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Determinants of Foreign Direct Investments in Bulgaria and Romania in the Context of Recent Economic Crisis

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Abstract *The objective of this paper is to select some relevant macroeconomic determinants for foreign direct investment (FDI) in Bulgaria and Romania since the start of the recent economic crisis (2008-2015). Even if the economic recession installed in 2009 in Romania, the foreign investors' decisions were influenced by the moment of global recession from 2008. A Bayesian approach was proposed, because of the small sample for the variables in analyzed period: FDI as percent of GDP, real GDP rate, unemployment rate, inflation rate, real interest rate, real effective exchange rate index (2010=100) and money demand (M2) as percent of GDP. The estimation results reflected that foreign investors in both countries were attracted by the increase in GDP from a year to another. On the other hand, for Bulgaria the inflation rate was the strongest determinant, indicating the economic stability of the country that made huge efforts in getting one digit inflation rate. In Romania, as expected, the foreign investors were searching for cheap labour force and the increase in unemployment rate attracted more FDI during the crisis period.*

Key words Foreign direct investments, economic crisis, Bayesian model, posterior distribution

JEL Codes: C51, C53, E22

1. Introduction

Many studies were dedicated to the identification of FDI determinants in various countries. A special attention was assigned to developing countries that saw in FDI an important source for achieving economic growth and the transition to market economy. On the basis of accelerating economic convergence as members of European Union (EU), Bulgaria and Romania were interested in attracting more foreign investors. Since 2005, Bulgaria knew a high increase in FDI, but this growth trend was interrupted in 2008 by the global economic crisis. In Romania, the period from 2005 to 2008 was characterized by fast increases in FDI, but this indicator declined only in 2009, the crisis effects being observed one year later compared to Bulgaria.

It is important to identify what variables were mostly followed by foreign investors in each country in order to take suitable policy decisions for attracting more FDI. An aspect is common for both countries: the foreign investors are directly interested in real GDP growth. For Bulgaria, inflation is important as it was a real problem till 2008, while Romania is seen as an important provider of cheap labour force.

After the presentation of main macroeconomic determinants of FDI in literature and specific factors for Romania and Bulgaria, the research presents the results of Bayesian estimations for identifying the most relevant determinants of FDI in both countries. The last section brings some conclusions, specifying the limits of the research and a future direction of study on this topic.

2. Literature review

There are few studies in literature that concentrated only on macroeconomic determinants of FDI. Boateng *et al.* (2015) analyzed macroeconomic determinants of FDI in case of Norway and made a review of macroeconomic factors that might influence the FDI in a host state: exchange rate, inflation rate, unemployment rate, money supply, interest rate, trade openness.

The literature on FDI determinants in Central and Eastern European countries (CEECs) consists in survey studies and econometric analyses. Most of the survey studies analyzed individual states, while the econometric approach was mostly applied for groups of countries. The econometric models were used for short time periods, which in the context of Frequent Econometrics, made the conclusions irrelevant. Therefore, as a novelty in literature, we proposed in this article Bayesian models that solve the problem of low volume samples.

In researched dedicated to CEECs, beside the traditional determinants from literature, transitional variables are considered. The traditional indicators used by Botric and Skuflic (2005) take into account aspects like efficiency (lower costs for trade, labour and production factors), resources (attractive business environment, good infrastructure, skilled labour resources, abundance in natural resources) and market seeking (market potential and size, GDP per capita and economic growth) in FDI placing in a host country (Simionescu, 2014). The variables related to transition process are divided into two main categories: transition variables (Botric and Skuflic, 2005; Brada *et al.*, 2006) and institutional variables (Altomonte, 2000),

Bevan *et al.*, 2004). All of them refer to evolution of transition process, implementation of the suitable reforms and the creation of institutions that correspond to market economy.

Some common motives were found in these studies for FDI in CEECs: aspects related to efficiency and market, openness of host state, the existence of free trade zones (Clausing and Dorobantu, 2005; Merlevede and Schoors, 2009). On the other hand, there are largely heterogeneous determinants related to quality of labour force, spatial location and macroeconomic variables (Kottaridi, 2004; Demekas *et al.*, 2005).

In general, the transitional variables had a high impact on FDI in most of the empirical studies for CEECs. Among these variables, we can give some examples: risk of host country (Merlevede and Schoors, 2009), evolution of privatization process (Brada *et al.*, 2006), reforms in banking sector and trade liberalization (Botric and Skuflic, 2005).

Most of the studies for CEECs refer to FDI determinants in the context of transition process, only few studies taking into account the global crisis effects on FDI determinants (Sakali, 2013; Dornean and Oanea, 2013; Jimborean and Kelber, 2014). Therefore, we will focus on the analysis of FDI determinants only in the period from the crisis starting.

For Bulgaria, the FDI determinants were mostly identified by surveys using questionnaires and interviews. At the beginning of the transition process, the foreign investors were not attracted by Bulgaria economic environment. Many issues were imputed to Bulgarian market: lack of macroeconomic stability, high level of corruption, political and legislative instability, high bureaucracy, uncertainty regarding market conditions, low GDP rates, high distance between Bulgaria and Western Europe countries, unattractive business environment, less skilled labour resources (Sakali, 2013).

