considered important tools in improving labour market conditions and boosting the number of jobs on the local labour market.

According to the results of this paper, unemployment fell by 1 percentage point. There was also net migration inflow after 2002. By 2007, locals accounted for around half of the employees at TPCA, local employment rising by 3.7 %. According to the results offered by Dinga, the positive effects on the local labour market are visible. This paper, however, does not take the role of investment incentives into account.

Of even greater interest are, in our opinion, the results offered by Bašťová and Dokoupil [1], who analyzed the effects of FDI inflow into the industrial zone in Plzeň. Their results came from a questionnaire survey carried out among the 15 largest industrial employers in Plzeň, who employ around 50 % of the labour force in industrial sectors. According to their findings, there is a huge discrepancy between the situation on the local labour market and the demands of

industrial companies, especially in terms of the quality of the labour force. The paper emphasises the loss of the qualifications originally attained by the local labour force. Another fact highlighted in the paper is the employment of foreign labour power. Around 75 % of the jobs at the Borská pole industrial zone in Plzeň, where a large number of companies went as a result of investment incentives, were staffed by foreign workers in 2008.

Finally, Hlaváček [17] looked at the influence of FDI in the neighbouring Usti region. His paper claims that FDI and its localisation create further asymmetric development and an east-west divide in the Usti region, along with the accompanying socio-economic effects (which are not exclusively positive). This small sample of papers indicates that labour market effects at a regional or local level can differ significantly.

In our paper, then, we first look at the labour market situation in the Liberec region, analyzing what sort of labour force supply is available for potential FDI or for investment incentives. The period analyzed is 2000–2009/2010; there is a lack of regional-level data before the establishment of regions as a component of territorial division. Data for the Liberec region is subsequently compared with data for the Czech Republic in order to highlight the specifics of the region. There then follows a dependence analysis of employment and newly-created jobs in the Liberec region. There are other crucial factors involved in FDI allocation in addition to labour market performance, such as political stability, economic prospects, legal framework or infrastructure. These have not been analyzed in the paper due to limitations of space.

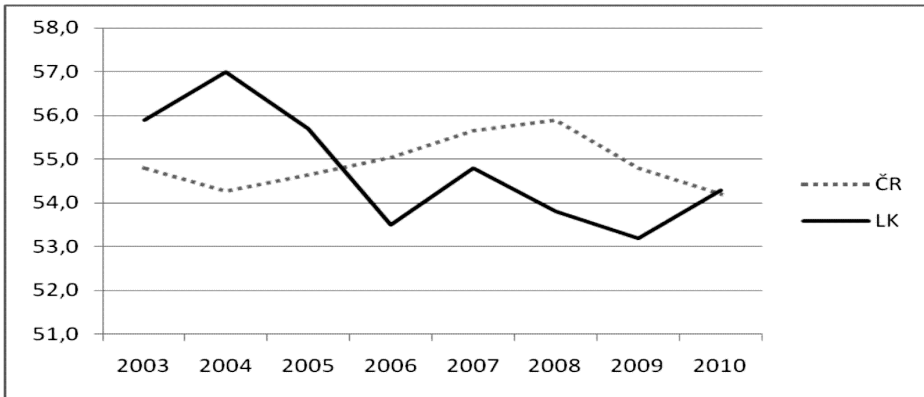
## 2. The Labour Market in the Liberec Region – Developmental Starting Point for FDI

Foreign direct investment has a considerable influence on economic development in transition economies. It was a source of capital, given the initial situation and the undercapitalization of such economies and especially their companies [2], [25] at the beginning of transformation, but also had a transmissive function and influenced the structure of economies, the size of fiscal revenues and the appearance of the supply side of the labour market.

The development to have taken place in the Czech Republic since 1990 classes it as a transition economy. Foreign direct investment in the Czech Republic brought with it movement on the labour market. The question is whether such strengthening of the range of job opportunities promoted overall development in

employment. It can be assumed that a narrower, regional perspective will bring us a more objective view of the interaction of FDI and the labour market, one reason being the generally recognised low mobility and flexibility of the labour force in the Czech Republic.

**Fig. 1: Development of the level of employment in the Czech Republic (ČR) versus the Liberec region (LK), age category 15+**



Source: [10]

This is precisely why it is logical when considering the formation of the supply side of the labour market to focus in this part of the paper on the labour market situation in the Liberec region and development after the year 2000, when FDI began to show in the real economy. And to identify the specifics of the labour market in the Liberec region, we need to compare its structure with the structure of the labour market in the Czech Republic. We shall principally concentrate on the indicators of employment, unemployment and the employment structure by sector and by level of education achieved, from which the specifics of the regional labour market can be inferred. This data is key in deciding whether to invest and in particular for the proper allocation of investment.

