DETERMINANTS OF FOREIGN DIRECT INVESTMENT: A BAYESIAN MODEL AVERAGING APPROACH FROM 55 COUNTRIES

Research

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Abstract

Purpose: This study aims to investigate the determinants of Foreign Direct Investment (FDI) for the 55 countries from 4 different continents and 3 different development levels.

Method: A panel dataset is constructed over the period of 1995-2019 with 17 candidate independent variables and Bayesian Model Averaging (BMA) is employed for each continent and for each development level to reveal the determinants of FDI.

Findings: Results showed that globalization is the primary factor to attract FDI regardless of the development level and continent. But there are also other factors that affect FDI which differ based on the development level and geographic location of the country. FDI in transition economies benefits from qualified labor force which negatively affects developed countries and has no effect on developing countries. Corruption is only effective in developing countries. Secondary education is effective at European and Asian countries, tertiary education is effective on American countries.

Originality: This study used a large dataset in terms of selected period, number of countries and selected variables which most of the studies lack of. Also, the advantage of applying BMA to a panel dataset is obvious as both control the cross-section variation and considers a weighted average of all possible linear regression results rather than giving only a single linear regression model result. Thus, applying BMA on a panel dataset gives a better insight as to which variables should be considered as determinants of FDI.

Keywords: FDI, BMA, Panel Data, Transition Economies, Emerging Economies

JEL Classification: C11, C23, F21

DOĞRUDAN YABANCI SERMAYENİN BELİRLEYİCİLERİ: 55 ÜLKE ÜZERİNE BAYESÇİ MODEL ORTALAMASI YAKLAŞIMI

Özet

Amaç: Bu çalışma 4 farklı kıta ve 3 farklı gelişmişlik düzeyine sahip olan 55 ülke için Doğrudan Yabancı Yatırım (DYY)'ı etkileyen etmenleri araştırmayı amaçlamaktadır.

Yöntem: 1995-2019 yılları arasında 17 aday bağımsız değişkenden oluşan bir panel veri seti oluşturulmuş ve doğrudan yabancı yatırımın belirleyicilerini ortaya çıkarmak için her bir kıta ve her bir gelişmişlik düzeyi için Bayesçi Model Ortalaması (BMO) yöntemi uygulanmıştır.

Bulgu: Yapılan analizler küreselleşmenin gelişmişlik düzeyi ya da ait olunan kıtadan bağımsız olarak DYY'ı etkileyen ana etmen olduğunu göstermiştir. Bununla birlikte gelişmişlik seviyesi ve bulunulan coğrafi bölgeye göre değişim gösteren etmenler de mevcuttur. Nitelikli iş gücü geçiş ekonomilerinde DYY'ı olumlu yönde etkilerken, gelişmiş ülkelerde olumsuz etkiye sahipken, gelişmekte olan ülkelerde herhangi bir etkiye sahip değildir. Yozlaşma sadece gelişmekte olan ülkelerde etkilidir. İkinci basamak eğitim Avrupa ve Asya ülkelerinde fark yaratırken, üçüncü basamak eğitim Amerika kıtasındaki ülkelerde etkilidir

Özgünlük: Bu çalışma, seçilen zaman periyodu, ülke sayısı ve seçilmiş değişkenler açısından oldukça büyük bir veri seti kullanmıştır. Ayrıca, BMO'yu bir panel veri setine uygulamanın avantajlı olduğu, hem kesit değişimini kontrol ettiği hem de yalnızca tek bir doğrusal regresyon modeli sonucu vermek yerine tüm olası doğrusal regresyon sonuçlarının ağırlıklı ortalamasını dikkate aldığı için açıktır. Bu nedenle, BMO'yu panel veri setine uygulamak, hangi değişkenlerin DYY'nin belirleyicileri olarak değerlendirilmesi gerektiği konusunda daha iyi bir fikir verecektir.

Anahtar Kelimeler: Doğrudan Yabancı Yatırım, Bayesçi Model Ortalaması, Panel Veri, Geçiş Ekonomisi, Gelişmekte Olan Ekonomiler

JEL Sınıflandırması: C11, C23, F21

INTRODUCTION

Foreign direct investment (FDI) is the term given to a process where a firm from a country provides capital to an existing or newly created firm in another country (Jones & Wren, 2006). These firms are usually referred to as multinational corporations (MNCs). A MNC owns outright controls or has direct managerial influence in income-generating, value-added facilities in at least two countries (Cohen, 2007). Cohen stated the relationship between FDI and MNCs by defining the latter as a tangible entity that in some way will impact a home country, which is where its main headquarters is located, and one or more host countries, the recipient(s) of incoming FDI (Cohen, 2007).

According to the OECD's benchmark definition, FDI reflects the objective of establishing a lasting interest by a resident enterprise in one economy (direct investor) to an enterprise (direct investment enterprise) that is resident in an economy other than that of the direct investor (OECD, 2008).

The amount of total FDI in the world has been increasing dramatically over the last two decades. According to the UNCTAD database (UNCTAD, 2009) and World Investment Report 2018 (UNCTAD, 2018) between 1990 and 2014, global FDI flows increased from 208 billion dollars to 1228 billion dollars. Total FDI flows reached 1868 billion dollars in 2016 and started to decline in 2017 to 1430 billion dollars.

FDI especially helps developing countries in the cases of global and regional financial crisis, by fostering economic activity where financing and market liquidity is a serious problem (Economou, Hassapis, Philippas, & Tsionas, 2017). FDI has been attracting vast interest because of its potential benefits on host countries' economies. Several studies remarked the growth benefits of FDI through employment, acquired knowledge and management skills, as well as technology spillovers (Economou et al., 2017). Multinational companies (MNCs), engage in FDI to expand sales, acquire resources and minimize competitive risks. On the other side, governments prefer FDI to boost the economy in many dimensions such as growth, human capital, employment etc. Thus, investigating the determinants of FDI is crucial for MNCs to decide whether to make investments and is important for governments' policy making.

This study aims to investigate the determinants of FDI in 55 countries from 4 different continents and 3 different development levels for the period of 1995 – 2019 within a panel data context by using Bayesian Model Averaging (BMA) method. A total of 17 candidate variables is chosen that reflect different aspects of countries such as market size, infrastructure, economic stability, institutional quality, labor quality, and trade. BMA comes in handy as it can be used for model selection especially when the number of explanatory variables is high. BMA facilitates all the possible regression models and allows considering all significant models. In that way, it provides more efficient and more convenient results rather than relying on only a single model (Ley & Steel, 2012).

This paper extends the existing literature in a few aspects. Most of the previous works either aimed to explain determinants of FDI for a large number of countries as a whole (Antonakakis & Tondl,

2012; Buchanan, Le, & Rishi, 2012) or for a specific geographical location (Masron & Nor, 2013; Solomon & Ruiz, 2012). These studies mostly used either classical regression techniques (Chakrabarti, 2001; Habib & Leon, 2002) or panel data analysis (Bengoa & Sanchez-Robles, 2003; Buchanan et al., 2012; Busse & Hefeker, 2007; Kinda, 2012a; Kok & Ersoy, 2009). This study combines these two approaches and focuses on a larger number of countries from different continents and different development levels. BMA is applied to both to all of the countries and to countries from each continent and each development level separately. Most of the previous works that use a large number of countries (Blonigen, Piger, & National Bureau of Economic Research., 2014; Eicher, Helfman, & Lenkoski, 2012; Mathur & Singh, 2013; Sánchez-Martín, De Arce, & Escribano, 2014; Solomon & Ruiz, 2012) which fail to catch the differences among continents and development levels of countries regarding factors affecting FDI. The first aim of this study is to provide feedback on such differences as such an insight would give a huge advantage to MNCs and governments as they could produce separate strategies for each country groups.

