

**DETERMINANTS OF INCOMING CROSS-BORDER M&A: EVIDENCE  
FROM EUROPEAN TRANSITION ECONOMIES**

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## **1. INTRODUCTION**

A growing volatility and complexity in today's business environment forces companies to reduce their vulnerability to adverse changes and, similar to rules of nature, increasing size of a company is necessary to enhance its market competitiveness. Therefore companies often seek methods to grow, especially in its external form, i.e. by mergers and acquisitions (M&A), since it provides more rapid changes when compared with internal growth opportunities. There are numerous classifications of motives for undertaking M&A activity yet Tichy's<sup>1</sup> will be presented since it provides a broad perspective on M&A. He organized reasons and goals for undertaking M&A in five groups: (1) exploitation of synergies of growth opportunities, (2) managers' interest in acquisitions, (3) dispersion of risk, (4) strengthening of market power and (5) reaction to changes in the business environment. M&A are considered to be a form of investment and the deal can involve local and/or foreign companies since companies are forced to keep up with both local and foreign competition. When a company decides to place its products in foreign markets it has a choice between export and local production through FDI. If it decides to produce locally a company can build their own facilities (greenfield investment) or acquire an existing enterprise (cross-border merger and acquisition)<sup>2</sup>. But in order to profitably expand its business in foreign markets a company should have a competitive advantage over local rivals; otherwise, local companies would crowd it out of the market<sup>3</sup>.

In contrast to domestic M&A, cross-border M&A imply a growth oriented towards foreign markets, thus granting access to business opportunities which domestic enterprises have not yet recognized or which they are not able to exploit. Additionally, cross-border M&A act as a tool of geographical diversification, consequently helping to overcome the risk of home country-specific shocks. Neto, Brandão and Cerqueira<sup>4</sup> systematized factors that influence the choice of a cross border M&A as a mode of entry into a foreign market as follows: (1) firm-level factors such as multinational experience; local experience; product diversity and international strategy; (2) industry-level factors such as technological intensity, advertising intensity and sales force intensity; and (3) country-level factors such as market size and growth in the host country, cultural differences between the home and host countries, and the specific culture of the acquiring firm's home country (namely in terms of uncertainty avoidance and risk propensity). Firm-level and industry-level factors could also be applied to domestic M&A, yet country-level factors are peculiarity of cross-border M&A.

Foreign capital in the form of M&A can help domestic companies to overcome constraints such as: (1) difficult and adverse funding sources, (2) outdated technology and business organization, (3) saturated and/or insufficient domestic market, (4) a slow adjustment to market conditions etc. On

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<sup>1</sup> For more comprehensive elaboration of theories explaining why companies decide to undertake M&A cf. Tichy (2001), p. 368.

<sup>2</sup> Nocke and Yeaple (2007), p. 337.

<sup>3</sup> Focarelli and Pozzolo (2001), p. 2306.

<sup>4</sup> Neto, Brandão and Cerqueira (2008), p. 4.

the other hand, companies bidding in cross-border M&As do not necessarily have long-term goals in mind, i.e. short term speculative motives are also considered to be a reason to undertake M&A. Negative influence of cross-border M&A on target companies can be manifested in terms of: (1) „asset stripping“, (2) reduction of employment and lowering wages, (3) poor business results caused by insufficiently prepared process of integration of different companies etc. Yet, effects of cross-border M&A on companies and their home countries can be dichotomous and final outcome can not be evaluated without considering the option in which a company would have gone out of business without being involved in M&A.

It is believed that foreign direct investment can have important positive effects on development either through direct or indirect channel such as technology transfer, knowledge spill over and learning-by-watching. Therefore, policy makers in most countries try to develop incentives to attract foreign investment and at the same time, to encourage domestic firms to invest abroad on the purpose of developing a target industry.<sup>5</sup> Positive impact of FDI (both inflow and outflow) is expected for companies involved and for their countries. However, each investment involves risks and FDI are a form of investment hence a caution is necessary when evaluating impact of FDI. Cross-border M&A may involve numerous risks<sup>6</sup> yet sometimes, like in cases of financial and economic crisis, cross-border M&A may play a role that FDI (its greenfield form) may not be able to play. If companies are facing intense pressures of competition and do not have access to financial and non-financial resources that enable them to survive the impacts of competition at the time of the crisis in the economy, cross-border M&A can relatively rapid restructure existing capacity and increase the competitiveness of enterprises, and at the same time increase the competitiveness of the whole economy<sup>7</sup>.

The impact of M&A on business activity of an enterprise is a subject of numerous researches with results indicating both positive and negative influence of M&A on business activity of involved companies. However, mentioned issue is not the issues of this paper and it is assumed that business subject act rationally while dealing with M&A hence M&A are regarded with affection, as well as their cross-border version.

This paper is an upgrade of previous work on cross-border M&A<sup>8</sup> and it aims to determine variables which affect the value of cross-border M&A in transitional European countries when they are regarded as host countries. Analysis of aggregate value of cross-border M&A is important for both investing and target countries, and for involved companies. European transitional countries are in the process of integration into the world market. In order to increase its competitiveness and to adjust their

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<sup>5</sup> Hyun and Kim (2007), p. 7.

<sup>6</sup> Numerous researches emphasize possible negative impact of M&A (and cross-border M&A as well) on involved companies. Some of the most commonly mentioned consequences are decrease in employment, asset stripping and slower upgrading of domestic technological capacity. For more details on the subject cf. Gugler and Burcin Yurtoglu (2004), p. 481-502.