It is clear from graph Fig. 1 that the level of employment in the 15+ age group between 2003 and 2010 saw differences in development in the Liberec region and in the Czech Republic as a whole. The percentage value was similar to that of the Czech Republic, with a maximum difference of two percentage points. Then, in

2010, the Liberec region reached the same level of employment in the 15+ age group as the Czech Republic as a whole. The differences of the labour market in the Liberec region only become clear in the sectoral structure, for which we have used the NACE classification.

Furthermore, it is evident from Table 1 that the Liberec region shows a below-average level of employment in the primary sectors (sectors A + B) and tertiary sectors (sectors G – S) throughout the period under consideration in comparison with the Czech Republic, in that the primary sector in the Liberec region fell by a third from 3 percentage points to 1.9 percentage points between 2000 and 2009. By contrast, the level of employment in the tertiary sector during the period under consideration rose by almost 5 percentage points, therefore copying the trend evident throughout the country. Employment in services in the Liberec region nonetheless remained below the national average by 8 to 10 percentage points throughout the period under consideration.

**Tab. 1: Level of employment by sector, Czech Republic (CR) versus Liberec region (LK), in %**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
A+B Lk	3.0	3.7	2.8	3.5	3.3	1.9	2.4	2.5	2.6	1.9
A+B CR	6.4	6.0	5.9	5.4	5.4	4.8	4.7	5.4	4.3	4.2
C-F LK	51.7	51.3	49.3	48.7	51.7	53.9	53.4	52.0	51.6	48.1
C-F CR	38.0	38.5	38.3	38.2	37.9	38.5	38.8	39.0	39.4	37.5
G-S LK	45.3	45.1	47.7	47.8	44.8	44.1	44.3	45.4	45.8	50.0
G-S CR	55.6	55.4	55.7	56.2	56.6	56.7	56.3	56.4	56.2	58.1

Notes: A+B – agriculture, C-F – industry+construction, G-S – tertiary sector

Source: [8], [9]

Employment in the secondary sector (sectors C – F) showed quite the opposite development, remaining well above the Czech average by almost 10 percentage points. This high level of employment in industry is related to the long-term dominance of industrial sectors in the region (the engineering industry, textile industry, glassmaking industry and costume jewellery industry) and the region's close proximity to the Škoda Auto plant in the neighbouring Central Bohemia region, which influences employment in the Liberec region as part of customer-supplier relations. We can deduce from this structure that any investment in the Liberec region should probably concentrate on the secondary sector. Although employment in the tertiary sector has long been rising, this sector will probably remain undersized in comparison with the Czech Republic in the long-term.

Further specifics are evident in the education structure in the Liberec region, which is presented in Table 2. Although analogies are evident in this case between development in the Czech Republic and development in the Liberec region, there are significant variations in the level of education obtained by the workforce. As in the Czech Republic as a whole, the number of employees with a lower level of education has typically been in decline since 1993 and the number of those with secondary school education completed with "maturita" school-leaving exams or with university education has been on the rise. Given the region's long-standing focus on industrial production, professions with lower levels of education were required to a greater extent in the past as this was sufficient for production in industrial sectors.

**Tab. 2: Employment structure by level of education, %**

		1993	1998	2004	2005	2006	2007	2008	2009
CR	Primary education	27.6	23.9	20.9	20.0	19.4	19.1	18.7	17.5
	Secondary education without "maturita" school-leaving exams	38.7	39.4	38.3	37.7	37.2	36.7	35.8	35.8
	Secondary education with "maturita" school-leaving exams	25.8	28.5	30.9	31.9	32.6	33.2	33.8	33.9
	University education	7.8	8.2	9.9	10.4	10.9	11.0	11.7	12.7
LK	Primary education	28.7	26.7	21.7	21.7	21.8	21.2	21.3	19.0
	Secondary education without "maturita" school-leaving exams	39.1	42.6	41.1	41.8	41.6	40.8	40.4	41.9
	Secondary education with "maturita" school-leaving exams	27.3	24.3	30.7	28.7	29.0	30.4	30.7	30.1
	University education	4.8	6.4	6.4	7.7	7.7	7.7	7.6	8.9

Source: [8], [9]