Although there are numerous works regarding FDI determinants in the literature, there is not a common opinion on factors affecting FDI. In fact, different studies using the same variables found different results (Chakrabarti, 2001; Kok & Ersoy, 2009). In this sense, applying BMA to a panel dataset comes in handy, because it not only controls the cross section variation but also gives a weighted average of all possible linear regression results rather than giving only a single linear regression model result (Eicher, Papageorgiou, & Raftery, 2011). As every paper dealing with determinants of FDI finds a different outcome applying BMA on a panel dataset could give a better insight as to which variables should be considered as determinants of FDI.

This paper will proceed as follows: Section 2 gives a brief overview of previous works focusing on the determinants of FDI. Section 3 focuses on dataset and variables. Section 4 explains the employed method BMA. Section 5 presents the empirical results of BMA results and section 6 concludes the paper with policy implications and key findings of the study.

LITERATURE REVIEW

Theory Overview

The growing interest in FDI coincides with the appearance of modern MNCs. Although there were organizations such as banks or companies that engaged with trading activities in earlier time periods, the birth of modern MNCs occurred in the 19th century (Moosa, 2002). The term modern MNCs refer to organizations those have their production units abroad. Especially by the end of the 19th century, firms had difficulties with the protectionist behavior of countries because of rising nationalism. This protectionist behavior leads customers to buy locally produced goods rather than imported ones which forces the companies to set up production facilities in foreign countries. Also, in time MNCs started to grow in size while looking for new markets. Technological improvements in communication and

transportation such as telegraph and railways also boost FDI allowing MNCs to control their investments in foreign countries.

The increase in FDI was slowed by the two World Wars and with the Great Depression between these two wars. In the second half of the 20th century the amount of FDI started to increase rapidly. Two main reasons for this increase were: (i) further technological improvements in transportation and communication which made it possible to control over a distance. (ii) the capital demand of European countries and Japan to finance reconstruction following World War II (Moosa, 2002). Also Jones & Wren (2006) connects this FDI increase to greater economic and political stability, the formation of trading blocks and a more liberalized attitudes from host governments as well as technological improvements. By the 1960s and later 1970s the capital need of European countries diminished due to Euro-currency markets and they also started to engage in high level of FDI.

In the 1980s, the amount of FDI continued to increase with the effect of high economic growth and increase in mergers and acquisitions. FDI continued to increase in the 1990s and 2000s with the help of growing Asian countries. The only exceptions are the 2001 and 2008 global crises which resulted in a sharp decline in FDI.

The attempts to explain FDI started in the 1960s, at the time FDI flows started to accelerate. Before that time, FDI was seen as a part of trade theory which was insufficient since it did not separate portfolio investment from FDI. This approach was incomplete as FDI is more than just the transfer of capital; it also involves the transfer of technology, organizational and management skills (Jones & Wren, 2006).

In this section a brief overview of some common theories concerning FDI will be given. Interested readers may refer to Jones & Wren (2006), Paez (2011), Bitzenis (2009) and Faeth (2009) for a more detailed account.

Hymer (1976) stated that if a firm wants to undertake an FDI, it should have certain advantages over companies such as control on raw materials, financial, managerial or marketing advantages etc. According to him, an MNC transfers its assets abroad to minimize risks and to achieve monopolistic power. Hymer also distinguishes portfolio investment from FDI by emphasizing the concept of control. Hymer stated three barriers to engaging FDI as uncertainty, host-country nationalism and risk. Yet MNCs continue to prefer FDI because either they use FDI to remove competition from the local market by merging or taking over a local company or they use firm specific advantages which gives them superior power over local companies.

Vernon (1966) developed the product life-cycle theory. According to Vernon, the product life-cycle theory has three stages. Jones & Wren (2006) defined these three stages as the product development process stage, the maturing product stage and the standardized product stage. In the product development stage, the product is not standardized and there is uncertainty about the product. Communication between the producers, the suppliers and the customers have great importance. Firms

have to make a location decision about the product. In the maturing product stage, the demand for the product starts to decline in the near market, so firms decide whether to invest abroad or not. This decision depends on the degree of competition, whether there is a patent for the product in the foreign country and the level of tariffs. In the standardized product stage, the product becomes more capital intensive, and the international market is well established, so sales of the product are determined by price competition. In this stage the low-cost of labor in less-developed countries may benefit the firms.

Caves (1971) expanded Hymer's work and linked Hymer's theory to horizontal and vertical integration. He distinguished the differences between horizontal FDI and vertical FDI. Basically, when companies move abroad to produce the same products they produce at home, their investments are called horizontal FDI. But if the companies produce different segments of the product in different countries and then they combine the resources to obtain the final product, this process is achieved via vertical FDI (Daniels, Radebaugh, & Sullivan, 2004).

Buckley & Casson (1976) are among the leading researchers in the internalization theory. Companies use internalization to avoid the transaction costs in the market. Transaction costs include the cost of searching for and determining the market price and the cost of negotiating and signing the contracts between the parties involved in the transaction. Buckley & Casson propose that MNCs do not only produce goods or services but they also perform activities such as marketing, training, research and development, management techniques and involvement with financial markets (Jones & Wren, 2006). In that way, MNCs minimize costs by integrating different aspects of the production process.

Besides firm specific and internalization factors, another motive for determining FDI is locational determinants. Locational determinants appear from different aspects. One of them is the locational advantages of low wages. The level of wages in the host country relative to the parent country is an important determinant of FDI. While low wages attract higher FDI for labor-intensive works, higher wages may also indicate higher quality of labor. Thus, the theory on labor wages is mixed. Other locational determinants are proximity to resources, transportation costs, infrastructure and market size.

One of the most widely accepted theory on FDI is Dunning's eclectic theory (Dunning, 1977). Dunning integrated Hymer's industrial organization theory, internalization theory and the location theory. According to this theory three conditions should be satisfied if a firm wants to use FDI. First, the firm must have a comparative advantage over other firms in the market. These advantages are called ownership advantages and arise from technology, monopoly power, access to raw materials, access to cheap finance and the level or quality of management. Second, the firm must internalize firm specific advantages rather than contracting or licensing them. This is called internalization advantages. Low transaction costs, low tariffs, and the protection of goods can be given as examples of internalization advantages. Third, there must be an advantage in setting up production in a

particular foreign country rather than exporting. These advantages are called locational advantages. Input prices, transportation costs, communication costs, government incentives, stable economical and governmental environment can be given as examples of locational advantages.

These three types of advantages are called ownership advantages (O), locational advantages (L) and internalization advantages (I). Thus, Dunning's eclectic theory is often referred to as OLI.