<sup>7</sup> Nocke and Yeaple (2007), p. 357.

<sup>8</sup> Cf. Višić, Tomas and Škrabić (2009).

activities to rules in a global market these countries need to generate and/or adjust its legislation, policies and regulations that promote private sector development. However, sound decisions can not be made if one doesn't know the nature of its problems. Therefore our goal is to find are there any particularities regarding determinants of incoming cross-border M&A in European transition economies.

The paper proceeds as follows. Section 2 provides an overview of the relevant literature. Section 3 describes data, model and estimation procedure; also it presents the main results of the study. The conclusion is presented in section 4.

## **2. THEORETICAL BACKGROUND**

Throughout the twentieth century M&A activities have experienced expansion and today are becoming even more interesting because of the growing interest of foreign investors towards transition countries. Most of the studies on the determinants of M&A use microeconomic perspective and scientific research on macroeconomic determinants of M&A directed to developing countries is scarce; especially when it comes to providing empirical evidence on determinates of cross-border M&A directed to European transitional countries.

Aguiar and Gopinath<sup>9</sup> analyzed relation between financial system of a country and its M&A activity on example of East Asian countries and came to conclusion that liquidity crunch, faced by domestic firms as a result of the East Asia crisis, increased M&A activity. Kamaly<sup>10</sup> on the other hand analyzed the cross-border M&As in sixty developing target countries in order to determine its trends and macroeconomic determinants. Di Giovanni<sup>11</sup> used panel data set of cross-border M&A to estimate the importance of several macroeconomic, financial and institutional variables in order to explain flows of international M&A. Unlike di Giovanni, Rossi and Volpin<sup>12</sup> analysed determinants of international and domestic M&A focusing mainly on the role of laws and the regulation across countries. Globerman and Shapiro<sup>13</sup> evaluated which variables are statistically significant while determining M&A and FDI inflows and outflows. Also, they analysed whether the determinants of international M&A activity are similar to the determinants of other forms of FDI, e.g. investments. Their work used as guidance for the research of Neto, Brandão and Cerqueira<sup>14</sup> who adopted their study as a basis and extended their analysis to the location-specific determinants of investments using panel data. Hyun and Kim<sup>15</sup> investigated both home and host country factors that may play and important role in determining the size and direction of M&A flows.

Although scientists have perceived possible positive impact of cross-border M&As on economies of involved countries (e.g. Tomić<sup>16</sup>) cross-border M&As in European developing countries are yet to be explored. Determining features of cross-border M&A involving European transitional countries provides wide research possibilities. This research will hopefully help to understand some of

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<sup>9</sup> Aguiar and Gopinath (2005), p. 451.

<sup>10</sup> Kamaly (2007), p. 19.

<sup>11</sup> di Giovanni (2005), p. 129.

<sup>12</sup> Rossi and Volpin (2004), p. 278.

<sup>13</sup> Globerman and Shapiro (2004), p. 3.

<sup>14</sup> Neto, Brandão and Cerqueira (2008), p. 3.

<sup>15</sup> Hyun and Kim (2007), p. 10.

<sup>16</sup> Tomić (2009), p. 140 has recognized the importance and potential of cross-border M&A in the function of fostering the development of the country's economy (he used Croatia as an example) and in his work he points to the results of research made by Eurostat on EU countries, with the emphasis on new members: Hungary, Poland, Czech Republic, Slovakia, Estonia, Latvia, Lithuania, Romania and Bulgaria, which showed that the companies of new EU member states, which are under foreign control, either directly or indirectly, are fare more efficient and productive than those under domestic ownership

their distinctive features with emphasis on determining trend and determinants of incoming cross-border M&As in European transitional countries.

### **3. DATA, MODEL AND ESTIMATION PROCEDURE**

This section will give a brief presentation of the data used, designed models, results of research and review on the methodology.

#### **3.1. Data description and trend**

The aim of this paper is to define determinants of the value of incoming cross-border M&A on example of transition European countries. The lack of empirical research on cross-border M&A outside the US and developed European territory, along with the shortcomings in the available data, either because of their imperfections, inconsistency or financial unavailability<sup>17</sup>, make this paper liable to justified criticism. Data on the value of cross-border M&A are taken from the database of the United Nations Conference on Trade and Development (UNCTAD) entitled The Cross-border mergers and acquisitions database, while all other data are taken from the Word Bank bases named World Bank Indicator 2008 and The Worldwide Governance Indicators. Data on private credit to GDP ratio are obtained from papers compiled by Beck et al. reachable on the web page of the Word Bank<sup>18</sup>.

Following host countries have been taken for the analysis of the value of cross-border M&As: Bulgaria, Czech Republic, Estonia, Croatia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovakia and Slovenia. An observation period is between 1994 and 2008. There is no dispute that these countries are not all on the same level of economic development, yet they could be regarded under a common denominator of European transition countries as perspective potential areas for foreign investment.

