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Foreign Direct Investment and Unemployment: VAR Analysis for Poland in the Years 1995-2009

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Abstract:

The paper is devoted to the influence of foreign direct investment on labour markets. The interdependencies between FDI and unemployment were econometrically analyzed in Poland. In the research the VAR methodology was utilized based on aggregate quarterly data. The VAR analysis for the period 1995-2009 have proved interdependencies between FDI and employment in Poland. FDI impulse leads to decreasing of unemployment rate. However, the positive influence of FDI on Polish labour market tend be rather short term. It can suggest that government policies designed for encouraging FDI investment should be reformed in order to make conditions for positive long term influence of foreign capital inflow on Polish labour market.

Key Words: *FDI, Unemployment, Vector Autoregressive Modelling*

JEL Classification*: C22, E24, F21*

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1. Introduction

Globalization process has completely changed the problem of capital availability in contemporary economy. It has brought diverse consequences for development of all economies. Global financial crisis of the years 2008-2010 has proved that under some unfavorable conditions capital flows and international financial interconnections between countries can lead to serious destabilization of their real economies (Thalassinos, 2008). Even though the crisis had started in highly developed countries and had touched them very hard, in many cases the real "crisis victims" were the developing economies. On the other hand, globalization and the availability of international capital can be a source of great opportunity for developing countries. First of all, developing economics can benefit from foreign capital. Foreign investment, especially foreign direct investment (FDI) can help in upgrading technological level of their economies, thus it can help to benefit from convergence process and to modernize a country. It is often believed that FDI can help to solve many serious economic and social problems. For example, it is commonly stated that FDI usually bring strong positive results for labour market of a beneficiary as it results in decreasing the level of unemployment. As a result in case of political process and political decision making this argument is very often used as justification for significant government direct financial support for international investors that plan their investments in a given country. Transnational corporation often directly influence government policy to lobby for a more favorable policy mix in the area of regulations, taxation or other form of direct and indirect support by utilizing their influence as potential large employers (see more: Whyman, 2006).

Thus, the question about relations between foreign direct investment and unemployment makes very important and interesting scientific problem for en economist. It is also crucial for forming development policies. The aim of this paper is to investigate interrelationships among FDI and unemployment in Poland in the years 1995-2009. The organization of the paper is as follows: the fallowing section gives some theory and literature review of international researches for highly developed and developing countries. The second section has strictly empirical character with short explanation of methodology and presentation of VAR model. Finally the paper ends up with concluding remarks.

2. Theoretical background and literature review

The influence of FDI on labour markets conditions has been extensively studied in recent years. These studies have had strictly theoretical but also empirical character. However, there are still many controversies on interrelations between FDI inflow and employment. Different theoretical models and empirical investigations for different countries or periods show often inconsistent results. This discussion and

controversies signal that the effects of FDI on labour markets can change from one country to another. These effects can depend on the country features and specific forms of investment. For example in principle, it is accepted that positive employment effects are usually much higher if the FDI has the form of greenfield project. On the other hand when the foreign capital inflow takes the form of buyouts of privatized enterprises, it usually can have minor or even negative influence on employment (Hisarciklilar et all, 2009, p. 9)

Among strictly theoretical works in the field one can point at work of Fung et all, where a three sector endogenous growth model is used to investigate effects of foreign direct investment on the dynamics of urban unemployment, labour and capital income and national welfare in Harris-Todaro economy. This model shows very complicated interrelations between destination of foreign direct investment, intersectoral mobility of capital, elastisities of substitution, factor investments of final good production, growth rate and welfare effects (Fung et all, 1999, pp. 651-664). Grinols builds models with different assumptions influencing the relative opportunity costs of domestic labour in order to assess consequences of increased foreign capital for an economy with unemployment. His models suggest that in case of economy with unemployment foreign capital brings significant welfare gains if the opportunity costs of labour are sufficiently low relative to the wages earned by labourers employed by new foreign capital (Grinols, 1991, pp. 107-121).

Starting with empirical analyzes on highly developed countries Bailey and Driffield econometrically investigate the effects of trade, inward FDI and technological development upon the demand for skilled and unskilled workers in the UK based on industry level data panel data on smaller firms. Their research is placed within the broader context of technological transformation of British economy and shifts in British industrial and regional policy. Their results suggest that both trade and FDI benefit skilled workers. However, FDI have also adverse effects on the demand for unskilled labour in the UK (Bailey and Driffield, 2007, pp. 189-211). Similar results for United Kingdom can be found in the work of Driffield et all, who were relating the technological and factor price determinants of inward and outward FDI to its potential productivity and labour market effects on both host and home economies. They empirically examine the effects of different types of FDI on United Kingdom productivity and on the demand for skilled and unskilled labour at the industry level. This research showed that different types of FDI have markedly different labour demand effects. According to these researchers this can be considered an important reason for the lack of consensus in the empirical literature on the employment effects of FDI (Driffield et all, 2008).