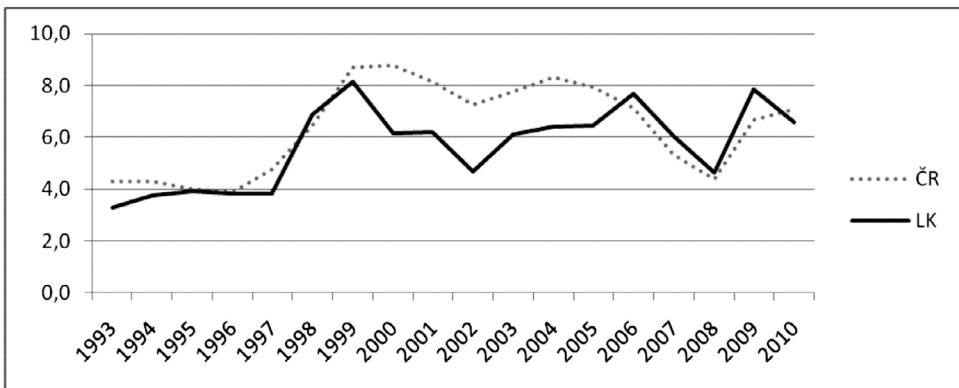
Although the percentage of employees with university education rose from 4.8 % to almost 9 % between 1993 and 2009, this is still almost 4 percentage points lower than in the Czech Republic as a whole. The situation is similar among employees having completed secondary education, the share of which rose by three percentage points in the Liberec region in the period under consideration in comparison with an increase of 7 percentage points in the Czech Republic. This fact can be considered a competitive disadvantage of the Liberec region from the long-term perspective given that the current trend is for FDI that concentrates primarily on employment positions with higher added value.

It is interesting that this competitive disadvantage – the lower percentage of highly-qualified personnel – has not yet manifested itself in the development of unemployment in the Liberec region. If we compare the development of the level of unemployment in the Czech Republic and in the Liberec region between 1993 and 2010, depicted in Fig. 2, the Liberec region remained at a lower level than the Czech Republic as a whole throughout the period under consideration, with the exception of 2009. The level of unemployment in the

Liberec region between 1998 and 2006 was some 2–3 percentage points lower than unemployment in the Czech Republic. This development was caused on the one hand by positive outside conditions and the above-average tempo of economic growth between 2004 and 2007. The considerable influence on the development of unemployment of the car industry and the production of car components concentrated in the Central Bohemia region, which as we have already mentioned has an influence on the regional labour market in the Liberec region, is most likely projected in the development of unemployment.

Despite the industrial orientation of the Liberec region and its lower percentage of highly-qualified personnel, the level of unemployment in the Liberec region is below the national average. This fact could understandably influence decisions on the future allocation and size of investment made. As far as the influence of FDI already made in the Liberec region is concerned, a survey of the impact of FDI made so far on the labour market has only been carried out at a central level and only for FDI coming into the Czech Republic as part of so-called investment incentives provided by the Czech government.

**Fig. 2: Development of the level of unemployment, Czech Republic (ČR) vs. Liberec region (LK), %**



Source: [8], [9]

We therefore have no data to concern the influence on the regional labour market or indeed the influence of FDI allocated in the Czech Republic outwith such investment incentives. At this stage, this allows us to

compare only the number of jobs created as a result of FDI in the Czech Republic and in individual regions, including the Liberec region, based on data from government agency CzechInvest.

Nineteen investment projects of a total volume of CZK 22,908 million were carried out in the Liberec region between 1998 and 2008 in the form of investment incentives, whereby the average planned value of one investment incentive was CZK 1,206 million [7]. This was the second largest average volume of investment, the largest being in the Central Bohemia region. Table 3 shows the percentage of newly-created jobs as a result of investment incentives in the total number of jobs between 1998 and 2008. There were no investment incentives in the Liberec region until 1999 and therefore the share of newly-created jobs in the overall number of jobs was lower than the national level for the first few years. The situation changed in 2005, when this share rose dramatically to 4.4 % and then 6.2 % in the year that followed. In 2008, the final year for

which we have available data, investment incentives in the Liberec region took a greater share in jobs than in the Czech Republic, by 0.5 of a percentage point.

Although this data points to a slightly higher dependence on investment incentives in the Liberec region than in the Czech Republic, we cannot take detailed conclusions from this. The main reason for this is the absence of data regarding FDI made outwith investment incentives. What is more, the fact is that newly-created jobs as a result of investment incentives can actually have a negative influence on the level and further creation of jobs at domestic companies and can therefore merely lead to the transfer of employees between domestic and foreign companies. In this case the benefit of investment incentives on the regional and national labour market would be debatable.