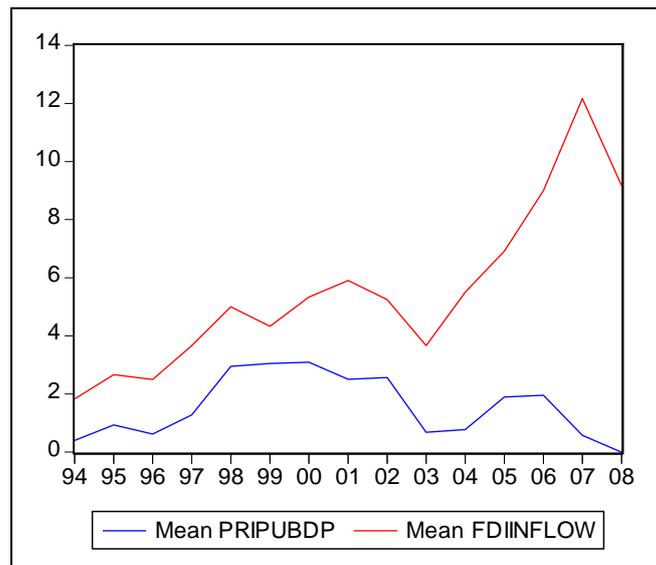
The main object of this research is the value of the incoming cross-border M&A in European transition countries, yet before the presentation of the econometric model trend of FDI and M&A movement in the aggregate form for all respective countries will be presented. Figure 1 shows that the portion of FDI in GDP grew over years, and follows trend of general economic activity such as global recession. Since a recession is a business cycle contraction one could assume that this trend will change and the FDI will rise again in their aggregate value and as a portion of GDP.

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<sup>17</sup> The authors are informed about the existence of quality data source called SDC Platinum Worldwide Mergers and Acquisitions Database. While working on this paper, above mentioned data base was not available to authors.

<sup>18</sup> Beck et al. (1999), source: web page, cf. Reference Literature.

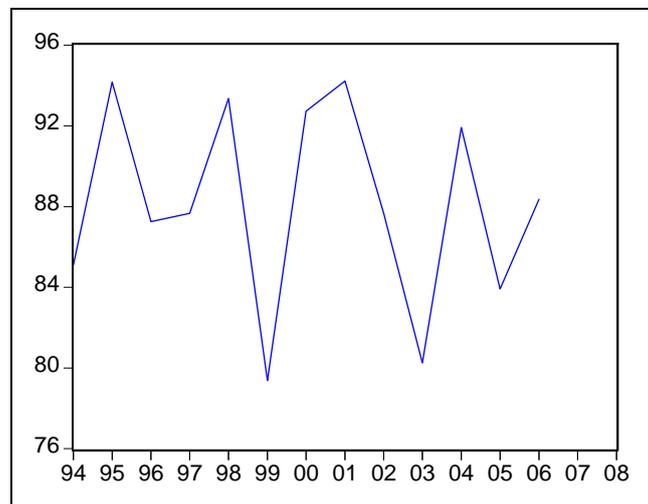
Figure 1. Portion of FDI in GDP



Source: Compiled by the authors.

Both incoming and outgoing investments are important for country's economy. However, only incoming investments have been analyzed in this research since results of the research presented in Figure 2 show that the portion of incoming FDI for respective countries is significantly higher than outgoing one.

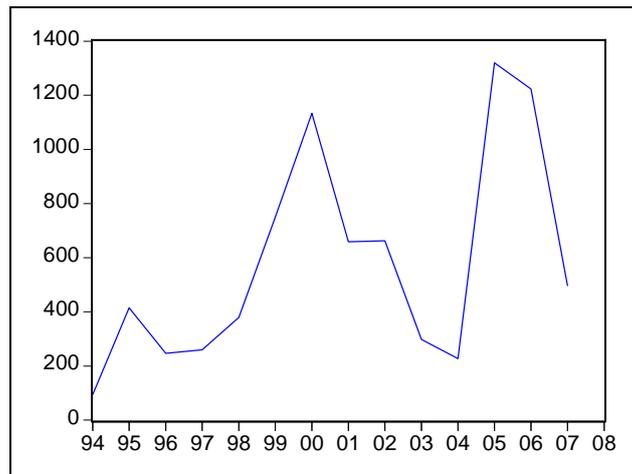
Figure 2. Portion of FDI inflow in total FDI value



Source: Compiled by the authors.

Since this analysis is made on chosen European transition countries it is interesting to compare the trend of value of cross-border M&A in these countries to global trend of cross-border M&A.

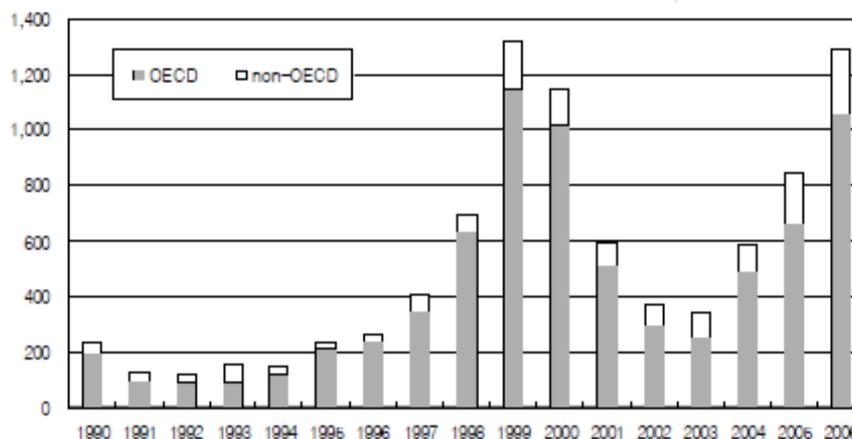
Figure 3. Mean of value of cross-border M&A<sup>19</sup>



Source: Compiled by the authors.

When comparing trend of cross-border M&A presented in Figure 3 and Figure 4 it is obvious that cross-border M&A in European transition countries follow pattern of global cross-border M&A. These trends are both wave shaped with sharp peaks around year 2000 and 2006. Shen offered explanation for the wave shape movement of M&A in following reasons: government encouragement and deregulation policy, business cycle effects, oligopolistic reaction behaviour, stock market booms etc.<sup>20</sup> His elaboration of the issue properly explains the movement of specified cross-border M&A because these countries are mostly all in different stages of the process of adjustment to capitalist-flavoured globalization in world market.