The effects of FDI on employment and wages in manufacturing sector from regional perspective in the United States in the years 1974-1994 were investigated by Axarloglou and Pournarakis. These researchers analyzed a sample of US states that were receiving almost the entire amount of the FDI inflows in manufacturing in the country. Based on this work it seems that FDI inflows had rather insignificant or weak effects on local employment. These results were primarily due to the industry

composition of the FDI inflows. FDI inflows in a subgroup of industries that includes printing and publishing, transportation equipment have positive effects on local employment and wages in several US states. However, FDI capital in industries such as leather and stone-clay-glass have negative effects on local labour markets in most states in the sample. Finally, FDI inflows in printing and publishing and transportation equipment stimulate the labour markets of most US states in the sample (Axarloglou and Pournarakis, 2007, pp. 424-445).

Moving to researches on FDI effects on labour market in case of developing countries one can point at Aktar and Ozturk who applied VAR methodology to investigate various interrelationships among FDI, exports, unemployment and gross domestic product for the years 2000-2007 in Turkey. Their research showed that in the analyzed period FDI did not have any contribution to reduce the unemployment rate in Turkey (Aktar and Ozturk, 2009, pp. 203-211). Also Hisarciklilar et all tried to investigate the effects of FDI inflows on the process of job creation in Turkey in the same period but at a sector level. Based on dynamic panel modeling they find a negative relationship between foreign investment and employment. They attributed this results to activities of transnational corporations that were shifting from low-tech to medium- and high-tech industries in manufacturing (Hisarciklılar et all, 2009).

Positive influence of FDI on employment growth in case of developing countries was found in China. As one of the world's most important recipients of FDI, Chinese labour market has significantly benefited from foreign capital inflow. Karlsson et all analyze FDI inflow and employment growth in China based on firm level evidence, using a large sample of manufacturing firms for the period 1998–2004. That research shows that FDI have positive effects on employment, which is result of job creation within foreign firms as well as indirect effect of FDI on employment in domestic firms. These researches argue that the high employment growth in foreign firms operating in China is associated with their specific characteristics such as high productivity, capital intensity and their high survival rate. Employment growth is also relatively high in private domestic Chinese firms. In this research both foreign companies and private domestic firms have relatively high employment growth, as compared to non-private domestic firms. The authors attribute the positive indirect effect of FDI on employment in private domestically-owned firms to positive spillover effects from FDI (Karlsson et all, 2009, pp. 178-201).

Pei and Esch also try to assess general FDI impact for economic situation of developing countries. They start with the micro-level investigation concentrating on the banking sector and corporate sector. Then they move to the macro-level analysis in which trade, employment and balance of payments are discussed. They argue that both theoretical and empirical evidence generally suggest that FDI has a beneficial impact on the economic conditions in host developing countries. However, they stress that real economic effects of FDI on the economic situation are almost impossible to measure precisely (Pei, Esch, 2004, pp. 109-117).

In case of Polish economy Stawicka investigated the relations between FDI and the situation of labour market. This research was showing some positive implications of foreign capital for labour markets, but the final results were inconclusive. However, this analysis was not based on econometric evaluation (Stawicka, 2009, pp. 68-76).

In the next section econometric research for Poland for the years 1995-2009 is presented.

3. Econometric analysis for Poland

In economic process one relatively often come across cases where each variable depends on all the other ones. Based on literature of the subject one can expect that this situation is very probable in research on influence of FDI on labour markets. In that case structural form of an econometric model is not identifiable. To solve this problem it is possible to use Christopher Sims' approach of Vector Autoregressive Systems (VAR) as an alternative to the traditional econometric modelling (Sims, 1980, Enders, 1995). This approach was used in this research. The tools of VAR analysis like Granger Causality (Granger, 1969; Sargent, 1976) and impulse response analysis were used in the specification of an economic model and in understanding the interrelationships among variables (Enders, 1995).

The order of the VAR model was established using Schwarz criterion as it seems to be the most popular, while it's providing a good forecasting model (Lütkepohl, 2005). The model in case of which SC criterion was minimum was selected as the suitable mode.