Empirical Overview

FDI can also be named horizontal FDI or vertical FDI. Horizontal FDI usually looks for new markets and this type of FDI is affected by market size and growth whereas vertical FDI usually looks for cost competitiveness.

Market size is considered as an important determinant of FDI and most of the empirical studies found positive relationship between host countries' market size, market growth and FDI (Bengoa & Sanchez-Robles, 2003; Bilgili, Tülüce, & Doğan, 2012; Billington, 1999; Blonigen et al., 2014; Chakrabarti, 2001; Eicher et al., 2012; Janicki & Wunnava, 2004; Kok & Ersoy, 2009; Kolstad & Wiig, 2012; Vijayakumar, Sridharan, & Rao, 2010). This is because a large market will attract firms that want to expand into other markets to obtain greater sales or market share. Also, the firms may want to enter into markets where they can grow. But some of the studies argue that market size and market growth are no longer significant determinants of FDI. In most of the studies, gross national product (GNP) or gross domestic product (GDP) are being used as a proxy for market size. In some studies, population is also preferred as an indicator of market size. GDP growth or GDP growth per capita are preferred as an indicator of market growth in most of the studies.

The availability of labor is expected to have a positive effect on FDI. But in the modern FDI theory besides availability of labor, labor wages, labor productivity and quality of labor have more importance. Labor cost is expected to have a reverse effect on FDI while productivity and labor quality are expected to have a positive effect on the amount of FDI flows. In some studies, the educational level or human capital are used as a proxy for labor quality (Antonakakis & Tondl, 2012; Bellos & Subasat, 2012; Bengoa & Sanchez-Robles, 2003; Blonigen et al., 2014; Eicher et al., 2012; Janicki & Wunnava, 2004; Sethi, Guisinger, Phelan, & Berg, 2003; Vijayakumar et al., 2010).

Trade openness is generally defined as the ratio of exports plus imports over GDP. Countries with higher openness are more likely to be integrated with the world economy and they are more competitive on the world market. Thus a higher trade openness is expected to have a positive effect on FDI flows (Chakrabarti, 2001; Cuyvers, Soeng, Plasmans, & Van Den Bulcke, 2011; Janicki & Wunnava, 2004; Kok & Ersoy, 2009).

Macroeconomic stability is another important determinant of FDI. Inflation rates, interest rates, and exchange rates are widely used as proxies for macroeconomic stability. High inflation rates, unstable currencies, and higher interest rates increase uncertainty thus a negative relationship between

macroeconomic stability and FDI flows are expected. But empirical results do not always confirm this expectation and nonsignificant or positive relations are also found when other factors are highly significant (Arbatli, 2011; Bengoa & Sanchez-Robles, 2003; Cavallari & D'Addona, 2013; Cuyvers et al., 2011; Kinda, 2012b; Sánchez-Martín et al., 2014; Solomon & Ruiz, 2012; Vijayakumar et al., 2010).

The general level of infrastructure in a host country is a potential attraction element for FDI. A higher level of infrastructure means better transportation and better communication opportunities. Also, the infrastructure level may indicate a high level of urbanization and many consumers. A positive relationship is expected between infrastructure and FDI (Bellos & Subasat, 2012; Busse & Hefeker, 2007; Sánchez-Martín et al., 2014; Sethi et al., 2003; Vijayakumar et al., 2010).

The political system and quality of institutions are other determinants of FDI flows. Countries with developed democracy and with a good quality of institutions yield to well-functioning markets which decrease the cost of doing business and thus increase the amount of FDI. The level of freedom and the level of corruption are widely used indicators of institutional factors (Asiedu, 2006; Bellos & Subasat, 2012; Bengoa & Sanchez-Robles, 2003; Buchanan et al., 2012; Busse & Hefeker, 2007; Eicher et al., 2012; Habib & Leon, 2002; Masron & Nor, 2013; Mathur & Singh, 2013; Sánchez-Martín et al., 2014).

There are also some studies that focus on a specific set of countries from a selected region. Okafor & Webster (2015) focuses on former Soviet Union countries and found a positive effect of market size on FDI. Bitzenis (2009), investigated the determinants of FDI for Eastern European countries and political and economic stability, market size, infrastructure, and economic development is found effective in their work. Asiedu (2006) aimed to find the determinants of FDI for the African countries and institutional variables, market size variables, human capital and stability variables are found significant. Bengoa & Sanchez-Robles (2003) and Sánchez-Martín (2014) investigated FDI in South American countries and economic freedom, economic growth, human capital, economic stability and liberalization of markets are found effective on FDI. Masron & Nor (2013), and Solomon & Ruiz (2012) considered the Asian countries in terms of FDI and according to their study KOF globalization index, GDP, corruption perception index and tertiary education have effect on FDI.

BMA is also used in a few studies to find the determinants of FDI. Eicher, Helfman and Lenkoski (2012) used Bayesian model averaging (BMA) to investigate robust FDI determinants. They used panel data for 46 countries over the years 1988-2000. They used many variables and found two groups of variables are effective: economic variables and country characteristics. Antonakis and Tondl (2012) investigated determinants of FDI for 129 countries over the period of 1995-2008. They used BMA and found that trade relations, qualified labor force, low wages and attractive tax rates are robust investment criteria. Blonigen & Piger (2014) also used BMA to detect determinants of FDI for the

year 2000. Cultural distance factors, parent-country per capita GDP, relative labor endowments and trade agreements are found to be effective for FDI.

METHODOLOGY

Data

A panel dataset is constructed for 55 countries over the period of 1995-2019 on a yearly basis. 55 countries are chosen from 4 different continents and 3 different development levels. Countries development levels are based on the World Bank classification (United Nations, 2018). In Africa and America, developing countries which have a decent amount of FDI stocks are chosen. In Asia, developing countries such as China and India are selected as well as transition economies which were once part of USSR are selected. In Europe only Central and East European countries are chosen which were influenced by USSR among with Turkey. Most of these countries are classified as developed countries with the influence of participation of the European Union. But these countries are still trying to complete their integration into the European Union. The list of the countries along with the continents and economy type is given in Table – 1.

Two factors affected the choice of the period. The first reason is the availability of data for the chosen variables. Since most of the Balkan and former USSR countries are founded at the beginning of the 1990s, the data starts from 1995. The second reason is the rapid increase in the amount of worldwide FDI starting in the 1990s.

In match with the Hymer's and Dunning's theories, the main determinants of FDI are grouped into 6 categories namely market size and economic growth (MARKET), labor market (LAB), trade openness (TRADE), macroeconomic stability (STABIL), infrastructure (INFRA) and institutional factors (INST) (Antonakakis & Tondl, 2012; Solomon & Ruiz, 2012). A total of 17 explanatory variables are considered as indicators of those 6 categories (Table-2). Four variables are linked to market size and economic growth factors which are GDP, KOF globalization index, economic freedom index and population. Five variables are considered as proxies of the labor market factor namely, labor productivity, secondary education, tertiary education, human capital index, and employment. Trade openness, which is calculated as the ratio of imports and exports over GDP is the only variable in the trade openness factor. The exchange rates and inflation rates are related to the macroeconomic stability factor, internet users and energy productivity are used as proxies for infrastructure and the civil liberty index, the political right index and the corruption perception index are linked to institutional factor. Description of all the variables and their sources is given in Table-2.

