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PREREQUISITES FOR POSITIVE IMPACT OF FOREIGN DIRECT INVESTMENTS ON ECONOMIC GROWTH

WARUNKI WSTĘPNE DLA POZYTYWNEGO EFEKTU BEZPOŚREDNICH ZAGRANICZNYCH INWESTYCJI NA WZROST GOSPODARCZY

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Abstract. *The paper concentrates on determination of prerequisites for the positive effect of FDI on economic growth. For this purpose database of "Global Competitiveness Report" is used. Significant evidence was obtained for institutions, infrastructure, health and primary education, meaning that improvements in these variables would lead to increase in positive effect of attracted FDI on economic growth.*

Keywords*: foreign direct investments, economic growth, dynamic estimation.*

Streszczenie*: Artykuł koncentruje się na określeniu warunków niezbędnych dla pozytywnego efektu FDI – FOREIGN DIRECT INVESTMENT („bezpośrednie zagraniczne inwestycje") – na wzrost gospodarczy. W tym celu skorzystano z bazy danych „Global Competitiveness Report" – „Światowego Raportu Konkurencyjności". W przypadku instytucji, infrastruktury, edukacji zdrowotnej i podstawowej otrzymano znaczące dowody na to, że poprawa tych zmiennych może prowadzić do zwiększenia pozytywnego efektu przyciągniętych „bezpośrednich zagranicznych inwestycji" na wzrost gospodarczy.*

Słowa kluczowe: *bezpośrednie zagraniczne inwestycje, wzrost gospodarczy, ocena dynamiki*

1. Introduction

In many countries economic policy for attracting FDI became a priority. Although a number of recent papers show that the effect of FDI on economic growth is not unambiguous. Mainstream economic literature recognizes various direct and indirect effects of FDI on economic growth. Besides, economic research recognizes possible negative consequences of FDI. This paper undertakes empirical investigation to determine the effect of various socio-economic indicators on ability of FDI to foster economic growth.

2. Modelling the impact of fdi of economic growth

Analysis of foreign direct investments effect on economic growth is made complicated due to a number of direct and indirect effects of foreign direct investments on economic growth (Dunning 2008, Gorodnichenko 2007, Mencinger 2003, 2008). Negative effects include e.g.: FDI may not lead to accumulation of grossed fixed capital, it may lead to import substitution for locally produced goods, lead to deterioration of tax revenues to state budget due to transfer pricing and tax optimization schemes, etc.
Aiming at detection most important factors for positive FDI effect on economic growth, we produced a model for estimation on data obtained from Economist Intelligence Unit and World Economic Forum – "Global Competitiveness Report". Our model is as follows:

$$y_{it} = \beta_0 + \beta_1 y_{it-1} + \beta_2 k_{it-1} + \beta_3 F_{it-1} + \beta_4 Gap_{it-1} + \sum_{j=1} \alpha_{ji} K_{jit} + \sum_{j=1} \delta_{ji} K_{jit} F_{it-1} + D + \varepsilon_t \quad (1)$$

where, y_{it} - log of real GDP per capital at purchasing power parity; k_{it-1} - lagged ratio of grossed fixed capital formation to GDP (in percent), lag is taken as it shows increase in fixed capital over the last year to be used in the production for the current year; F_{it-1} - lagged ratio of FDI inflows to GDP (in percent); Gap_{it-1} - lagged difference between GDP per capita in a country and GDP per capita in EU-15 (in USD thousand); $\sum_{j=1} \alpha_{ji} K_{jit}$ - set of variables for capturing effect of individual features - infrastructure, institutions, education, public health etc. (pillars of competitiveness); $\sum_{j=1} \delta_{ji} K_{jit} F_{it}$ - set of interacted abovementioned indicators with FDI to

onsider the role of these indicators for the effect of FDI on economic growth; D - set of year-specific dummies; ε_t - residual of the regression.
Database «Global Competitiveness Report» contains high number of potentially significant variables. Inclusion of all these variables to the regression is impossible as is exceeds number of degrees of freedom. Thus, it is necessary to group variables by their economic and social nature. We utilized grouping of the Report – by twelve pillars of competitiveness (The Global Competitiveness Report 2008-2009).