Into VAR model specification can be additionally included constant, deterministic trend or deterministic seasonality, which was done in the research. In this way, the VAR model could be described as (Osińska, 2007):

$$Z_t = A_0 D_t + \sum_{i=1}^{q} A_i Z_{t-i} + \varepsilon_t,$$

where:

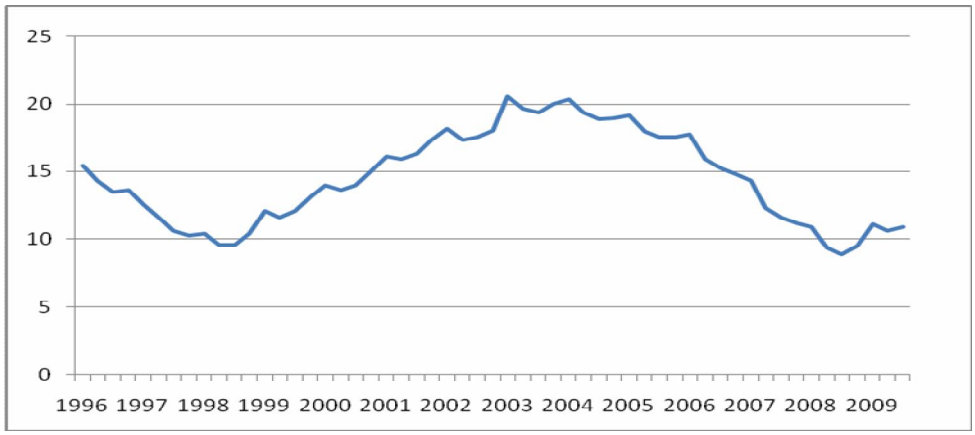
A_0 – matrices of appropriate parameters,

D_t - matrices of average of process, deterministic trend and seasonality values.

In the aim of investigating the dependencies between FDI and unemployment rate in Poland, quarterly data for 1996-2009 were collected. The intention was to collect data from the beginning of transformation process, but the quarterly data for FDI in the early 1990s were inaccessible. The most data come from Central Statistical Office in Poland and only for FDI – from National Bank of Poland.

In this time period the unemployment rate in Poland has varied between 8,9% in Q3.2008 and 20,6% in Q1.2003. As one can see on chart 1. the unemployment rate was over 15% between Q1.2001 and Q3.2006. Since Q1.2008 this index has oscillated at 10%.

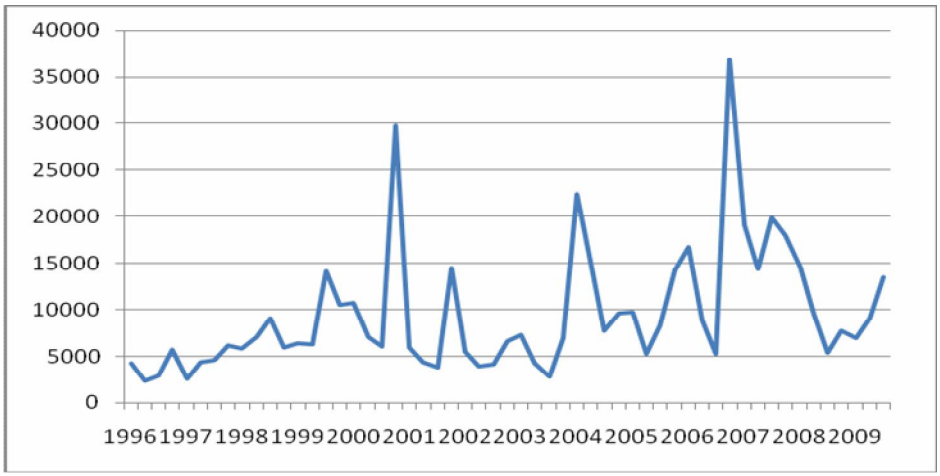
Chart 1. The unemployment rate in Poland for the analyzed period.



Source: www.stat.gov.pl (10.01.2010)

In 1990s the tendency of growth in FDI can be observed. Then in 2001-2003 the influence of FDI level fallen off. The reason of this can be found in global tendency and in the decreasing economic growth rate in developed countries. The highest level of FDI was reached in 2007 (chart 2.)

Chart 2. The influence of foreign direct investments in Poland in analyzed period



Source: www.nbp.pl (10.01.2010)

By the aim to improve the explanatory and predictive properties of the VAR model not only unemployment rate and foreign direct investments influence were taken into account. Complete list of variables was included in Table 1.