**Tab. 3: Newly-created jobs as a result of investment incentives in the Czech Republic (CR) and in the Liberec region (LK)**

	Jobs (thousands)		Jobs created as a result of investment incentives		Percentage of new jobs	
	CR	LK	CR	LK	CR	LK
1998	4,866	199	22,475	0	0.5	0.0
1999	4,764	201	35,051	732	0.7	0.4
2000	4,732	201	60,849	1,455	1.3	0.7
2001	4,728	202	98,644	2,749	2.1	1.4
2002	4,765	205	137,927	3,648	2.9	1.8
2003	4,733	201	152,120	5,596	3.2	2.8
2004	4,707	204	165,773	6,223	3.5	3.1
2005	4,764	201	215,318	8,857	4.5	4.4
2006	4,828	198	263,828	12,323	5.5	6.2
2007	4,922	199	296,896	13,854	6.0	7.0
2008	5,002	199	308,043	13,379	6.2	6.7

Source: [7]

### 3. FDI and Employment – a Dependence Analysis

The data from CzechInvest presented above was also used for a statistical verification of the dependence of the development of employment on the number of newly-created jobs as a result of FDI. Let us return to the national figures. The key question here is whether the influx of foreign direct investment brings higher employment to the Czech economy.

The question is whether the development of employment in the Czech Republic and the Liberec region is dependent on the number of new jobs generated by the new companies created as a result of foreign direct investment. It is first important to try and delineate the possible influences having an effect on the objectivity of such monitoring:

1. Employment and unemployment in a country fluctuate under the influence of various

macroeconomic factors, in particular under the influence of the economic growth or decline of the country.

2. Employment and unemployment are dependent on the overall movement of the population, in particular its productive element.
3. The arrival of FDI can cause significant shifts in employment, which could lead to the demise of uncompetitive businesses, original employment capacities.

When analyzing effects, we most often monitor FDI that uses investment incentives provided centrally. Here an interaction of such investments should be directed through these incentives, which are determined by the specific political spectrum during a certain period in the development of the given state. The principle aim of these incentives is economic success, which is subsequently able to confirm that the economic programme of this political arrangement is correctly set. FDI made without incentives is monitored to a lesser extent, a situation which is influenced by the lower availability and scope of the relevant data. In both cases, however, the results are considered at the central level of individual countries in the vast majority of cases.

The government in the Czech Republic adopted the idea of investment incentives in 1998 with the aim of increasing the competitiveness of the Czech economy, at a time when Poland and Hungary already had incentive programmes in place. The implementation of the incentive programme in the Czech Republic was entrusted to government agency CzechInvest [14]. CzechInvest is therefore entrusted with providing analyses and regular reports on the influence investment-incentive-based FDI has on the Czech economy. Of course there are other institutions that monitor FDI, for example the Czech Statistical Office, the Employment Office, the Czech National Bank and other institutions, always from their own angle and in most cases from some sort of central, national view.

The most common effect monitored in relation to the effect of FDI is the labour market effect; in other words, the influence FDI has on employment or unemployment, on wages and on the number of newly-created jobs (both at the investment stage of the investment in

question and at the operation stage, i.e. during construction and then subsequent operation).

The analysis only looks at foreign direct investment supported by investment incentives, meaning that the investment made in the Czech Republic without such aid is missing here, which logically dictates that it is not and cannot be evaluated and monitored in the same way; neither is the relevant information available.

Description of individual groups of data:

- **Total employment in national economy** – Dependence will be found for this variable and can therefore be determined as dependent. The name “Employment\_total” (Zamest\_celk) is indicated as a variable in calculations, graphs and tables.
- **Newly-created jobs** – This variable will be determined as independent in the following analysis. The name “New\_FDI\_sustainable” (Nova\_PZI\_udr) is indicated as a variable in calculations, graphs and tables.
- **Sustainable jobs** – These do not include jobs created during the investment stage of FDI and are not therefore associated with the construction and creation of FDI, but with subsequent operation. They can therefore be considered a more stable and longer-term source of employment.

We can find out how the variables stand in a regression line model. The level of significance is set at 5 %. The level of significance shown of 0.0394 (taken from Statgraphics) is lower than 5 %, which confirms the hypothesis concerning the dependence of the dependent variable on the independent variable.