We grouped countries by each pillar for "weak", "average" and "high". Then dummy variables were constructed for "weak" and "high" countries for each pillar. These dummy-variables were interacted with FDI in order to capture their influence on usefulness of FDI for economic growth. Novelty of this approach is its abilityu to determine the conditions, which are most favorable for positive effect of FDI on economic growth. Following variables were calculated for the empirical estimation:
Inst (also fdi_inst_1 and fdi_inst_3) – normalized pillar of institutional development, interactions of the pillar and FDI (calculated by multiplying fdi by dummy-variables for weak - *fdi_inst_1* and strong - *fdi_inst_3* level of institutional development);
Infr (also fdi_infr_1 and fdi_infr_3) – normalized pillar of development of infrastructure, interactions of the pillar and FDI;

As well as the other variables and their interactions with FDI: *Macro* – pillar of macroeconomic stability, *Health* – pillar of public health and primary education, *Heduc* – higher education and training, *Goodsm* – pillar of goods market efficiency, *Labm* – labor market efficiency, *Finm* – Financial market sophistication, *Tech* – Technological readiness, *Msize* – Market size, *Bsoph* – Business sophistication, *Innov* – Innovation.
Basic economic indicators, which were obtained from Economic Intelligence Unit, are available for 5 years (2004-2008), and data on pillars of competitiveness from "Global Competitiveness Report" is available for 3 years (2006-2008) for 88 countries. In total, minimal number of observations equals 202.

The combined database is characterized by small number of time periods and comparatively large number of countries. Probably, the best method to analyze such a database is linear generalized method of moments (GMM) by Arellano-Bover/Blundell-Bond (Roodman 2006). This methodology allows for obtaining unbiased and efficient parameters of a model with

correlation between dependent variable and its past realizations and explanatory variables not being strictly exogenous.

We estimated 13 model specifications – a simple one (without inclusion socio-economic components/pillars), as well as twelve models with inclusion of the pillars – separate model for each pillar. Lagged values of all variables were used as instruments, according to the methodology of the GMM approach. Statistically significant estimation results are summarized in table 1.

Table 1. Estimation results for FDI and economic growth model

Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
Constant	0,5840***	0,9186***	0,5665***	0,7001***	0,5588***
L.ln_y	0,9401***	0,9056***	0,9513***	0,9165***	0,9592***
L.inv	0,0033**	0,0020	0,0016	0,0028	0,0039***
L.fdi	0,0047**	-0,1103*	-0,0066	-0,0004	-0,0173
L.y_gap	-0,0083***	-0,0119***	-0,0767***	-0,0112***	-0,0079***
y06	0,0073***	-	-	-	-
y07	-0,0074	-0,0082*	-0,0135**	-0,0091	-0,0266*
y08	-0,0263***	-0,0251***	-0,0302***	-0,0276***	-0,0479***
Inst	-	0,0706	-	-	-
Fdi_Inst_1	-	0,1272	-	-	-
Fdi_Inst_3	-	0,1132**	-	-	-
Infr	-	-	-0,0696	-	-
Fdi_Infr_1	-	-	0,0148	-	-
Fdi_Infr_3	-	-	0,0124**	-	-
Macro	-	-	-	0,1734	-
Fdi_Macro_1	-	-	-	0,0464**	-
Fdi_Macro_3	-	-	-	0,0062	-
Health	-	-	-	-	-0,1838
Fdi_Health_1	-	-	-	-	-0,0984***
Fdi_Health_3	-	-	-	-	-0,0124
No. obs.	272	202	202	202	202

* 1% sign. level; ** 5% sign. level; *** 10% sign. level

Description of the results: *L.ln_y* – variation in GDP per capita is for 85-90% explained by its change in the past period. *L.inv* – increase in the rate of investment by 1 percentage point leads to increase in GDP by 0,33% in the subsequent year. *L.fdi* – increase in FDI inflows per capita by USD 1 thousand increases GDP per capita growth by 0,47% in the subsequent year. *L.y_gap* – result obtained provides no evidence for convergence effect.

Inst (model 2) – effectiveness of FDI attraction is higher for countries with well-developed institutions, compared to those with weak or average level of institutional development. *Infr* (model 3) – effectiveness of FDI attraction is higher for countries with well-developed infrastructure. *Macro* (model 4) – on average, FDI brings-in more economic growth to countries with weak macroeconomic stability. *Health* (model 5) – effectiveness of FDI attraction is low for countries with low level of health and primary education.
Effect of the following indicators was statistically insignificant: Labor market efficiency, Higher education and training, Goods market efficiency, Financial market sophistication, Technological readiness, Market size, Business sophistication, Innovation.

3. Conclusion

According to the estimation results, 4 out of 12 socio-economic indicators were found significant as prerequisites for effective utilization of FDI: Institutions, Infrastructure, Macroeconomic stability, Health and primary education. Statistically insignificant coefficients were obtained for the other pillars probably not because of the absence of their effect on FDI and GDP, but due to small number of time periods, also probably because for the purpose of this investigation pillars do not sufficiently capture the underlying social and economic phenomenon. Hence, we plan an investigation with a higher number of time-periods and with a deeper analysis of social and economic factors to shed more light on the issue under study.

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