Table 1. Variables in VAR analysis

Variable name	Description	unit	variables type
FDI	Influence of foreign direct investments into Poland	mln zł	endogenous
BAEL	Unemployment rate in Poland	%	endogenous
GDP	Gross Domestic Product in Poland	mln zł	endogenous
DEM	Domestic demand	mln zł	exogenous
SAL	Average salary in the economy	zł	exogenous
EKI	The ratio of total exports to imports	index	exogenous

Source: Own work

Using the Schwarz criterion the first endogenous lags order was established in VAR model. Before the final estimate of the model, to determine the order of equations the Granger's causality was examined. The p-values of the calculated F statistics are presented in Table 2

Table 2. The p-values of the calculated F statistics for Granger causality

skutek / przyczyna	BIZ_t	PKB_t	$BAEL_t$
BIZ_{t-1}	-	0,720	**0.008**
BIZ_t	-	0,053	0,081
PKB_{t-1}	0,559	-	**0,060**
PKB_t	0,053	-	**0,012**
$BAEL_{t-1}$	0,661	**0.049**	-
$BAEL_t$	0,081	**0,012**	-

Source: Own calculations

These results suggest that inflows of foreign direct investment has an impact on unemployment in Poland, while the level of unemployment rate influences on the gross domestic product. In addition, between unemployment rate and GDP value is instantaneously causality. Therefore, the order of the estimated equations VAR model should be as follows: Equation 1: FDI, equation 2: Unemployment rate and the equation 3: GDP. Estimated model is presented in tables 3 to 5.

Table 3. Results of Equation 1: FDI estimation

	Parameter	*Stand. Error*	*t-Student*	*p-value*
Const	-266734	214354	-1,2444	0,22491
FDI_1	0,05904	0,215888	0,2735	0,78673
BAEL_1	-804,55	1436,21	-0,5602	0,58033
GDP_1	-0,8813	1,19096	-0,7400	0,46619
DEM	0,54429	0,31929	1,7047	0,10065
DEM_1	0,68356	0,978649	0,6985	0,49133
SAL	60,8484	49,6896	1,2246	0,23215
SAL_1	-71,383	40,3019	-1,7712	0,08872
EKI	54416,8	67798	0,8026	0,42975
EKI_1	188927	128921	1,4655	0,15526
S1	35550,4	20038,4	1,7741	0,08823
S2	27979,9	11121,9	2,5157	0,01867
S3	16535,1	10229,2	1,6165	0,11855
Time	-1723,16	1242,39	-1,3870	0,17769

Source: Own calculations

Table 4. Results of Equation 2: BAEL estimation

	Parameter	*Stand. Error*	*t-Student*	*p-value*
Const	19,4888	16,8371	1,1575	0,25801
FDI_1	-0,000006	0,000017	-0,3477	0,73095
BAEL_1	0,569019	0,112811	5,0440	0,00003
GDP_1	-0,000117	0,000094	-1,2556	0,22086
DEM	-0,000397	0,000025	-1,5812	0,12640
DEM_1	0,000035	0,000077	0,4592	0,65008
SAL	0,002628	0,003903	0,6734	0,50684
SAL_1	0,002039	0,003166	0,6442	0,52534
EKI	1,2664	5,3254	0,2378	0,81397
EKI_1	6,09148	10,1265	0,6015	0,55290
S1	1,48937	1,57397	0,9462	0,35308
S2	-2,32401	0,873604	-2,6603	0,01344
S3	-1,3164	0,803487	-1,6384	0,11387
Time	0,105027	0,0975875	1,0762	0,29210