Figure 4. Cross-border M&A Trends



Source: Hyun, H-J. and Kim, H. H. (2007), i.e. Thomson One Banker. (Unit: US\$ billion)

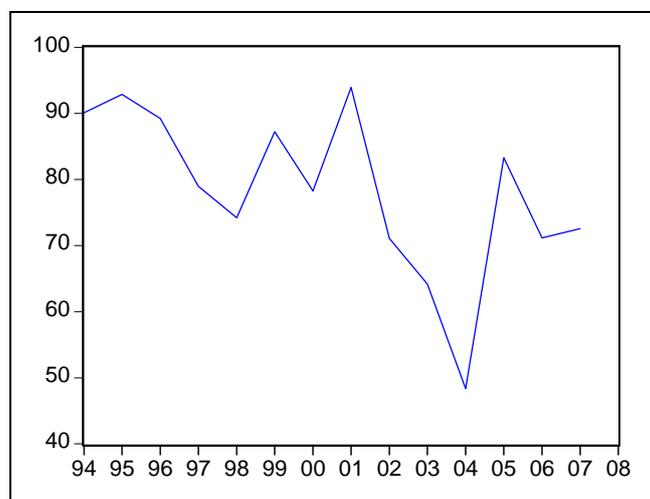
Since the accent of this study is on the value of incoming cross-border M&A it is necessary to present its trend. As presented in Figure 5, for respective countries incoming cross-border M&A are

<sup>19</sup> Value is given in millions of US dollars for a period between 1994 and 2007.

<sup>20</sup> Shen (2008), p. 1.

more significant than the outgoing one. Its portion in aggregate value of cross-border M&A is high and therefore it makes the focus of the study more reasonable.

Figure 5. Portion of value of incoming cross-border M&A in total value of cross-border M&A



Source: Compiled by the authors.

Table 1 provides descriptive statistics for each variable which includes mean, standard deviation, minimum and maximum values and number of observations. Pair wise correlations matrix with correlation coefficients between independent variables ranging from -0.003 to 0.8846 is presented in Table 2. Most of the correlation coefficients show weak correlation between variables. Yet, correlation between variables of governance (control of corruption and rule of law) and the GDP per capita is relatively high. Therefore, additional panel models have been introduced containing variable GDP growth instead of GDP per capita. To avoid the problem of multicollinearity variables of governance (control of corruption and rule of law) have been used separately in presented panel models.

Table 1. Descriptive statistics

	Value of M&A to GDP	GDP per capita	GDP growth	Inflation	Interest rate spread	Private credit to GDP	Stock Market Capitalization to GDP	Control of Corruption	Rule of Law
<b>Mean</b>	1.6507	4482.661	4.262	82.227	9.9435	30.504	17.027	0.1885	0.3457
<b>Median</b>	0.6026	4257.000	5	88	6	27.758	13.086	0.2849	0.4173
<b>Maximum</b>	16.403	13662.00	12	135	216	82.787	128.67	1.0994	1.1081
<b>Minimum</b>	0	1352.000	-10	1	-1	4.4392	0.0192	-1.0594	-0.6298
<b>Std. Dev.</b>	2.5851	2496.979	3.5555	26.135	20.751	16.426	15.687	0.5346	0.4541
<b>Observations</b>	159	174	180	180	177	166	172	156	156

Source: Compiled by the authors.

Table 2. Pair wise correlations matrix

	Value of M&A to GDP	GDP per capita	GDP growth	Inflation	Interest rate spread	Private credit to GDP	Stock Market Capitalization to GDP	Control of Corruption	Role of Law
Value of M&A to GDP	1								
GDP per capita	-0.1583	1							
GDP growth	-0.1450	0.1647	1						
Inflation	0.0917	0.3400	0.3062	1					
Interest rate spread	0.0300	-0.2587	-0.4323	-0.3987	1				
Private credit to GDP	-0.0651	0.4795	0.1349	0.3347	-0.0850	1			
Stock Market Capitalization to GDP	-0.0742	0.4229	0.2464	0.4315	-0.1984	0.4671	1		
Control of Corruption	-0.0579	0.7442	0.2247	0.2382	-0.3058	0.4277	0.3253	1	
Rule of Law	-0.1571	0.7262	0.1334	0.1247	-0.2348	0.3533	0.2513	0.8846	1

Source: Compiled by the authors.

### 3.2. Empirical methodology

Many economic relationships are dynamic in their nature so it is expected that current behavior depends upon past behaviour. Therefore describing economic relations often requires estimation of dynamic panel model. These dynamic relations are characterized by the presence of lagged dependent variable among the regressors:

$$y_{it} = \mu + \gamma y_{i,t-1} + \beta_1 x_{it1} + \beta_2 x_{it2} + \dots + \beta_K x_{itK} + \alpha_i + \varepsilon_{it}; \quad i = 1, \dots, N, t = 1, \dots, T \quad (1)$$

where  $i$  denoting individual and time  $t$ ,  $\mu$  is an intercept,  $\gamma$  is a parameter of lagged dependent variable and  $\beta_1, \beta_2, \dots, \beta_K$  are the parameters of exogenous variables. It is assumed that  $\varepsilon_{it}$  are  $IID(0, \sigma_\varepsilon^2)$ ; identically and independently distributed error terms. Unobservable individual-specific effect  $\alpha_i$  is time invariant and it accounts for any individual-specific effect that is not included in the regression. If lagged dependent variable  $y_{i,t-1}$  is included in model the variable is correlated with individual-specific effect  $\alpha_i$ . That renders the OLS estimator biased and inconsistent even if  $\varepsilon_{it}$  are