Table 1. Country list by continent and type

Countries	Continent	Type	Countries	Continent	Type	Countries	Continent	Type
Algeria	Africa	Developing	**Armenia**	Asia	Transition	**Albania**	Europe	Transition
Angola	Africa	Developing	**Azerbaijan**	Asia	Transition	**Bosnia & Herz.**	Europe	Transition
Cameroon	Africa	Developing	**Belarus**	Asia	Transition	**Bulgaria**	Europe	Developed
Cote d'Ivoire	Africa	Developing	**China**	Asia	Developing	**Croatia**	Europe	Developed
Egypt	Africa	Developing	**Georgia**	Asia	Transition	**Cyprus**	Europe	Developed
Ethiopia	Africa	Developing	**India**	Asia	Developing	**Czech Rep.**	Europe	Developed
Ghana	Africa	Developing	**Indonesia**	Asia	Developing	**Estonia**	Europe	Developed
Kenya	Africa	Developing	**Kazakhstan**	Asia	Transition	**Hungary**	Europe	Developed
Morocco	Africa	Developing	**Kyrgyzstan**	Asia	Transition	**Latvia**	Europe	Developed
Nigeria	Africa	Developing	**Lebanon**	Asia	Developing	**Lithuania**	Europe	Developed
Senegal	Africa	Developing	**Malaysia**	Asia	Developing	**Macedonia**	Europe	Transition
South Africa	Africa	Developing	**Moldova**	Asia	Transition	**Malta**	Europe	Developed
Tunisia	Africa	Developing	**Pakistan**	Asia	Developing	**Poland**	Europe	Developed
Argentina	America	Developing	**Russia**	Asia	Transition	**Romania**	Europe	Developed
Brazil	America	Developing	**South Korea**	Asia	Developing	**Serbia**	Europe	Transition
Mexico	America	Developing	**Tajikistan**	Asia	Transition	**Slovakia**	Europe	Developed
Peru	America	Developing	**Turkmenistan**	Asia	Transition	**Slovenia**	Europe	Developed
Venezuela	America	Developing	**Ukraine**	Asia	Transition	**Turkey**	Europe	Developing
			Uzbekistan	Asia	Transition			

Table 2. Variable list, data sources and brief definitions.

Variables	Description	Source	Factor
FDI	The logarithm of FDI stocks US Dollars at current prices and current exchange rates in millions	UNCTAD	---------
GDP	The logarithm of GDP at constant 2005 U.S. dollars.	UNCTAD	MARKET
Internet	Internet users (per 100 people)	WDI	INFRA
Exchange Rate	Real Effective Exchange Rate	Bruegel Datasets	STABIL
PR	Political Right Index 1: High Political Right 7: Low Political Right	Freedom House	INST
CL	Civil Liberty Index: 1: High Civil Liberty 7: Low Civil Liberty	Freedom House	INST
Freedom Index	Economic Freedom Index 0: No Freedom 100: Complete Freedom	Heritage Foundation	MARKET
KOF	Index of Globalization 1: No Globalization 100: Total globalization	KOF Institute	MARKET
CPI	Corruption Perception Index 0: Highly Corrupt 10: No Corruption	Transparency Int.	INST
Human Capital	Human capital index	PWT 8.1	LAB
Employment	The logarithm of the number of persons engaged in millions	PWT 8.1	LAB
Labor Productivity	The logarithm of GDP per person engaged (constant 1990 US$ at PPP)	KILM 8th edition	LAB
Trade Openness	(Import + Export) / Total GDP	WDI and Own Calculation	TRADE
Population	The logarithm of absolute values in thousands	UNCTAD	MARKET
Inflation	Average Consumer Prices	WEO	STABIL
Secondary Education	Educated percentage of the working-age population	CEPII Database	LAB
Tertiary Education	Educated percentage of the working-age population	CEPII Database	LAB
Energy Productivity	The logarithm of Energy Productivity	CEPII Database	INFRA

BMA

This section will provide brief information on Bayesian Model Averaging. For further and detailed knowledge on BMA one can look at Hoeting et al.'s work (1999).

The selection of the appropriate subset of variables in a linear regression model is a problem when there is a huge number of variables. Bayesian Model Averaging (BMA) addresses this issue by

providing a natural solution to model uncertainty, based on formal probabilistic reasoning, leading to better predictions than simply selecting and using one model (Ley & Steel, 2012).

In the Bayesian approach when dealing with model uncertainty, each candidate model is treated as random variables and the data is used to make inference on them (Ley & Steel, 2009).

Let y denotes the dataset and let M_γ denotes the candidate models with $\gamma = 1, 2, \cdots, 2^K$ where K is the number of independent variables. Here, the aim is to define a full probabilistic description with a Bayesian approach by specifying a prior $p(M_\gamma)$ and reaching a posterior $p(M_\gamma|y)$ with the help of the data y. In this approach, this posterior either can be a one "best" model or it can be a weighted average of all the models by assigning posterior model probabilities as weights. Previous works suggest using weighted averages rather than a single model as it performs better in terms of predictive performance and interpretability (Eicher, Papageorgiou, & Raftery, 2011; Raftery, Madigan, & Hoeting, 1997).

According to the logic of Bayesian inference, the posterior distribution of any quantity of interest, let us say θ_γ, is a weighted average of the posterior distributions of β under each of the models, where the weights are given by the posterior model probabilities (PMPs) and is denoted with the following equation (Antonakakis & Tondl, 2012),

$$p(\theta|y) = \sum_{\gamma=1}^{2^K} p(\theta|y, M_\gamma) p(M_\gamma|y) \tag{1}$$

The posterior model probability (PMP), $p(M_\gamma|y)$ is proportional to the marginal likelihood of the model, $p(y|M_\gamma)$, times prior model probability $p(M_\gamma)$ which can be formulated as:

$$p(M_\gamma|y) \propto p(y|M_\gamma)\, p(M_\gamma) \tag{2}$$

Here $p(M_\gamma)$ denotes how probable is the model M_γ before looking at the data.

Then the integrated likelihood term can be calculated with,

$$p(y|M_\gamma) = \int p(y|\theta_\gamma, M_\gamma)\, p(\theta_\gamma|M_\gamma) d\theta_\gamma \tag{3}$$

The point estimates of the parameter θ can be given with,

$$E(\theta|y) = \sum_{s=1}^{2^K} p(M_s|y) p(\theta|M_s) \tag{4}$$

$$V(\theta|y) = \sum_{s=1}^{2^K} p(M_s|y)V(\theta|M_s, y) + \sum_{s=1}^{2^K} p(M_s|y)\big(E(\theta|M_s) - E(\theta|y)\big)^2 \qquad (5)$$

Implementing BMA may be difficult sometimes because elicitation of 2^K models is required. In order to overcome this problem, some algorithms exist which take a sample from 2^K models instead of evaluating all of them. These algorithms are called Markov Chain Monte Carlo Model Composition methods (MC3).

