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EU FUNDING AS A DETERMINANT OF FOREIGN DIRECT INVESTMENTS IN RURAL AREAS - POLICY IMPLICATIONS

***Juris Hazners[1], Andra Zvirbule[2]**
[1]Institute of Agricultural Resources and Economics, Latvia
[2]Latvia University of Life Sciences and Technologies, Latvia
*Corresponding author's email: juris.hazners@arei.lv

Abstract
This paper analyzes the direct impact of the EU funding on the spatial distribution of Foreign Direct Investment (FDI) inflows in Latvian rural districts. While the determinants of inflows of FDI are often analysed at the regional and national level, the impact of the EU funding on the spatial distribution of FDI between the administrative entities within a single country is not extensively studied. The research objective is to assess the possible net impact of the EU funding on FDI inflows in Latvian rural districts, thus enabling the more targeted policy decisions with respect to the structure in future EU funding. To evaluate this impact, Instrumental Variables method is applied using the panel data on Latvian rural districts. The research results confirm that positive direct impact of the EU funding on the FDI inflows in Latvian rural districts exists, and it is substantial and statistically significant. At the same time, confounded 'third factors' might exist with negative impact on FDI inflows. While the spatial distribution of the FDI inflows in several regional aspects is rather uneven, the respective differences in the EU funding are less pronounced confirming the existence of negative 'third factors'. Hence, the structure of the support by EU funds has to be revised to improve the local potential determinants of the FDI inflows with emphasis on infrastructure and human capital.
Key words: rural areas, foreign direct investments, EU funding, instrumental variable, policy implications.

Introduction

The gains and losses from Foreign Direct Investment (FDI) inflows in the country are described by Czinkota et al. (2015). On the one hand, there are economic benefits like increase in capital flows, new technologies, increased competition that benefits the economy, improvements in balance of payments, new jobs created, improved access to global markets. Also, the standards of living might improve. On the other hand, risks arise in a longer term of increase in capital outflows in cases when the shortage of local suppliers induces larger imported supplies. Often FDI inflows bring changes in the lifestyles of consumers in the host country by introducing new products and services. Studies abound on country level determinants of FDI, especially in large Asian economies like China and India. Zheng (2009) employs statistical models for China and India showing ambiguous results. For both countries market growth, imports, labour costs, and the country political risk and policy liberalization are the FDI determinants. While exports, market size, and borrowing costs are important to China, geographical and cultural distance factors are important to India. Panel data analysis of Brazil, Russia, India, China and South Africa (BRICS) by Vijayakumar et al. (2010) identifies market size, labour cost, infrastructure, exchange rate and gross capital formation as the potential determinants of FDI inflows while the economic stability, growth prospects trade openness seem to be the insignificant factors. Liargovas and Skandalis (2012) tested the causality between FDI inflows and several factors in the developing countries by analyzing panel data. They prove that in a longer term the inflows of FDI are associated with the openness to trade. Procher (2011) finds that since the very beginning French investments in Europe, North America and North Africa are positively affected by higher market demand and former colonial ties with France, while higher labour cost and distance are deterring factors. Eastern Europe as a region is attractive location for manufacturers and established companies. Agglomerations and clusters of companies are important. Cleeve et al. (2015) assessed the role of human capital (HK) measured by several indicators of educational attainment on FDI inflows to sub-Saharan Africa. The research results show that all measures of HK have a significant influence on FDI. Katsaitis and Doulos (2009) investigated the impact of the funding from EU Structural Funds on the volume of FDI inflows in EU-15 countries using a variety of econometric techniques yielding robust empirical findings. The results indicate that the institutional quality of the receiving countries is crucial. Breuss et al. (2010) proved that the EU enlargement in 2004 with a redistribution of funds towards the new member states has made the accession countries even more attractive as a location of FDI. Dumciuviene and Paleviciene (2017) analyzed the impact of the support form EU structural funds on FDI inflows. Fewer papers focus on the spatial distribution of the FDI within a single country. Hoškova (2001) states that since joining the EU, the distribution of FDI inflows in Slovakia have been uneven with more than half of FDI being made in a close proximity to state or regional capitals. The larger distance from an industrial centre means less foreign investment. She finds that the main factors behind this are associated with the infrastructure of transport and communications (especially access to highways and the airport), skilled labour and easily accessible relevant state institutions. Previous experience with the