not correlated. As a result, a new method for estimation was required. Arellano and Bond (1991) proposed new estimator for the dynamic panel model. They argued that additional instrument must be included in dynamic panel data model<sup>21</sup> are first to consider panel auto regression model without exogenous variables:

$$y_{it} = \gamma y_{i,t-1} + \alpha_i + \varepsilon_{it}; \quad i = 1, \dots, N, t = 1, \dots, T, \quad (2)$$

where  $\varepsilon_{it}$  are  $IID(0, \sigma_\varepsilon^2)$ . In model (2), lagged dependent variable  $y_{i,t-1}$  and individual-specific effect  $\alpha_i$  are correlated. To overcome the correlation problem the first alterations of the equation (3) are needed:

$$y_{it} - y_{i,t-1} = \gamma (y_{i,t-1} - y_{i,t-2}) + (\varepsilon_{it} - \varepsilon_{i,t-1}); \quad i = 1, \dots, N, t = 1, \dots, T \quad (3)$$

OLS estimator of  $\gamma$  in equation (3) is inconsistent, even when  $T \rightarrow \infty$ , and  $(\varepsilon_{it} - \varepsilon_{i,t-1})$  follows MA(1) process. This inconsistency is a result of correlation between  $y_{i,t-1}$  and  $\varepsilon_{i,t-1}$ . Equation (3) for time period  $t = 3$  is defined:

$$y_{i3} - y_{i2} = \gamma (y_{i2} - y_{i1}) + (\varepsilon_{i3} - \varepsilon_{i2}); \quad i = 1, \dots, N \quad (4)$$

For  $t = 3$ ,  $y_{i1}$  is a valid instrument for  $(y_{i2} - y_{i1})$ . Moreover,  $y_{i1}$  is highly correlated with  $(y_{i2} - y_{i1})$  and it is not correlated with  $(\varepsilon_{i3} - \varepsilon_{i2})$ , as long as  $\varepsilon_{it}$  are not correlated. If this procedure is continued for  $t = 4, 5, \dots, T$ , for period  $t = T$ ,  $(y_{i1}, y_{i2}, \dots, y_{i,T-2})$  are valid instruments for  $y_{i,T}$ . Arellano and Bond suggested that the list of instruments can be extended by exploiting additional moment conditions. It is well known that imposing more moment conditions increases the efficiency of estimators<sup>22</sup>.

Number of moment conditions varies with  $T$ . For  $t = T$ , there are  $T - 2$  moment conditions and  $T - 2$  valid instruments.<sup>23</sup>

$$E\left\{(\varepsilon_{iT} - \varepsilon_{i,T-1})y_{i1}\right\} = 0, E\left\{(\varepsilon_{iT} - \varepsilon_{i,T-1})y_{i,2}\right\} = 0, \dots, E\left\{(\varepsilon_{iT} - \varepsilon_{i,T-1})y_{i,T-2}\right\} = 0. \quad (5)$$

Dynamic panel model which includes  $K$  exogenous variables can be written in matrix form:

$$y_{it} = \mu + \gamma y_{i,t-1} + x'_{it} \beta + \alpha_i + \varepsilon_{it} = 1, \dots, N, t = 1, \dots, T \quad (6)$$

where  $\beta$  is a vector of parameters  $\beta_1, \dots, \beta_K$  and  $x'_{it}$  is a matrix of exogenous variables  $x_{it1}, x_{it2}, \dots, x_{itK}$ . Assuming that exogenous variables are predetermined which means that all  $x_{it1}, x_{it2}, \dots, x_{itK}$  for  $t = 1, \dots, s$  are not correlated with  $\varepsilon_{is}$  in (6), valid instruments for  $t = 3$  are

<sup>21</sup> Arellano and Bond (1991), p. 277 – 297.

<sup>22</sup> Verbeek (2005), p. 341.

<sup>23</sup> Cf. Arellano and Bond (1991) for entire proof of estimators.

$y_{it}$   $x'_{it}$   $x'_{i2}$ , for  $t = 4$  valid instruments are  $y_{i1}$   $y_{i2}$   $x'_{i1}$   $x'_{i2}$   $x'_{i3}$  and if this procedure is continued for  $t = T$  valid instruments are  $y_{i1}, y_{i2}, \dots, y_{i, T-2}, x'_{i1}, x'_{i2}, \dots, x'_{i, T-1}$ .

Validity of chosen instruments for parameters estimation can be tested using Sargan test<sup>24</sup>. Therefore, Sargan test is used for testing over identification of the restrictions. If a null hypothesis is accepted by Sargan test it means that all chosen instruments are valid, i.e. dynamic panel model is adequately specified. Namely, optimal number of instruments must be chosen to accept the null hypothesis which reduces estimation bias.

Two key tests for serial correlation are derived by Arellano and Bond: test for the first-order serial correlation (usually labelled  $m_1$ ) and test for the second-order serial correlation in differenced residuals (usually labelled  $m_2$ ). The first-order autocorrelation in the differenced residuals does not imply that the estimates are inconsistent<sup>25</sup>. However, the second-order autocorrelation would imply that the estimates are inconsistent.