Graph Fig. 3, which monitors the progress of both time series, shows a certain peculiarity in that both curves have been very similar to each other since 2002. If we consider the possible realistic causes of this phenomenon, we could make the hypothesis that the actual influencing of newly-created jobs by foreign direct investment is manifested from a certain level of such investment onwards; i.e. at such time as this investment realistically impacts on the development of the economy. Employment in the national economy, unless there is some significant increase or decrease in the population, oscillates around a certain value over the long-term. FDI can have a say in this development at such time as it leads total

Tab. 4:

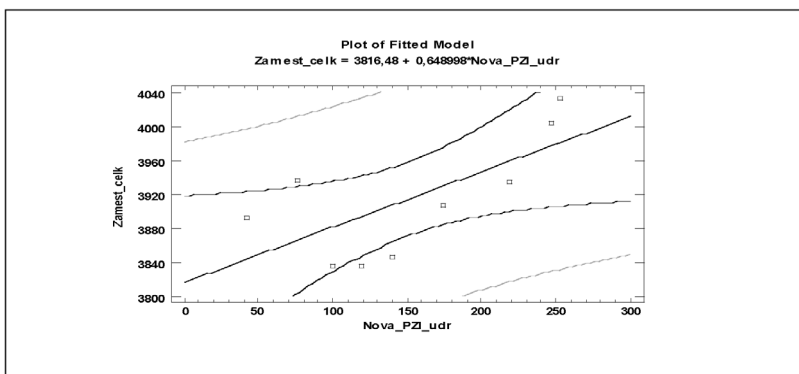
**Total employment and new jobs arising from FDI between 2000 and 2008 in thousands of persons**

Year	Total employment	New sustainable jobs from FDI
2000	3,894.3	41.0
2001	3,936.8	75.9
2002	3,836.5	99.1
2003	3,837.4	118.3
2004	3,846.6	138.8
2005	3,907.1	172.8
2006	3,934.9	217.5
2007	4,003.4	245.8
2008	4,034.4	251.5

Source: [7] and [10]

Fig. 3:

**Regression line model - Employment\_total (Zamest\_celk) and New\_FDI\_sustainable variables (Nova\_PZI\_udr)**



Source: own calculations (Statgraphics)

employment out of this oscillation, i.e. at such time as the number of new, sustainable jobs created by FDI has a considerable share in the number of jobs overall.

According to this hypothesis, this happened in 2002, some four years after the actual launch of incentive activity.

Tab. 5:

**Total employment and new jobs from FDI between 2000 and 2008 in thousands of persons**

Year	Employment_total_reduced	New FDI_sustainable_reduced
2002	3,836.5	99.1
2003	3,837.4	118.3
2004	3,846.6	138.8
2005	3,907.1	172.8
2006	3,934.9	217.5
2007	4,003.4	245.8
2008	4,034.4	251.5

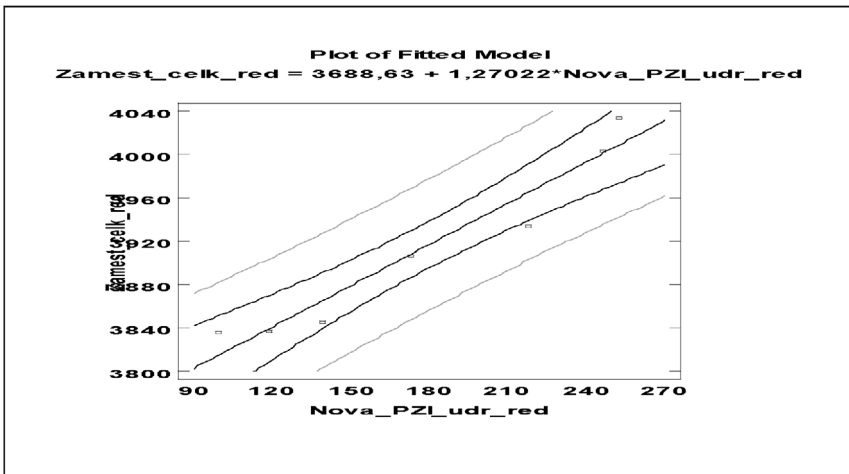
Source: [7], [10]



Statistically, therefore, the contention is made that from a certain moment onwards the time series selected showed a very strong linear dependence between the total number of jobs in the national economy and the number of new jobs arising from FDI. If we begin our monitoring in 2002, the time series will therefore

be reduced and the table and alignment graph will look as follows (in the case of the following calculations, the variables are named in graphs and tables as Employment\_total\_reduced (Zamest\_celk\_red) and New FDI\_sustainable\_reduced (Nova\_PZI\_udr\_red)):

**Fig. 4: Regression line model - Employment\_total and New\_FDI\_sustainable variables**



Source: Own calculations

The level of significance of 0.0003 is very low.