foreign investors also affects new inflows positively. By analyzing input-output linkages in Hungary, Bekes (2005) suggests that there is an agglomeration effect and access to suppliers and markets is crucial for selecting the location. The closeness of companies in the same industry is important pointing towards a role of already established clusters. Castro et al. (2007) analyzes regional patterns in Argentine with the regression based on spatial error model and spatial lag model. The results suggest that among other proxies of infrastructure the increase in paved roads per capita provides for FDI growth. The overall results from the analysis in Sweden by Falck and Colin (2014) indicate that regions with a relatively diverse economy, good access to international airport and qualified labour force appear to be the most attractive destinations for FDI ventures. Furthermore, the importance of information and knowledge spillovers is emphasized. Kersan-Škabič and Tijanič (2014) by performing static and dynamic panel data analysis identified a number of factors that influence the unequal distribution of FDI inflows. The results show that education, location at the areas of special state concern and capital city region have positive and statistically significant influences, while unemployment and location at the regions bordering with the EU show negative statistically significant influences. The agglomeration effect also is stressed. The research results obtained at the county level in Poland by Nazarczuk and Krajewska (2018) are similar to other findings in other countries at the regional level. The FDI inflows depend on road quality, availability of skilled labour, overall economic situation and proximity of markets. Steenbergen and Tran (2020) have addressed the scarcity of research on the impact of FDI on employment and welfare in developing countries. Moreover, the influence of FDI on income inequality also is not extensively studied. The results obtained prove that FDI has a positive impact on employment and growth in wages, helping to reduce poverty as FDI-induced wage increases occur mainly at the lower side of the income spectrum. However, at the same time FDI raises the income gap because workers with poorer education and lower skills are less affected. The negative impact of FDI on income distribution should be addressed in labour market and education policies. In the EU countries, Hunady and Orviska (2014) found that FDI inflows are larger when labour costs and the risks of incurring additional costs from firing are lower. At the macro level, the openness of the economy is important along with the lower public debt and higher GDP per capita.

Materials and Methods

The instrumental variables (IV) method is a quasi-experimental design technique. Similarly to propensity score matching, instrumental variables provide an adjustment for confounding factors. Imbens and Angrist (1994) state that while the evaluation of treatment effects in healthcare and medical programs is usually based on the data collected from randomly assigned treatment and control groups, the use of random assignment in socio-economic programs is controversial. They introduce the local average treatment effect concept. The framework for estimation of causal effects with instrumental variables is proposed by Angrist, Imbens and Rubin (1996). They address the problems arising when assignment to a binary treatment is ignorable while the receipt of treatment is non-ignorable. The instrumental variables approach is used in a number of impact analyses of specifically designed programmes in labour market policy area. Carling and Pastore (1999) analyzed two Swedish employment programs. They find that the engagement of the unemployed in the subsidized elaborated special programs increases the risks for the person to be repeatedly unemployed more than twice if compared to the program designed for the encouraging the self-employment. By using non-parametric methods Forslund et al. (2004) found that Swedish employment subsidy programme has a positive treatment effect for the participants. Frolich and Lechner (2004) evaluated the effects of active labour market policies (ALMP) such as training on chances for the participant to get an employment and improvement in earnings by non-parametric instrumental variables. Their results show that in the short term the participation in a program raises probability to get a job by approximately 15%. Winter-Ebmer (2006) use the microeconometric evaluation methods to assess the treatment effects of a specialized non-managerial training program in Austria on workers who lost their jobs due to a decline in the metalworking industry. The results show that in the short and even medium term after the completing the program graduates have far better employment opportunities with higher labour compensations. Usually, FDI is not a variable targeted in broader national or specifically designed programs as it is not suitable for measuring the impact in terms of economic growth, productivity, employment and income. Hence, there are no studies available on the impact of public support on FDI.