Applying BMA to the FDI dataset

Now consider the linear regression model in the panel data form given with (6): constructed to be used along BMA to find the determinants of FDI. Please note that this notation is slightly different than above as dataset consists of both dependent variable y and matrix of independent variables X. The subscripts i and t denote the country dimension and the time dimension respectively.

$$y_{it} = \alpha_{\gamma_{it}} + X_{\gamma_{it}}\beta_{\gamma_{it}} + \varepsilon_{it} \qquad (6)$$

with the normally distributed errors $\varepsilon_{it} \sim N\big(0, \sigma_{it}^2 I\big)$ and $\alpha_{\gamma_{it}}$ is the individuals' effects.

When the number of candidate variables X_γ is high, the question of which subset of all independent variables, $X_\gamma \subset \{X\}$, should take place in (6) occurs. BMA deals with this problem by estimating models for all combinations of $\{X\}$ and constructing a weighted average over all of them. If $\{X\}$ contains K potential variables, this means there are 2^K variable combinations and 2^K models.

In the linear regression model given with (6), $X_{\gamma_{it}}$ is a subset of all the 17 explanatory variables described in Table-1. BMA tackles the problem of which subset of $X_{\gamma_{it}}$ should take place in (6) by estimating models for all combinations of $X_{\gamma_{it}}$ and constructing a weighted average over all of them.

In a Bayesian view, prior for $\alpha_{\gamma_{it}}$, $\beta_{\gamma_{it}}$ and σ_{it}^2 should be defined in the regression model (6). A standard choice for α_γ and σ is $p(\alpha_\gamma) \propto 1$ and $p(\sigma) \propto \sigma^{-1}$. The definition of these priors is improper priors, which suggests α_γ and σ are evenly distributed and states prior uncertainty where the prior is located. The crucial point here is to define priors on β_γ. It is common to assume a conservative prior with 0 mean for the coefficients which reflect lack of information on coefficients. Their variance structure is defined with the Zellner's g, $\sigma^2 \left(\frac{1}{g} X_\gamma' X_\gamma\right)^{-1}$ so β_γ is in the form

$$\beta_\gamma|g \sim N\left(0, \sigma^2 \left(\frac{1}{g} X_\gamma' X_\gamma\right)^{-1}\right) \qquad (7)$$

Equation (7) state, the researcher thinks the coefficients, β_γ are zero, and their variance-covariance matrix broadly depends on the data. The hyperparameter g describes how certain the researcher thinks

that the coefficients are 0. A small g means that the researcher is quite certain that the coefficients are 0 while a large g means that the researcher is uncertain that the coefficients are 0.

In BMA, the posterior model probability is proportional to the marginal likelihood of the model, times prior model probability (Koop, 2003). In this paper, a uniform prior model is assumed where there is an equal probability to every model with a benchmark prior (BRIC) suggested by Fernandez et al. which suggests taking $g = max(n, k^2)$ where n is a number of observations and k is the number of independent variables (Fernández, Ley, & Steel, 2001).

A more detailed notation where each factor is explicitly stated is given in the equation (8).

$$FDI_{it} = \alpha_{\gamma_{it}} + MARKET_{\gamma_{it}}\beta_{\gamma_{1it}} + LAB_{\gamma_{it}}\beta_{\gamma_{2it}} + TRADE_{\gamma_{it}}\beta_{\gamma_{3it}} + STABIL_{\gamma_{it}}\beta_{\gamma_{4it}}$$
$$+ INFRA_{\gamma_{it}}\beta_{\gamma_{5it}} + INST_{\gamma_{it}}\beta_{\gamma_{6it}} + \varepsilon_{it} \tag{8}$$

where $\varepsilon_{it} \sim N(0, \sigma_{it}^2 I)$

The equations (1) to (5) given in subsection 4.1 can be re-arranged to equation (8) by taking

$y = FDI_{it}$, $\beta_\gamma = \theta$ and $X_\gamma = \{MARKET_\gamma, LAB_\gamma, TRADE_\gamma, STABIL_\gamma, INFRA_\gamma, INST_\gamma\}$.

FINDINGS

BMA results for exploring determinants of FDI are given in Table-3 and Figure-1. BMA results are given for each continent and each development level as well as all of the 55 countries. The PIP column in Table-3, which is an abbreviation for "posterior inclusion probability", gives the ratio of statistically significant models for a variable. The Post. Mean column is the average of coefficients of a variable for all models and the Post. SD is the average of the standard deviation of a variable for all models. The Cond. Sign column is the proportion of positive signed coefficients for a variable in all models. For example, GDP for all the countries has a PIP value of 0.628 which means that it is statistically significant in almost 63% of all models. Also, the sign column value for the GDP is 1.000 which means GDP has a positive sign in all the models. In this study, variables with a PIP value over 0.5 are considered as significant (de Luca & Magnus, 2011; Magnus, Powell, & Prufer, 2010).

Figure – 1 gives a summary of the top 75 models for each BMA analysis which provides a visual representation of the results. Each column represents a model starting from the model with the highest model probability. Black and grey colors indicate that the variable has a positive and negative significant effect on FDI in the corresponding model respectively. Blank white squares denote an insignificant effect on FDI.