Two step Arellano and Bond GMM estimator is used for model estimation because one step estimation assumes the error terms to be independent and homoskedastic across countries and over time. Two step estimator relaxes the assumption of independence and homoscedasticity by using the residuals obtained from the first step estimation to construct a consistent estimate of the variance-covariance matrix. Thus, when the error term  $\varepsilon_{it}$  is heteroskedastic the two step estimator is more efficient.<sup>26</sup>

Arellano Bond estimator is not a good estimator for a dynamic panel when value of autoregressive parameter  $\alpha$  increases towards unit. In that case differenced values are weak correlated with lagged levels of this variable. This results in weak instruments in the context of Arellano Bond estimator. Weak instruments could cause large finite-sample biases when using Arellano Bond procedure to estimate autoregressive models for moderately persistent series from moderately short panels.<sup>27</sup>

Blundell and Bond<sup>28</sup> proposed improvement of Arellano Bond estimator. That approach imposes an additional restriction on initial conditions process, under which all available the moment conditions available can be exploited by a linear GMM estimator in system of first differenced and levels equations. System GMM estimator can improve performance of usual Arellano Bond estimator when the autoregressive parameter is moderately high and number of time-series observations is moderately small.

<sup>24</sup> Huang (2006), p. 18.

<sup>25</sup> Arellano and Bond (1991), p. 282.

<sup>26</sup> Cole, Moshirian and Wu (2008), p.1000.

<sup>27</sup> Blundell and Bond (1999), p.1.

<sup>28</sup> Blundell and Bond (1998).

For the econometric model (18) Arellano Bond estimator is good because all values of lagged dependent variable are less than 0.31. Further, system GMM is not appropriate to use with dataset with small number of countries such as in this research where number of countries is twelve.

### 3.3. Model

Following scarce sources of empirical studies that attempt to examine cross-border M&A this paper provides a model that is an upgrading of a model presented in previous paper.<sup>29</sup> Previous model included following variables: (1) GDP per capita, (2) inflation rate, (3) trade openness, (4) interest rate spread and three indicators of financial development: (1) stock market capitalization to GDP percentage, (2) stock trade total value to GDP and (3) private credit to GDP. This model, as well, aims to explore determinants of cross-border M&A in their aggregate value and it will provide additional variables, along with elimination of some variables.

Value of M&A to GDP ratio of a country is considered to be the dependent variable, observed during fourteen years. To make sure that the endogenous variable is stationary and second to control for the size of the target country, ratio of M&A to GDP is used instead of simply the aggregate value of M&A.<sup>30</sup> Taking into consideration the first order autoregressive behaviour<sup>31</sup> of the total value of M&A to GDP dynamic panel model is specified and given by the following equation:

$$y_{it} = \alpha + \gamma y_{i,t-a} + x'_{it} \beta + \varepsilon_{it} \quad (7)$$

It is assumed that  $\varepsilon_{it}$  are  $IID(0, \sigma_\varepsilon^2)$ ; identically and independently distributed error terms where dependent variable  $y_{it}$  is ratio M&A to GDP,  $y_{i,t-1}$  is a lagged dependent variable,  $x'_{it}$  is  $K \times 1$  matrix of explanatory variables ( $K$ -total number of explanatory variables)  $\beta = [\beta_1, \beta_2, \dots, \beta_K]^T$  is vector  $K \times 1$  of all coefficients of independent variables. Thus, all the  $\beta_1, \beta_2, \dots, \beta_K$  coefficients represent short-run effects. The long-run<sup>32</sup> effect can be derived by dividing each of betas by  $1 - \gamma$ <sup>33</sup>. The list of explanatory variables is divided into three groups and includes:

(1) Macroeconomic variables:

- GDP per capita (converted US dollars at constant 2000)
- GDP growth (percentage)
- Inflation rate (Consumer Price Index ,CPI)
- Interest rate spread (lending rate minus deposit rate)

<sup>29</sup> Višić, Tomas and Škrabić (2009), p. 274.

<sup>30</sup> Decision to use value of M&A to GDP ratio has theoretical anchorage in Kamaly (2007), p. 22.

<sup>31</sup> Corresponding static models have also been estimated: a model with fixed effect model and random effect. Results of the performed Watson test showed existence of first-order autocorrelation among residuals. In order to eliminate the problem of autocorrelation appropriate dynamic models are being estimated. The results can be obtained on request.

<sup>32</sup> Long run effect can be derived only if  $|\gamma| < 1$ .

<sup>33</sup> Baltagi et al. (2009), p. 287.

(2) Two indicators of financial development are used:

- Private credit to GDP (percentage) or credit provided to private sector by banks and other financial institutions (measure of activity of financial sector (banking sector))
- Stock market capitalization to GDP percentage (measure of size of stock market)<sup>34</sup>

(3) Governance indicators<sup>35</sup>:

- Rule of Law (capturing perception of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence)
- Control of Corruption (capturing perception of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests).

This study excluded following indicators that have been used in former research<sup>36</sup> as independent variables: (1) openness and (2) stock trade total value to GDP and added two governance indicators. (1) rule of law and (2) control of corruption. Openness had statistically significant yet quantitatively minimal effect on M&A which is consistent with the results of the analysis Kamaly<sup>37</sup> performed. Hence, due to its lack of robust to different model specifications this openness has been excluded from this panel analysis. Stock trade total value to GDP appeared to have negative influence on endogenous variable and it was not statistically significant and therefore has not been included in panel models.<sup>38</sup> Chosen countries are transitional economies still dealing with numerous problems concerning governance, institution organization etc. and at the same time are far from transition countries which are not able to even receive investments in form of M&A. Therefore, new variables concerning governance have been included while exploring determinants of incoming cross-border M&A. World Bank analyses following governance indicators: (1) voice and accountability, (2) political stability and absence of violence/terrorism, (3) government effectiveness, (4) regulatory quality, (5) rule of law and (6) control of corruption. Unlike political stability and absence of violence, rule of law and regulatory quality control of corruption appeared to be statistically significant aggregate governance indicators. Due to very high value of correlation between four mentioned variables only rule of law and control of corruption have been included in model.