In a matrix form, with a simple regression with one independent variable, the cause-result relationship between the dependent variable and independent variable can be indicated as follows:

$$Y = \alpha + \beta X + E, \quad (1)$$

where:
α – regression constant,
β – regression slope coefficient,
$Y = (y_1 \dots y_n)$ – vector of dependent variable,

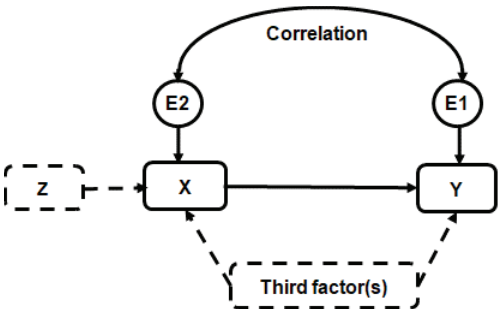

Figure 1. The layout of the instrumental variables method.

$X = (x_1 \dots x_n)$ – vector of independent variable,
$E = (e_1 \dots e_n)$ – vector of error terms (residuals).

However, the possibility of existence of so-called 'third factor(s)' or confounded variables is not considered. The simultaneous increase in dependent and independent variables might be affected by the same single factor or several factors. Likewise, the increase in independent variable might occur when dependent variable decreases due to 'third factor(s)'. If the expected value of independent variable from the regression can be regressed by some other variable and other independent variable(s) added, the effect caused by 'third factor(s)' can be separated and explained as correlation between the errors (residuals) from two regressions. The approach used can be illustrated by the following layout (Figure 1).

Two conditions have to be satisfied. First, there a correlation between both errors (residuals) exists. Second, correlation does not exist between the instrumental variable and both errors (residuals). The suitability of selected instruments has to be empirically tested. In practice, variables which satisfy those two conditions can rarely be found, and this is often the main reason why instrumental variables method is not applicable. The coefficients in both regressions have to be statistically significant.

The data panel used in this study contains information on 110 Latvian rural districts according to the territorial division before the territorial reform coming into force in June, 2021. Four variables are selected – total support received from EU funds over the period from 2015 to 2019 (for calculations, vector is denoted as 'funds'), aggregated FDI inflows from 2015 to 2021 ('fdi'), district budgets in 2015 ('budget') and number of commercial healthcare providers in 2015 ('health'). The selection of the last two variables is determined by their empirically proven suitability for use as instruments. The data on EU funds, FDI inflows and district budgets are extracted from the Regional Development Indicators Module database (RAIM, 2022). The data on healthcare providers are extracted from the National Statistics databases (CSP, 2022).

Results and Discussion

The calculations start with the first regression - 'funds' are regressed on 'budget' and 'health'. By inserting the obtained values of the regression coefficients, the expected value of funds (denoted 'funds_hat') is calculated. By extracting the expected value from the actual value, the first residual vector e1 is calculated. Then, the second regression follows – 'fdi' is regressed on 'health' and 'funds_hat'. By inserting the obtained values of the regression coefficients, the expected value of 'fdi' (denoted 'fdi_hat') is calculated. By extracting the expected value from the actual value, the second residual vector e2 is calculated. The results of two regressions are shown in Table 1.

All coefficients in both regressions are statistically significant. The last calculation step is a correlations matrix. The correlations between 'budget' and both residuals are shown in Table 2.

Neither of residuals correlates with 'budget' and there exists a moderate statistically significant correlation between the residuals. Thus, the two conditions mentioned above are met and 'budget' can be considered a valid instrument. The coefficient of the 'funds_hat' variable in the second regression characterizes the direct impact of the EU funding on FDI inflows. Increase in one currency unit of EU funding causes increase in FDI inflows by 4.96 currency units. The impact is rather high.