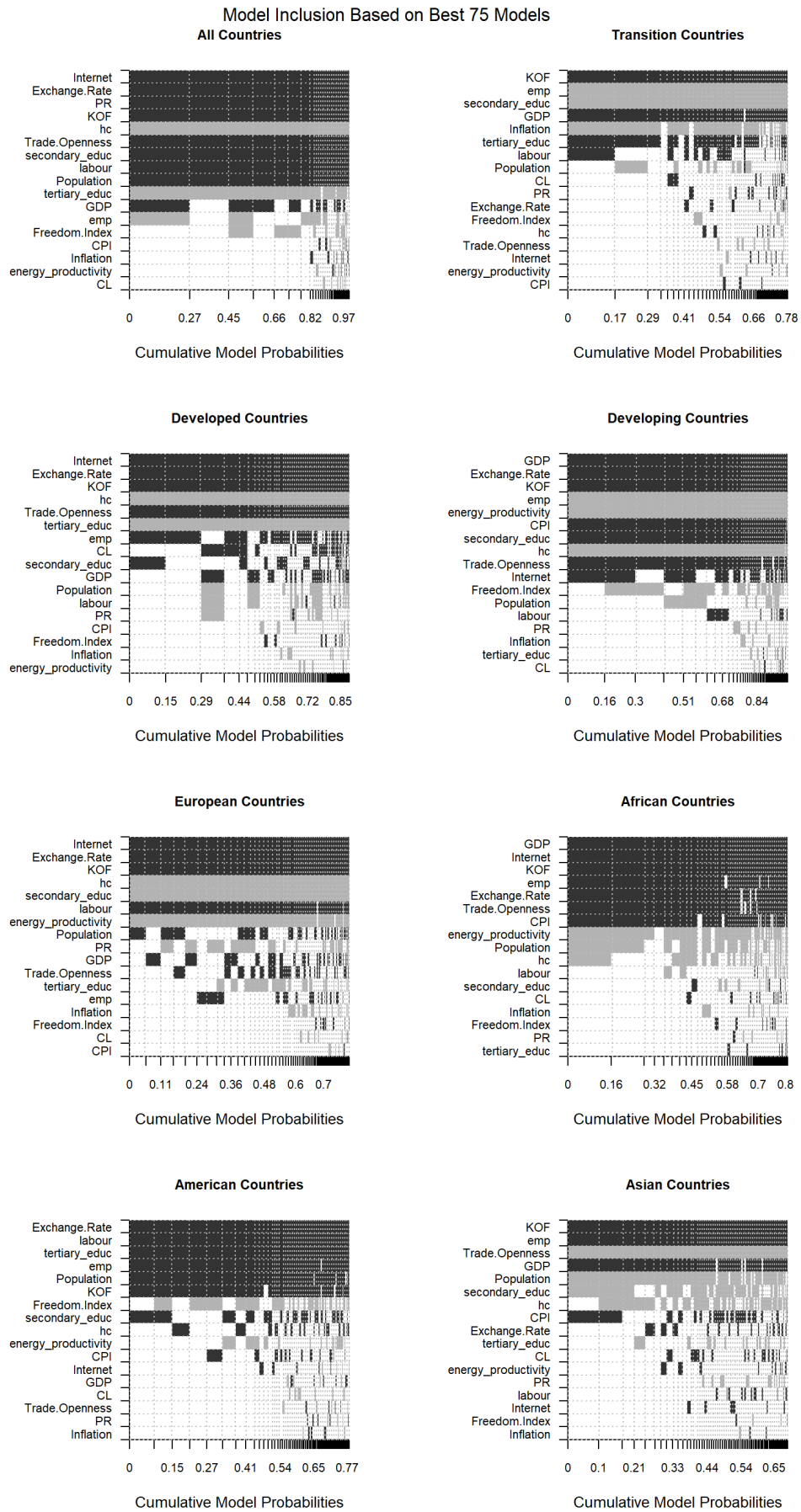Model Inclusion Based on Best 75 Models

Figure 1. Model inclusion graph

BMA results for all countries revealed that KOF globalization index, trade openness, population, internet, secondary and tertiary education, political right index, exchange rate, labor productivity and human capital are the main determinants of FDI with a PIP value over 0.80. In addition, GDP and employment have PIP value over 0.50 and they have secondary importance on FDI. All of these variables except human capital, tertiary education and employment have a positive posterior mean and the sign value of all of them are 1.000 stating they have a positive coefficient in all of the models thus having a positive effect on FDI. On the other hand, human capital, tertiary education, and employment have negative posterior means and PIP values of 0.000 indicating a negative effect on FDI. These results imply a deeper analysis is required so BMA analyses are conducted for each continent and each country group separately.

BMA results by country type reveal that FDI on transition economies is affected by six factors: GDP, KOF globalization index, employment, inflation, and secondary and tertiary education. GDP and KOF globalization index can be considered as a proxy for market size.

FDI on developed countries located in Eastern Europe is mainly affected from KOF globalization index, tertiary education, human capital, trade openness, exchange rate and Internet availability with PIP values higher than 0.99, and from employment which has some effect on FDI with PIP value 0.74.

FDI on developing countries mainly located in Africa, Asia and America and they are related with 9 main factors: KOF globalization index, corruption perception index, secondary education, GDP, trade openness, exchange rate, energy productivity, human capital, employment with PIP values over 0.95.

Table – 3 and Figure – 1 indicates that BMA results differ among continents. KOF globalization index, exchange rate, internet availability, human capital, labor productivity, energy productivity and secondary education have PIP values over 0.90 and these variables are effective on the FDI flows in the European countries.

For African countries, KOF globalization index, GDP, Internet, employment, exchange rate, trade openness, corruption perception index, and energy productivity all of which have PIP values over 0.80, have an impact on FDI.

KOF globalization index, population, labor productivity, employment, exchange rate and tertiary education have PIP values over 0.90 with positive posterior means for American countries. Freedom Index also effective for FDI in American countries with PIP values over 0.50.

For Asian countries, five variables have PIP values over 0.80 which are KOF globalization index, trade openness, employment, GDP and population as in Solomon & Ruiz (2012) and Masron & Nor's (2013) work. Secondary education and human capital, have PIP values over 0.60 for Asian countries.

Table 3. BMA Results by country type and continent.

Dep. Variable: FDI	ALL				TRANSITION				DEVELOPED				DEVELOPING			
Independent Variables	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign
GDP	0.628	0.227	0.204	1.000	0.983	1.209	0.378	1.000	0.354	0.466	0.769	1.000	1.000	1.061	0.112	1.000
Internet	1.000	0.015	0.001	1.000	0.078	0.000	0.001	0.748	1.000	0.020	0.003	1.000	0.672	0.004	0.003	1.000
Exchange Rate	1.000	0.006	0.001	1.000	0.121	0.001	0.002	1.000	0.999	0.020	0.004	1.000	1.000	0.007	0.001	1.000
PR	0.999	0.110	0.022	1.000	0.129	0.013	0.050	0.847	0.199	-0.030	0.077	0.085	0.081	-0.002	0.010	0.000
CL	0.034	0.000	0.008	0.015	0.121	0.013	0.045	0.999	0.375	0.066	0.102	1.000	0.045	0.000	0.008	0.485
Freedom Index	0.299	-0.003	0.005	0.000	0.102	-0.001	0.006	0.000	0.091	0.001	0.004	1.000	0.584	-0.009	0.009	0.000
KOF	1.000	0.060	0.006	1.000	1.000	0.101	0.018	1.000	1.000	0.127	0.012	1.000	1.000	0.058	0.009	1.000
CPI	0.042	0.000	0.001	0.679	0.064	0.000	0.004	0.957	0.092	-0.001	0.002	0.003	0.997	0.020	0.005	1.000
Human Capital	1.000	-3.142	0.357	0.000	0.101	0.232	0.972	0.999	1.000	-11.312	1.074	0.000	0.998	-2.741	0.665	0.000
Employment	0.519	-0.001	0.001	0.000	1.000	-0.040	0.006	0.000	0.738	0.083	0.055	1.000	1.000	-0.002	0.000	0.000
Labor Productivity	0.999	0.798	0.200	1.000	0.407	0.392	0.554	0.997	0.293	-0.328	0.603	0.077	0.146	0.027	0.082	0.993
Trade Openness	1.000	0.007	0.001	1.000	0.107	0.000	0.001	0.000	1.000	0.007	0.001	1.000	0.976	0.006	0.002	1.000
Population	0.999	0.708	0.189	1.000	0.310	-0.240	0.512	0.073	0.310	-0.326	0.579	0.004	0.274	-0.070	0.132	0.000
Inflation	0.044	0.000	0.000	1.000	0.850	-0.006	0.003	0.000	0.072	0.000	0.001	0.000	0.060	0.000	0.000	0.002
Secondary Education	1.000	0.016	0.004	1.000	0.999	-0.058	0.015	0.000	0.350	0.005	0.009	1.000	0.999	0.028	0.006	1.000
Tertiary Education	0.979	-0.018	0.006	0.000	0.776	0.055	0.036	1.000	1.000	-0.085	0.013	0.000	0.046	0.000	0.002	0.289
Energy Productivity	0.038	-0.001	0.014	0.340	0.067	0.001	0.033	0.409	0.065	-0.005	0.056	0.122	1.000	-0.333	0.073	0.000