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<sup>34</sup> Previous research included lagged value of this variable, but due to its volatility over time variable has been changed.

<sup>35</sup> The indicators are constructed using an unobserved component methodology described in detail in the paper. The six governance indicators are measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better governance outcomes. Cf. Kaufmann, D., Kraay, A. and Mastruzzi, M. (2009).

<sup>36</sup> Višić, Tomas and Škrabić (2009).

<sup>37</sup> Kamaly (2007), p. 24.

<sup>38</sup> More detailed explanation of results on this variable and its implication can be found in Kamaly (2007), p. 26 and Višić, Tomas and Škrabić (2009), p. 276-277.

Ten dynamic panel models with one lag of dependent variable have been estimated with one lag of dependent variable and two-step Arellano and Bond GMM estimator is used for model estimation equation (7). All models are estimated using Arellano and Bond dynamic panel GMM estimations using a maximum of three lags of dependent variable for use as instruments. These models are divided into two groups. Each of the ten designed models as independent variables use lagged M&A to GDP, inflation, interest rate spread and they vary combinations of governance and financial development indicators. However, models are dividend into two groups depending whether they use lagged GDP per capita or less conventional measure as lagged GDP growth as an indicator of economic growth of a country. Empirical results of estimated panel models containing GD per capita are given in Table 3 followed by a Table 4 containing five panel models with GDP growth.

Table 3. Dynamic panel models

Explanatory Variables	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5
$\alpha$	-0,9191*** (0,3135)	-2,0206*** (0,6246)	-1,7301* (0,8929)	-0,5646*** (0,2185)	-1,6929*** (0,6325)
Lagged M&A to GDP	0,2664*** (0,0614)	0,2269*** (0,0753)	0,2383*** (0,0730)	0,1617*** (0,0432)	0,1020*** (0,0504)
Lagged GDP per capita	0,0011*** (0,0005)	0,0040*** (0,0013)	0,0040* (0,0021)	-0,0011 (0,0009)	0,0034** (0,0014)
Inflation	0,0746*** (0,0230)	0,1686*** (0,0649)	0,1824* (0,0984)	0,0669*** (0,0194)	0,1089** (0,0505)
Interest rate spread	0,0280*** (0,0108)	0,0435*** (0,0037)	0,0149 (0,0098)	0,0178*** (0,0036)	0,0418*** (0,0139)
Lagged Private credit to GDP	-	-0,1026*** (0,6246)	-0,1498** (0,1081)	-	-
Stock market Capitalization to GDP	-	-	-	0,0488 (0,0371)	-0,0138 (0,0161)
Lagged Rule of Law	-	-	18,4756* (10,0911)	-	8,4075** (4,1435)
Lagged Control of Corruption	5,3998** (2,3441)	8,5395*** (2,2974)	-	7,7916*** (2,4135)	-
Number of observations	106	97	97	97	97
Number of groups	12	12	12	12	12
Sargan test (p-value)	0,9987	1	0,9340	0,7136	1
$m_1$ test (p-value)	0,0178**	0,0484	0,0366*	0,0190**	0,0794*
$m_2$ test (p-value)	0,4959	0,3320	0,2916	0,4676	0,8861

Notes: \*, \*\*, \*\*\* indicates significance at 10%, 5% and 1% confidence level. <sup>a</sup> the numbers in the brackets are standard errors.

Source: Compiled by the authors.

Table 4. Dynamic panel models

Explanatory Variables	MODEL6	MODEL7	MODEL8	MODEL9	MODEL10
$\alpha$	-0,6538*** (0,2004)	-0,6538*** (0,2004)	-0,5300*** (0,1672)	-0,3018 (0,2053)	0,2599 (0,1023)
Lagged M&A to GDP	0,2125*** (0,04587)	0,2863*** (0,0896)	0,4025*** (0,0901)	0,1877*** (0,0455)	0,3068*** (0,0422)
Lagged GDP growth	0,3062*** (0,0287)	0,1429*** (0,0258)	0,3188*** (0,1237)	0,3067*** (0,1107)	0,1142*** (0,0422)
Inflation	0,0558** (0,0274)	-0,1334 (0,1049)	0,0370* (0,0284)	-0,0062 (0,0232)	-0,0585 (0,0476)
Interest rate spread	0,0362*** (0,0043)	0,0474*** (0,0118)	0,0162*** (0,0053)	0,0333*** (0,0070)	0,0300*** (0,0046)
Lagged Private credit to GDP	-	0,0231 (0,0136)	-0,0135 (0,0202)	-	-
Stock market Capitalization to GDP	-	-	-	-0,0491*** (0,0191)	-0,0484*** (0,0115)
Lagged Rule of Law	-	-	30,9789** (6,651)	-	-1,5200 (7,8497)
Lagged Control of Corruption	5,8422*** (2,0174)	12,0758* (6,651)	-	5,5937** (2,4352)	-
Number of observations	101	101	101	101	101
Number of groups	12	12	12	12	12
Sargan test (p-value)	0,9523	1	0,9371	0,5759	1
$m_1$ test (p-value)	0,0383**	0,0136**	0,0274**	0,0482**	0,0200**
$m_2$ test (p-value)	0,3498	0,2325	0,2081	0,3506	0,4570

Notes: \*, \*\*, \*\*\* indicates significance at 10%, 5% and 1% confidence level. <sup>a</sup> the numbers in the brackets are standard errors.