To confirm the plausibility of these findings, ivreg2 procedure was performed with Stata13 software yielding the same results.

Correlation between FDI and EU funding was negative, weak and statistically insignificant, $r(108) = -0.140$, $p = 0.856$. Simple linear regression was used to test if EU funding significantly predict FDI. The fitted regression model was: (fdi) = 16270507 - 0.213 * (funds). The overall regression was not statistically significant (R-squared = 0.02, $F_{(1,108)} = 2.17$, $p = 0.144$). It was found that EU funding can not significantly predict FDI ($\beta = -0.213$, $p = 0.144$). These two calculations are used only to check whether the findings of positive high impact of EU funding on FDI are in line with the expected direction of the relationship

Table 1

Results of two instrumental variable regressions

		β	SE	Beta
Coefficients – 1st regression				
	Intercept	15109516***	2979513	
	Budget	1.07*	0.631	0.216
	Health	221024**	112629	0.250
Model summary				
	R-squared	0.188		
	Adjusted *R*-squared	0.173		
	F statistic	12.39***		
Coefficients – 2nd regression				
	Intercept	-82089947***	14859640	
	Health	-1461039***	319362	-1.091
	Funds_hat	4.96***	0.833	1.419
Model summary				
	R-squared	0.293		
	Adjusted *R*-squared	0.28		
	F statistic	22.19***		

** p<0.1, ** p<0.05, *** p<0.01*

Table 2

Pairwise correlations matrix between the instrumental variable and residuals

Correlations	budget	e1	e2
budget	1.000	-0.000	-0.000
e1	-0.000	1.000	-0.410***
e2	-0.000	-0.410***	1.000

** p<0.1, ** p<0.05, *** p<0.01*

between two variables. The contradictions between the results of these two simple calculations with the empirically strong results obtained with instrumental variable regressions point towards the existence of "third factors" that have negative impact on FDI. A comparison of spatial distributions of EU funding and FDI might lead to conclusions about the impact of EU funding on FDI in various spatial segments.

The distributions of the aggregate FDI and EU funding are shown in Figure 2.

Distribution of aggregated FDI is shown on the left side of the picture. In regional breakdown, it shows marked differences between regions with majority of inflows to Central Region. In Eastern Region, the inflows are the smallest. At the same time, the EU funding is distributed rather evenly. Referring to the studies mentioned above, an agglomeration effect on FDI inflows is clearly visible with capital city and vicinities being a dominating factor. Similarly marked differences do exist between inland and border districts or districts closer to the State capital and remote districts while the differences in EU funding are less pronounced. In distance breakdown, remote districts receive even more EU funding. These findings are also in line with previous research pointing towards a dominance of border and distance as factors with negative influence on FDI inflows. Thus, the superficial conclusion from the instrumental variable regressions about targeting larger inflows of FDI with unstructured increasing of EU funding would be erroneous. The 'third factors' mentioned above from the research on the determinants of FDI inflows should be considered for modifying the structure of funding accordingly to be enclosed in future rural development policies. These might include elaboration of policy measures that target the improvements in human capital and infrastructure in 'vulnerable' spatial segments. By examining the EU support for small and medium-sized enterprises in the Czech Republic and Slovakia Šipikal et al. (2013) have detected a substantial deadweight representing more