The suitability of the linear model is characterised by a determination index (coefficient) of 93.85 %, whereby the suitability percentage of certain alternative models is not significantly higher and the suitability of the exponential model is essentially the same. The degree of dependence from the exponential model expressed as a correlation coefficient is 0.968767.

The resultant model takes the following form:  $Employment\_total = 3688.63 + 1.27022 \cdot New\_FDI\_sustainable$ .

Given a zero value of new jobs created by FDI, total employment is 3688.63 thousand jobs. A regression coefficient of 1.27022 says that 1 new job created by FDI adds 1.27 jobs to the employment system in total, which indicates the multiplication effect of FDI on overall employment.

We also intend to verify the secondary effects of foreign direct investment, specifically on total employment in the Liberec region and

gross domestic product per head in the region. Mathematical / statistical methods are used for this verification, the basic method here being a regression analysis accompanied by additional analyses with the aim of confirming the suitability of the models tested and the subsequent quantification of any possible relationship between variables.

The following time series were selected as the variables involved in the analysis:

- newly-created jobs as a result of foreign direct investment in the Liberec region – this variable will be given the working title of “newly-created jobs” (nova\_mista);
- total employment in the Liberec region – working title “employment” (zamestnanost);
- gross domestic product in the region – “gdp\_liberec” (hdp\_liberec).

Input data is shown in the following table, Tab. 6.

Tab. 6:

Employment in thousands, GDP per head in thousand CZK and newly created jobs in the Liberec region

Year	Employment in the Liberec region (zamestnanost)	Newly-created jobs by investment incentives (nova_mista)	GDP per head of population in the Liberec region (hdp_liberec)
1998	199.0	0	170,623
1999	201.2	732	180,525
2000	201.9	1,455	190,641
2001	202.3	2,749	201,861
2002	205.5	3,648	211,426
2003	201.5	5,596	204,456
2004	204.3	6,223	221,558
2005	201.7	8,857	244,447
2006	198.8	12,323	255,133
2007	199.3	13,854	263,987
2008	199.7	13,379	257,638

Source: [7], [8]

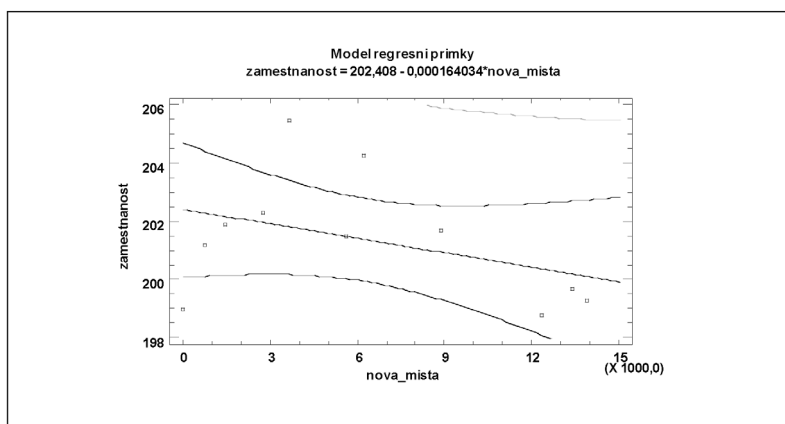
We will first analyse the dependence of total employment on foreign direct investment. There is a legitimate question in the case of total employment as to the influence of jobs created through foreign direct investment. A suitable regression model shall be sought in order to verify this hypothesis. A look at commonly-used regression models shows that there are not that many suitable models from the perspective of mathematical/statistical

criteria. Most regression functions show very low determination index values (below 30 %).

The regression line model, for example, failed in tests and a null hypothesis on the unsuitability of the model was not even rejected at 20% significance. The extremely high residual sum of squares is manifested in the low value of test criterion F (1.64). The model is depicted in the following graph, with parameters being estimated using the least squares method.

Fig. 5:

Regression line model – Employment (zamestnanost) and newly-created jobs (nova\_mista)



Source: Own calculations

Of course there is one model tested that shows relatively good results; the regression parabola function. The hypothesis of the unsuitability of the model was rejected at a significance level of 5 %, with sub t-tests also proving the statistical significance of individual parameters at this significance.

The resultant function takes the following form:  $200.321 + 0.000983196 \cdot \text{newly-created\_jobs} - 8.05845E-8 \cdot \text{newly-created\_jobs}^2$ .