Source: Compiled by the authors.

Each one of the ten presented specifications has three satisfactory diagnostic statistics. Specifically, the Sargan test doesn't rejected the over-identification restrictions; the absence of first order serial correlation ( $m_1$  test) is rejected at statistical significance at 10% while the absence of second order serial correlation ( $m_2$  test) is not rejected.

According to the estimated parameters of the ten dynamic panel models for value of M&A to GDP ratio in Table 3 and Table 4, the lagged dependent variable is statistically significant<sup>39</sup> and positive in all models. Lagged GDP per capita is not statistically significant and positive in all models, unlike lagged GDP growth which is statistically significant and positive in all models. The comparison of these two similar variables indicates that future investment opportunities, which could be appraised by the growth of the GDP growth rate, are important while deciding on incoming cross-border M&A.

<sup>39</sup> Only in the model where additional regressor is lagged total value of stocks traded to GDP variable lagged dependent variable is statistically significant at 10% level.

Obtained results support Globerman and Shapiro's<sup>40</sup> findings that rapid economic growth can contribute to disequilibria in input and output markets that create above average profit potential for investors who identify the opportunities and possess the resources to exploit those opportunities.

Explanatory variable named interest rate spread has statistically significant and positive effect on M&A in nine out of ten presented models which could indicate that foreign investors receive clear signal to invest and gain profit since domestic investors will have trouble providing favourable credits due to high lending rate. The influence of inflation on M&A varies in its statistical relevancy and its direction.

Variables used as proxy for climate in financial system of a country: (1) market capitalization to GDP and (2) lagged private credit to GDP have negative influence on endogenous variable in most of the presented model and their statistical significance varies and at first this negative correlation may seem unexpected. However, Kamaly<sup>41</sup> offered two possible explanations: (1) a slowdown in the level of activity of the stock market is associated with a similar drop in the stock market return or stock prices depreciation in the stock prices may create some valuable investment opportunities, especially when prices reach "fire-price" levels and (2) in a situation where a foreign investor tends to invest in a certain sector in a given transition country so he will then most probably decide to acquire some shares in a company within this sector, if the stock market is underdeveloped, which is in most cases classified as an M&A transaction. It is also possible that the stock market improves in terms of depth and development; therefore investor would be inclined to invest in the stock market rather than directly acquire equity shares in some companies.

Explanatory variables named rule of law and control of corruption are highly positively correlated, as shown in Table 2, hence they have not been examined at the same model. Both of the variables show positive correlation to M&A and are statistically significant in nine out of ten analyzed panel models. Considering the fact that chosen countries are transitional economies still in process of fully adjusting to word competition and ruthless capitalism such results considering governance have been expected. General conclusions results from this study concerning governance indicators are in accordance to those obtained in studies of di Giovanni (2005), Hyun and Kim (2007) and Neto, Brandão and Cerqueira (2008).

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<sup>40</sup> Globerman and Shapiro (2004), p. 16.

<sup>41</sup> Kamaly (2007), p. 26.

#### **4. CONCLUSION**

This paper aimed to determine variables which affect the value of incoming cross-border M&A in transitional European countries. These countries are in the process of integration into the world market and in order to increase their competitiveness and to adjust their activities to rules of global market they need to generate and/or adjust its legislation, policies and regulations that promote private sector development. Hopefully, this analysis unveiled some characteristics of complex investments such as cross-border M&A.

Results obtained from panel data analysis of determinants of incoming cross-border M&A involving European transitional countries are in general similar to those found in similar studies examining cross-border M&A. According to the estimated parameters obtained from dynamic panel models, the analysis of the observed countries for period between year 1994 and 2008 shows that following variables are statistically significant and have positive effect on the value of cross-border M&A to GDP ratio: lagged value of cross-border M&A to GDP ratio, lagged GDP per capita, lagged GDP growth, interest rate spread, rule of law and control of corruption. Inflation, lagged private credit to GDP and market capitalization to GDP are independent variables that vary in their statistical significance and influence on the dependent variable in compiled dynamic panel models.

Research results suggest that the economic growth of the country is likely to attract cross-border mergers and acquisitions in European transitional countries as they become more capable to absorb investments; therefore it was expected for the variable of lagged GDP growth to be statistically significant and positive variable. Explanatory variable named interest rate spread also has statistically significant and positive effect on M&A and it indicates that foreign investors receive are likely to seize the opportunity if domestic investors have trouble providing favourable credits due to high lending rate. Variables used as proxy for climate in financial system of a country: (1) market capitalization to GDP and (2) lagged private credit to GDP are less robust due to different model specifications, precisely involving two governance variables. Since these variables named rule of law and control of corruption are highly positively correlated with dependant variable and are statistically significant in nine out of ten analyzed panel models it is possible to conclude that for European transition countries financial indicators are not as important as they are in other studies of similar issues.

Determining features of cross-border M&A involving European transitional countries provides wide research possibilities especially when there are indicators of future culmination of international wave of M&A. Analysis of relation between countries that are involved in cross-border M&A whether as a purchaser or a seller could be fruitful path for future research. Additionally, improvements in econometric model will most likely involve new/improved variables explaining geographic characteristics such as distance and cultural variables.

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