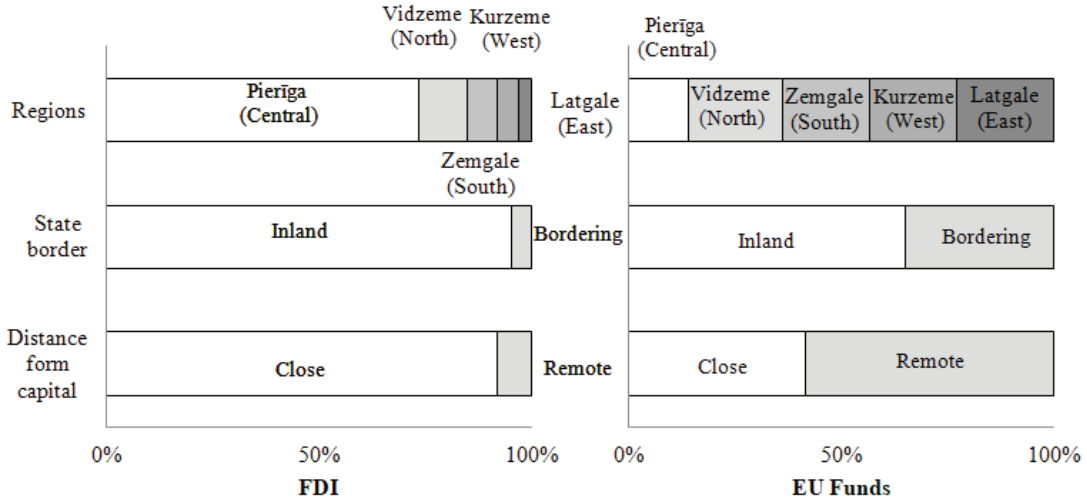

Figure 2. Distribution of aggregated FDI and EU funding, 2015-2019, by spatial characteristics.

than 35% of public subsidies. The activities within the measures designed for education and creation of job opportunities have lower deadweight effect than support for investments. The share of the support for investments in Latvian Rural Development Programme amounts to 46% of total public financing. Meanwhile, the support for infrastructure and knowledge transfer combined has only 14% share in total financing. However, as previously conducted evaluations suggest (Benga & Hāzners, 2016), there is no deadweight effect detected from farm modernization support measure which consumes the majority of investment support in the total public financing. Hence, the redistribution of public support by redirecting funding from investments to other activities can not be recommended as there are no investments which would have been made without programme support. Instead, the restructuring of funding less favourable areas in terms of FDI inflows with emphasis on infrastructure, human capital and other spatial determinants of FDI like manufacturing clusters has to be considered.

Conclusions

1. The FDI inflows in the host country brings economic benefits like increased capital flows, technology transfer, increased competition, favourable balance of payments, increased employment opportunities, improved access to global markets and improved standards of living. New products and services are often introduced.
2. The long-term risks arising with the FDI inflows are associated with possible capital outflows due to larger imported supplies. The adverse effects include also inequality created by disproportionate benefits for better educated and higher-skilled workers.
3. The main country level determinants of FDI inflows are economic stability, trade openness, policy liberalization, institutional qualities, market size, market growth rate, labour costs, geographical and cultural proximity, infrastructure, exchange rate and gross capital formation. In the EU, redistribution of funds towards the new member states has had a positive impact on the attractiveness of accession countries with respect to a location of FDI.
4. The main spatial determinants of FDI inflows within a single country are agglomeration factors such as vicinity of capital city and a few regional centres, especially driven by a good transport and communications infrastructure, distance from the economic centre of the country, skilled workforce, past experience with the foreign investors, industrial clustering and proximity of potential customers.
5. Due to a scarcity of research on the impact of the EU funding on the spatial distribution of FDI inflows within a single country, there is no evidence mentioned on the possible direct impact of the EU funding.
6. The research results bring the evidence that the direct impact of the EU funding on the FDI inflows in Latvian rural districts is substantial and statistically significant. At the same time, confounded ‘third factors’ might exist with a negative impact on FDI inflows.
7. While the spatial distribution of the FDI inflows in several regional aspects is rather uneven, the respective differences in the EU funding are less pronounced confirming the existence of negative ‘third factors’. Hence, the structure of the support by EU funds has to be revised to improve local potential determinants of the FDI inflows with emphasis on infrastructure, human capital and clusters.

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