The most important FDI determinants in Bulgaria, according to various researches from literature, proved to be:

- Low costs on labour market (Totev, 2005; Kalotay, 2008);
- Perspectives on market and economic growth (Marinova *et al.*, 2004; Bitzenis, 2006; Sakali, 2013);
- Skilled and highly motivated labour resources (Totev, 2005; Kalotay, 2008);
- Prospects for EU integration and distance relative to EU market (Kalotay, 2008; Bitzenis and Vlachos, 2010);
- Efforts for improving the business and economic environment (Totev, 2005; Kalotay, 2008);
- The economic relationship between Bulgaria and origin country of foreign investors (Totev, 2005).

An empirical study of Sakali (2013) based on panel data estimations showed that economic growth prospects are relevant for attracting foreign investors in Bulgaria. The skills of workforce gained ground in the last years, but traditional factors like labour force costs lost their importance.

In case of Romania, after it reached the maximum stock of FDI in 2008, this indicator decreased fastly in 2009 with 60% in the context of economic crisis. However, many economists, like Georgescu (2013), discussed this problem not only in the context of economic crisis. After considerable growth, FDI reach a level of saturation that might explain the decrease acceleration. The uncertainty in the prospects of growth and the failure of policies' implementation are factors that still discourage the potential foreign investors in Romania.

In Romania, the FDI are seen as an important factor in achieving the sustainable development objectives (Zaman, 2012; Simionescu, 2016). In this context, many studies analyzed the relationship between economic growth and FDI in Romania. The results obtained by Birsan and Buiga (2009), Ludosean (2012), Duhnea and Moraru (2013) and Carp and Popa (2013) indicated that economic growth is an important determinant of FDI. Moreover, Birsan and Burgu (2008) considered that before the crisis, market dimension and its potential was the most important factor of FDI, being followed by business liberalization, economic growth, and labour costs. Carp (2014) considered as determinants of FDI the following variables: unemployment rate, trade openness, inflation rate and GDP per capita. However, the proposed linear regression model was not valid and the time series was too short for a traditional estimation in the Frequent Econometrics framework. Therefore, our proposed Bayesian method is better to respond to this challenge.

A comparative study of Andrei (2011) revealed that CEECs received mostly FDI from European Union and Western Europe. However, a considerable gap was observed between Romania and the other emergent countries like Poland, Hungary, Czech Republic, and Slovakia when the transition process started in these countries. In the context of achieving economic convergence huge improvements were made by these states.

In the context of recent economic crisis, Zaman *et al.*, (2013) studied the role of FDI in ensuring economic growth in the Romanian regions. There are positive effects of FDI consisting in higher salaries, improvements in productivity, and a good transfer of high level technologies, high degree of propagation effects, and more skilled and motivated workforce). There are also negative effects of FDI consisting in a highest concentration of them in capital of Romania and other large towns, layoffs regarding privatization, a higher concurrence for internal goods and services, increase in unemployment level, more disparities regarding very skilled people and the unqualified ones. Using the Lorenz curve and coefficient of homogeneity, the authors showed that the high gaps between regions and Romanian counties in terms of FDI per capita during the economic crisis are caused by the high concentration of FDI in the region that includes the capital (Bucharest-Ifov region).

3. Bayesian models for explaining FDI

In this study, the FDI determinants in Romania and Bulgaria were identified using a Bayesian approach, which is the best solution for a short time period like crisis period (2008-2015). The database was provided by World Bank for the following variables:

- Foreign direct investment (FDI) as percent of GDP;
- Real GDP rate (%);
- Unemployment rate according to national estimates (%);
- Money demand (M2) as percent of GDP;
- Inflation rate (%);
- Real interest rate (%);
- Real effective exchange rate index (2010=100).

Some Bayesian simple linear regression models are built considering FDI as dependent variables and the rest of the variables as explanatory variables. The Bayesian approach supposes three steps:

- The specification of prior distribution for model's parameters (slope and constant);
- The estimation of likelihood function which is also met in Frequentist Econometrics;
- The determination of posterior distribution by combining the prior distribution with the likelihood function using Bayes's principle.

In our case, we selected a normal prior distribution for both coefficients, the average of the repartition being 0 and the variance being 1. A null average was chosen because in the context of global economic crisis we suppose that none of the foreign investors are interested in bringing capital in a developing country. Some of the foreign investors might keep their business, but the investments are lower. On the other hand, other investors might close their affair in the host country. All in all, these specific behaviours in crisis times made us to consider that, in average; there is an insignificant impact of macroeconomic determinants on FDI. We are not very sure about this situation and we considered the uncertainty by giving a value equaled to 1 for the distribution's variance.

We stated a normal likelihood function of variance equaled to 1. The Random Walk metropolis Hasting algorithm was applied for a number of 12 500 iterations. The first 2 500 iterations were dropped, because they were only considered for adaptation, while the rest of the iterations were used in estimation.

The normal prior distribution is normal conjugated. So, under a normal prior distribution and a normal likelihood function, we will have a normal posterior distribution.