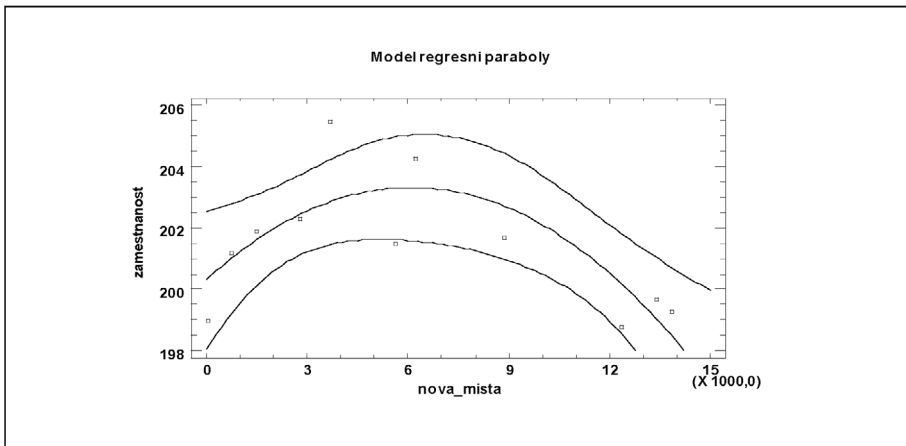
The determination index is in excess of 60 % (only 53.29 % after adjustment).

The influence of so-called autocorrelation of residuals is possible in a dependence analysis. This disruptive fact was tested with the help of two commonly used tests – the

Durbin-Watson test and a first-order autocorrelation test of consecutive residuals. The Durbin-Watson test for the regression model in question draws on the hypothesis that random errors are not mutually correlated. This hypothesis was not even rejected at a significance level of 70 %. The value of test statistics is around 2.72. Unfortunately, the second of the tests verified indicates a mutual correlation of residuals that is relatively strong (correlation coefficient of approximately – 0.42).

What is empirically clear is that **there is no increase in the growth of total employment in the region as the result of a higher number of jobs newly-created due to investment**. This fact has been theoretically checked and modelled.

Fig 6: Regression parabola model



Source: Own calculations

For the completeness of the analysis it is important to point out that the time series of “employment” in the region is probably subject to cyclical fluctuations given its economic nature. Such cyclical fluctuations are another of the influences left unaccounted for in ascertaining the effect of foreign investment; these, however, undoubtedly provide further opportunities for examination in the future. Different development over time might also lend itself to an analysis of the dependence of time series.

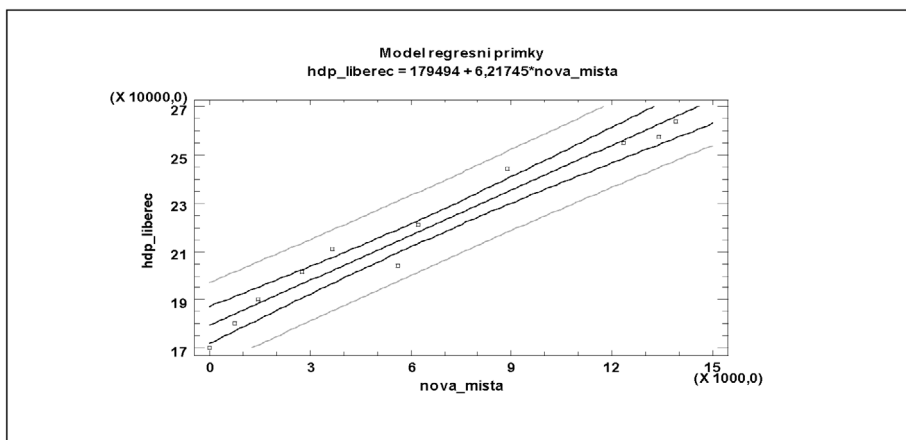
We also analyse the dependence of the gross domestic product generated on foreign direct investment. The same procedure as

used in the previous chapter will be applied to testing the hypothesis of the dependence of gross domestic product on jobs newly-created as a result of foreign investment. The regression line model under consideration draws on a null hypothesis of the insignificance of all parameters. The hypothesis was disproved even at a level of significance of 1 % and so the model proved to be highly suitable.

There is a very strong linear relationship among the individual variables, which can be expressed through a regression function in the following form:  $\text{gdp\_liberec} = 179,494 + 6.21745 \cdot \text{newly-created\_jobs}$ .

Fig. 7:

Regression line model – GDP (hdp) per head and newly created jobs (nova\_mista)



Source: Own calculations

Each newly-created job therefore generates an increase in GDP of CZK 6.22. The correlation is very strong and the selection correlation coefficient is around 0.98. The model explains almost 96 % of the total variability of a dependent variable.