Source: Own calculations

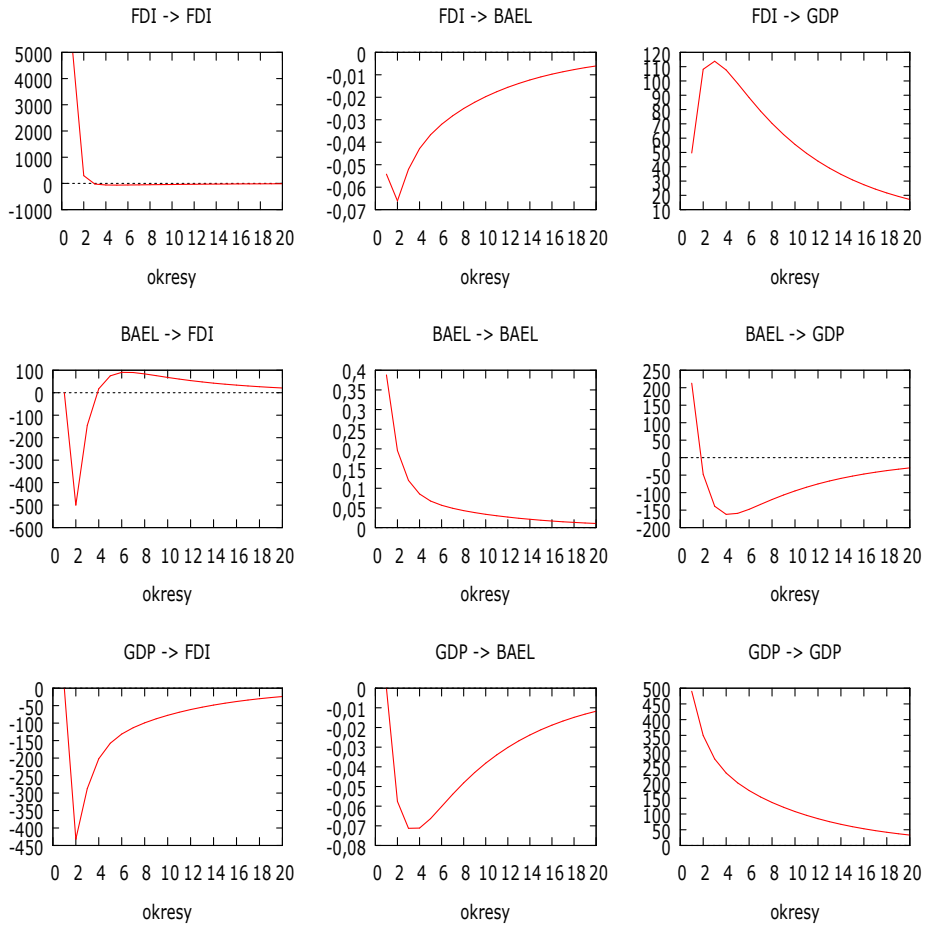
Table 5. Results of Equation 3: GDP estimation

	Parameter	*Stand. Error*	*t-Student*	*p-value*
Const	41455,7	23055,7	1,7981	0,08425
FDI_1	0,009004	0,023220	0,3878	0,70146
BAEL_1	-513,78	154,477	-3,3259	0,00272
GDP_1	0,713248	0,128099	5,5680	0,00000
DEM	0,862177	0,0343424	25,1053	0,00000
DEM_1	-0,725671	0,105262	-6,8939	0,00000
SAL	-0,962046	5,34455	-0,1800	0,85860
SAL_1	-2,62955	4,33481	-0,6066	0,54958
EKI	98862,4	7292,26	13,5572	0,00000
EKI_1	-84209,1	13866,6	-6,0728	0,00000
S1	-4032,86	2155,3	-1,8711	0,07307
S2	-4379,63	1196,26	-3,6611	0,00118
S3	-4616,39	1100,24	-4,1958	0,00030
Time	376,827	133,63	2,8199	0,00927

Source: Own calculations

The estimated model allowed to calculate the impulse response function, which results is presented in Chart 3:

Chart 3. Impulse response function



Source: Own calculations

According to the results impulse of FDI inflows causes a reduction in the level of unemployment, but only in the short term. Similarly, in the short term, FDI contributes to growth of gross domestic product, and then return to state before the impulse response. Additional the unit growth of unemployment rate causes the decrease of GDP value in short term.

4. Conclusions

The presented literature review shows that it is not easy to draw any universal conclusions and form undisputed theory on interdependencies between FDI and unemployment. However, there are some common characteristics of

situations when FDI inflow brings positive results for labour market. It is not controversial that FDI inflow is usually positive for skilled labour force. It means that long term agenda for economic policy should be forming good conditions for improving quality of labour force. It is agreed that greenfield investment in high tech industry tend to bring many spillover effects that in the long term result in improving economic situation of a country. This means that this kind of FDI inflow should be the priority of government policy.

The empirical investigation based on aggregate data and VAR methodology for the period 1995-2009 have proved interdependencies between FDI and unemployment. The analysis of impulse response function shows that the FDI impulse indicates decrease of unemployment rate, but then slowly growth to initial state of this rate takes a place. It means that even if generally FDI have some potential to deteriorate the unemployment in the short-run, the government should still implement policies that attract investments fulfilling above mentioned criteria, which would result in positive long term results of foreign capital inflow.

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