Deviance information criterion (DIC) is seldom used in selecting the best model when the same dependent variable is used. DIC is a generalization of Akaike information criterion and it is valid when we have a normal multivariate posterior distribution. The model with the lower DIC is better. However, when the sample is very small, the results might be cautiously considered. The data were processing using Stata 14.

Table 1. Estimations for Bayesian linear regressions for FDI in Bulgaria

Model	Coefficient	Posterior mean	Posterior standard deviation	Deviance information criterion (DIC)
M1_bg	Growth_bg	1.071	0.132	178.5889
	Constant	4.223	0.348	
M2_bg	unemployment_bg	-0.219	0.0864	200.3514
	Constant	7.110	0.840	
M3_bg	M2_bg	0.0341	0.0132	241.85
	Constant	2.906	0.911	
M4_bg	inflation_bg	1.191	0.085	63.802
	Constant	2.001	0.400	
M5_bg	interest_bg	-0.372	0.098	188.619
	Constant	7.443	0.685	
M6_bg	exchange_bg	0.054	0.010	229.0883
	Constant	0.195	0.981	

In Bulgaria, inflation had the highest impact of FDI inflows. However, there is a positive correlation between inflation and FDI. In general, inflation reflects the economic stability of a state. In case of high inflation rates, the foreign investors are not eager to invest in that country. Contrary to the expectations, in the crisis period, the foreign investors came to Bulgaria even if the inflation increased. This situation has a plausible explanation. After EU accession, the inflation dropped in Bulgaria.

In 2008, Bulgaria had a high inflation of 12.35% that quickly dropped to 2.75% in 2009. Even if the inflation increased since 2009, the growth was low and the values of two digits were not registered since then. Moreover, in 2014 and 2015 Bulgaria registered deflation. So, these are arguments for supporting the strong impact of inflation in Bulgaria of FDI.

The increase in Bulgarian GDP attracted more investors, but the influence of this variable is lower than inflation impact. A negative relationship was observed between FDI and real interest rate. The unemployment had a negative impact on FDI. When the unemployment rate is high, more foreign investors come in order to find a cheaper labour force, but in this case the unemployment increase did not attract more investors. Real effective exchange rate index (2010=100) and money demand (M2) had a positive, but insignificant effect on FDI in Bulgaria.

When the real GDP increased in average with one percent, the FDI grew with 1.07 percentage points. On the other hand, when inflation rate increased with one percent, the FDI grew in average with 1.19 percentage points.

Table 2. Estimations for Bayesian linear regressions for FDI in Romania

Model	Coefficient	Posterior mean	Posterior standard deviation	Deviance information criterion (DIC)
M1_ro	Growth_ro	0.199	0.085	35.68015
	Constant	1.973	0.355	
M2_ro	unemployment_ro	0.2381	0.15326	40.21416
	Constant	0.7952	0.96612	
M3_ro	M2_ro	0.044	0.025	40.40247
	Constant	0.722	0.933	
M4_ro	inflation_ro	0.015	0.009	40.42297
	Constant	0.750	0.973	
M5_ro	interest_ro	-0.110	0.087	34.52706
	Constant	2.894	0.606	
M6_ro	exchange_ro	0.027	0.010	36.64574
	Constant	-0.246	0.980	

In Romania, money demand M2, inflation rate and real effective exchange rate index (2010=100) had a positive, but insignificant effect on FDI. It seems that real interest rate had a negative effect on FDI, the increase in real interest rate discouraging the foreign investors. The increase in unemployment rate during the crisis attracted more investors. As expected, when the unemployment rate is high, more foreign investors come in order to find a cheaper labour force. In Romania, the higher rates for GDP encouraged the foreign investors. When unemployment rate increased with one percent, the FDI grew in average with almost 0.24 percentage points during 2008-2015. When real GDP rate increased with one percent, the FDI grew in average with almost 0.2 percentage points during 2008-2015.

4. Conclusions

All in all, the results of the research figured out that in Romania and Bulgaria, similar countries as development level that entered EU in 2007, the increase in real GDP attracted more foreign investors during the recent economic crisis. On the other hand, inflation had the biggest impact on foreign investors' decisions in Bulgaria, while for Romania its influence on FDI is not significant. As expected, higher unemployment rates in Romania attracted more investors searching for cheaper labour force, while in Bulgaria even if the unemployment rate grew, the foreign investors were not encouraged by this reason to invest in Bulgaria. Our results are in accordance with previous studies, like that of Sakali (2013), who showed that in Bulgaria traditional determinants like cost of workforce lost their importance. Moreover, Sakali (2013) and Bitzenis (2006) emphasized that growth perspectives are very important for foreign investors, determinant that was also identified in our research. For Romania, the economic growth is particularly followed by investors, a relationship of causality being identified also by Ludosean (2012) and Carp and Popa (2013).

The limit of the research is given by the lack of a threshold for selecting the relevant determinants. There is a subjective appreciation of the relationship intensity. Therefore, in a future research, the algorithm for stochastic search variable selection could be used to identify the most relevant FDI determinants for both countries.

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