Dep. Variable: FDI	EUROPE				AFRICA				AMERICA				ASIA			
Independent Variables	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign	PIP	Post Mean	Post SD	Cond. Sign
GDP	0.354	0.067	0.117	0.978	0.999	1.206	0.336	1.000	0.140	0.073	0.304	0.731	0.947	0.798	0.292	1.000
Internet	1.000	0.020	0.003	1.000	0.996	0.011	0.003	1.000	0.104	0.000	0.001	0.716	0.102	0.000	0.001	0.947
Exchange Rate	1.000	0.019	0.003	1.000	0.951	0.005	0.002	1.000	0.999	0.004	0.001	1.000	0.247	0.001	0.002	0.989
PR	0.423	-0.053	0.071	0.000	0.075	-0.001	0.016	0.336	0.068	0.000	0.011	0.621	0.154	-0.013	0.038	0.012
CL	0.086	-0.004	0.025	0.162	0.117	0.007	0.027	0.952	0.093	-0.004	0.019	0.002	0.238	0.032	0.069	1.000
Freedom Index	0.080	0.000	0.002	0.966	0.082	0.001	0.003	0.999	0.518	-0.008	0.009	0.000	0.061	0.000	0.003	0.390
KOF	1.000	0.067	0.011	1.000	1.000	0.052	0.012	1.000	0.906	0.039	0.018	1.000	1.000	0.109	0.013	1.000
CPI	0.062	0.000	0.001	0.263	0.892	0.019	0.009	1.000	0.204	0.002	0.006	0.976	0.469	0.008	0.010	1.000
Human Capital	0.996	-3.335	1.063	0.000	0.499	-0.910	1.101	0.000	0.266	0.462	0.926	0.977	0.646	-1.258	1.124	0.000
Employment	0.297	0.014	0.025	1.000	0.958	0.035	0.013	1.000	0.955	0.013	0.004	1.000	0.986	0.003	0.001	1.000
Labor Productivity	0.944	0.810	0.301	1.000	0.151	-0.069	0.239	0.113	0.970	1.509	0.364	1.000	0.173	0.084	0.249	0.851
Trade Openness	0.354	0.001	0.001	0.999	0.941	0.010	0.004	1.000	0.078	0.000	0.001	0.485	1.000	-0.012	0.002	0.000
Population	0.431	0.088	0.129	0.990	0.699	-0.614	0.510	0.000	0.943	0.765	0.287	1.000	0.888	-0.556	0.259	0.014
Inflation	0.150	0.000	0.001	0.001	0.104	0.000	0.000	0.003	0.067	0.000	0.001	0.698	0.068	0.000	0.001	0.680
Secondary Education	0.999	-0.041	0.008	0.000	0.139	0.000	0.007	0.398	0.473	0.010	0.013	0.997	0.691	-0.013	0.011	0.000
Tertiary Education	0.337	-0.008	0.014	0.001	0.067	0.001	0.008	0.942	0.998	0.110	0.027	1.000	0.219	-0.004	0.008	0.001
Energy Productivity	0.936	-0.554	0.218	0.000	0.840	-0.303	0.174	0.000	0.295	-0.107	0.201	0.001	0.148	0.020	0.062	0.999

DISCUSSION AND CONCLUSION

Similar to Okafor & Webster's (2015) study that focuses on former Soviet Union countries, a positive effect of market size is determined on FDI for the transition economies. Also, it makes sense that KOF globalization index has a positive effect on FDI because all transition countries are established after 1990 and better integration with the world economy in a short amount of time, provide more FDI. In addition, qualified labor force denoted with tertiary education has a positive effect on FDI for transition countries while employment and secondary education have negative signs on FDI. Transition countries need a more qualified labor force to integrate with the modern world. Inflation is the last variable with a negative posterior mean.

Bitzenis (2009) also investigated the determinants of FDI for Eastern European countries and economic stability, market size, infrastructure, and economic development is found effective in their work. The findings of this study and Bitzenis (2009) are in match where KOF globalization index, tertiary education, human capital, trade openness, exchange rate and Internet availability are the most important factors from this study for the developed countries.

The factors affecting FDI in developing countries have a more complex structure with market size, globalization, semi-skilled labor force, and institutional quality are the most important factors.

The results for European countries also match with the Bitzenis (2009)'s work as market size, institutional quality, infrastructure, and economic stability variables are found effective on FDI along with semi-skilled labor force variables.

This result is at the same line with Asiedu's (2006) work as institutional variables, market size variables, and stability variables are found significant with the addition of human capital. These findings also coincide with the findings of Bengoa (2003) and Sanchez-Martin et al's (2014) works.

For Asian countries, five variables have PIP values over 0.80 which are KOF globalization index, trade openness, employment, GDP and population as in Solomon & Ruiz (2012) and Masron & Nor's (2013) work. Secondary education and human capital, have PIP values over 0.60 for Asian countries.

Combining all the results of BMA would provide a better understanding of similarities and differences by continent and by development level. The only common variable that attracts FDI is the KOF globalization index regardless of the development level or continent. Adaptability to globalization is the main determinant of FDI and the integration to the world through globalization boosts FDI.

On the other side, some factors appeared to be specific for a continent or for a development level. Tertiary education is an example of this. Tertiary education serves as a proxy for the qualified labor force. While FDI in transition economies benefits from qualified labor force, it negatively affects developed countries and has no effect on developing countries. FDI in developing countries benefits from secondary education which can be thought of as a proxy for semi-skilled labor. This may be because developing countries rely on semi-skilled labor force and lack the impact of skilled labor

force on the economy. Developed countries may also have enough skilled labors and no further improvement exists by having additional skilled labors. These countries should transfer their skilled labor force to other countries with the help of integrating into the EU. Corruption is only effective in developing countries which clearly keep away FDI as corruption level increases. Transition countries and developed countries are not affected from corruption in terms of attracting FDI. Population, which can be considered as a proxy for market size, is not an important factor among transition, developed and developing countries.

Investigating the BMA results among continents also provides some information. Less corruption has a positive effect on FDI only in African countries. While secondary education is effective at European and Asian countries, tertiary education is effective on American countries. This result suggests that European and Asian countries benefit from the semi-qualified labors and American countries benefits from the qualified labors.

This study investigated the determinants of FDI in 55 countries from 4 different continents and from 3 different development levels within a panel data context with BMA. Dataset from various sources is constructed for the years of 1995-2019 for 55 countries.

BMA comes in handy when the number of independent variables is high, and it provides a weighted average of all the possible results and gives more efficient and reliable results compared to relying on a single model such as linear regression. Furthermore, this study aimed to reveal whether the determinants of FDI change by continent or development level of a country. A separate BMA analysis is conducted for each development level and each continent and results are compared and econometric inferences are made based on the results.

BMA results revealed that determinants of FDI differed by continent and development level whereas KOF globalization index is the only variable that influences FDI for each country group. This result suggests that integration into the global world is the most important factor to attract FDI. On the other side some factors appeared to be specific for a continent or for a development level. This leads to the requirement of constructing separate strategies by both MNCs and governments to maximize the benefits of FDI among continents and countries' development level.