The hypothesis of the mutual correlation of random errors was not proven (D-W statistic = 1.79619 and P-Value = 0.2254). In the same way, the first order autocorrelation coefficient of residuals does not suggest the unsoundness of the model, its value being approximately -0.02. The model is depicted in the graph, Fig. 7.

## Conclusion

Opinions on the impact of FDI on the economies of the target countries of such investment differ greatly. Nobody, however, denies that FDI has a significant impact, primarily in those countries that are making attempts to restructure their economies. The experiences of many countries (we could name the Republic of Ireland or Finland, for example) confirm that foreign direct investment can play a very positive role in the economy of the host country.

Economic restructuring will certainly come about under the influence of FDI. The question is whether it moves in the right direction and whether manufacturing and the other elements

of the economic structure of the country relating to this become involved in healthy economic disciplines. When analyzing effects, we most often monitor FDI that uses centrally-provided investment incentives. Here the desirable interaction of such investments should be directed through these incentives, which are determined by the specific political spectrum during a certain period in the development of the given state. In many respects, however, foreign direct investment has a fundamental and indisputable influence on the region in which it is made.

In this paper we demonstrate that central and regional starting conditions on the labour market can differ substantially, for example in aspects such as the structure of the regional economy, the labour force available etc. The Liberec region, for example, has 10 % higher employment in the secondary sector and about 8 % lower employment in the tertiary sector than is the national average. At the same time, the level of education is lower than the national average: there are around 3 % fewer people with tertiary education and 4 % fewer with secondary education completed with “maturita” school leaving examinations than in the Czech Republic as a whole. Despite these facts, which would indicate a less favourable situation than that of the national average, the level of unemployment in the Liberec region between

1998 and 2006 was some 2–3 percentage points lower than unemployment in the Czech Republic as a whole.

In terms of the level of FDI, CZK 22,908 million was invested in the Liberec region between 1998 and 2008 in the form of investment incentives, whereby the average planned value of one investment incentive was CZK 1,206 million [7]. This was the second largest average volume of investment in the country, the largest being in the Central Bohemia region, indicating that despite its structural and educational disadvantages, the Liberec region can still claim a surprisingly good labour market situation. Of course the question is whether this situation is sustainable.

A statistical analysis of dependence therefore allows us to make the contention that employment in the Czech Republic has been dependent on the increase in the number of jobs created through foreign direct investment since the year 2002.

As far as our analysis of the effects of FDI on employment development and GDP per head in the Liberec region is concerned, the results are quite surprising. Newly-created jobs as a result of the influx of FDI inflow tend to decline with a rising number of newly-created jobs on the whole. This could be the outcome of worker migration between domestic and foreign companies. Despite this fact, the correlation between GDP per head and FDI is very strong in the Liberec region and every job newly created as a result of FDI influx generates GDP growth.

This analysis therefore sides with those contentions that claim the positive influence of an increasing influx of FDI on employment in the target country of investment. Of course there do exist arguments against such a contention and for this reason the authors of the paper will continue to work on the issue and principally collect data at the Liberec regional level. Monitoring shifts at the regional level could help towards a more objective view of the effect of FDI, both in terms of employment, and therefore the labour market effect considered in this paper, and from the perspective of other economic and social effects that we are better able to observe and evaluate at a regional level.

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## **FDI AND THE LIBEREC REGION: THE CASE OF THE LABOUR MARKET**

**Jaroslav Demel, Zuzana Potužáková**

*Foreign direct investment accelerated over the past two decades as a result of the processes of globalisation and liberalisation. In addition to its other impacts, FDI changed the operation of developed market economies and integrated them more in the global economy. At a broader level, FDI also influenced undercapitalised transition economies after the fall of the communist regimes of Central and Eastern Europe and the transformation process itself. What is more, foreign direct investment influenced transition economies at a national level and in the regions into which it flowed.*

*The first part of the paper considers the theoretical background of FDI and the effects of FDI on a transition economy, especially its effects on the labour market. We consider labour market conditions to be a key in taking decisions on FDI. The second part analyses labour market development in the Liberec region, where the authors are based, and follows its development over the long term. We analyse sectoral and educational structures in the Liberec region and compare these with national figures. The final section focuses on a dependence analysis, applying a statistical method to describe the correlation between FDI and employment in the Czech Republic and in the Liberec region.*

*The aim of this paper is to compare the labour market situation in the Liberec region and that of the national economy in order to demonstrate the specifics of particular regions within the national economy and to analyse the impact of FDI on the regional labour market.*

**Key Words:** FDI, regional level, Liberec region, investment incentives.

**JEL Classification:** J21, F21, H4.