REFERENCES

Antonakakis, N., & Tondl, G. (2012). Do determinants of FDI to developing countries differ among OECD investors? Insights from Bayesian Model Averaging. Discussion Papers 1/12, Europa-Kolleg Hamburg, Institute for European Integration.

Arbatli, E. (2011). Economic policies and FDI inflows to emerging market economies. In *IMF Working Papers, 2011*(192), 1-25. https://doi.org/10.5089/9781462306251.001

Asiedu, E. (2006). Foreign direct investment in Africa: The role of natural resources, market size, government policy, institutions and political instability. *The World Economy*, *29*(1), 63–77. https://doi.org/10.1111/j.1467-9701.2006.00758.x

Bellos, S., & Subasat, T. (2012). Governance and foreign direct investment: a panel gravity model approach. *International Review of Applied Economics*, *26(3)*, 303–328. https://doi.org/10.1080/02692171.2011.587110

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: New evidence from Latin America. *European Journal of Political Economy*, *19*(3), 529–545. https://doi.org/10.1016/S0176-2680(03)00011-9

Bilgili, F., Tülüce, N. S. H., & Doğan, İ. (2012). The determinants of FDI in Turkey: A Markov Regime-Switching approach. *Economic Modelling*, *29*(4), 1161–1169. https://doi.org/10.1016/j.econmod.2012.04.009

Billington, N. (1999). The Location of foreign direct investment: An Empirical analysis. *Applied Economics*, *31*(1), 65–76. https://doi.org/10.1080/000368499324561

Bitzenis, A. (2009). *The Balkans: Foreign Direct Investment and EU Accession*. Ashgate Publishing, Ltd.

Blonigen, B.A, & Piger, J. M.(2014). Determinants of foreign direct investment. *Canadian Journal of Economic/Revue canadienne d'économiques*, *47*(3), 775–812. https://doi.org/10.1111/caje.12091

Buchanan, B. G., Le, Q. V., & Rishi, M. (2012). Foreign direct investment and institutional quality: Some empirical evidence. *International Review of Financial Analysis*, *21*(24), 81–89. https://doi.org/10.1016/j.irfa.2011.10.001

Buckley, P. J., & Casson, M. (1976). *The future of the multinational enterprise*. London: McMillan.

Busse, M., & Hefeker, C. (2007). Political risk, institutions and foreign direct investment. *European Journal of Political Economy*, *23*(2), 397–415. https://doi.org/10.1016/j.ejpoleco.2006.02.003

Cavallari, L., & D'Addona, S. (2013). Business cycle determinants of US foreign direct investments. *Applied Economics Letters*, *20*(10), 966–970. https://doi.org/10.1080/13504851.2013.767971

Caves, R. (1971). International Corporations: The Industrial economics of foreign investment. *Economica*, *38*(149), 1–27. https://doi.org/10.2307/2551748

Chakrabarti, A. (2001). The Determinants of foreign direct investment : Sensitivity analyses of cross-country regressions. *Kyklos*, *54*(1), 89–114. https://doi.org/10.1111/1467-6435.00142

Cohen, S. D. (2007). *Multinational corporations and foreign direct investment* (Vol. 1). New York: Oxford University Press.

Cuyvers, L., Soeng, R., Plasmans, J., & Van Den Bulcke, D. (2011). Determinants of foreign direct investment in Cambodia. *Journal of Asian Economics*, *22*(3), 222–234. https://doi.org/10.1016/j.asieco.2011.02.002

Daniels, J., Radebaugh, L., & Sullivan, D. (2004). *International Business: Environments and Operations*. Prentice-Hall.

De Luca, G., & Magnus, J. R. (2011). Bayesian model averaging and weighted-average least squares: Equivariance, stability, and numerical issues. *Stata Journal*, *11*(4), 518–544. https://doi.org/10.2139/ssrn.1894610

Dunning, J. H. (1977). Trade, location of economic activity and the MNE: A search for an eclectic approach. In: Ohlin, B., Hesselborn, PO., Wijkman, P.M. (eds) *The International Allocation of Economic Activity*. Palgrave Macmillan, London. https://doi.org/10.1007/978-1-349-03196-2_38

Economou, F., Hassapis, C., Philippas, N., & Tsionas, M. (2017). Foreign direct investment determinants in OECD and developing countries. *Review of Development Economics*, *21*(3), 527–542. https://doi.org/10.1111/rode.12269

Eicher, T. S., Helfman, L., & Lenkoski, A. (2012). Robust FDI determinants: Bayesian Model Averaging in the presence of selection bias. *Journal of Macroeconomics*, *34*(3), 637–651. https://doi.org/10.1016/j.jmacro.2012.01.010

Eicher, T. S., Papageorgiou, C., & Raftery, A. E. (2011). Default priors and predictive performance in bayesian model averaging, with application to growth determinants. *Journal of Applied Econometrics*, *26*, 30–55. https://doi.org/10.1002/jae

Faeth, I. (2009). Determinants of foreign direct investment - A tale of nine theoretical models. *Journal of Economic Surveys*, *23*(1), 165–196. https://doi.org/10.1111/j.1467-6419.2008.00560.x

Fernández, C., Ley, E., & Steel, M. F. J. (2001). Benchmark priors for Bayesian model averaging. *Journal of Econometrics*, *100*(2), 381–427. https://doi.org/10.1016/S0304-4076(00)00076-2

Habib, M., & Leon, Z. (2002). Corruption and Foreign Direct Investment. *Journal of International Business Studies*, *33*(2), 291–307. https://doi.org/10.2307/3069545

Hoeting, J. A, Madigan, D., Raftery, A E., & Volinsky, C. T. (1999). Bayesian model averaging: A tutorial. *Statistical Science*, *14*(4), 382–401. https://doi.org/10.2307/2676803

Hymer, S. H. (1976). The international operations of national firms: A study of direct foreign investment. *MIT Press*.

Janicki, H. P., & Wunnava, P. V. (2004). Determinants of foreign direct investment: empirical evidence from EU accession candidates. *Applied Economics*, *36*(5), 505–509. https://doi.org/10.1080/00036840410001682214

Jones, J., & Wren, C. (2006). *Foreign Direct Investment and the Regional Economy*. Hampshire: Ashgate Publishing, Ltd..

Kinda, T. (2012a). Foreign ownership, sales to multinationals and firm efficiency: The case of Brazil, Morocco, Pakistan, South Africa and Vietnam. *Applied Economics Letters*, *19*(6), 551–555. https://doi.org/10.1080/13504851.2011.587765

Kinda, T. (2012b). On the drivers of FDI and portfolio investment: A simultaneous equations approach. *International Economic Journal*, *26*(1), 1–22. https://doi.org/10.1080/10168737.2010.538428

Kok, R., & Ersoy, B. A. (2009). Analyses of FDI determinants in developing countries. *International Journal of Social Economics*, *36*(1/2), 105–123. https://doi.org/10.1108/03068290910921226

Kolstad, I., & Wiig, A. (2012). What determines chinese outward FDI? *Journal of World Business*, *47*(1), 26–34. https://doi.org/10.1016/j.jwb.2010.10.017

Koop, G. (2003). *Bayesian Econometrics,* John Wiley & Sons.

Ley, E., & Steel, M. F. J. (2009). On the effect of prior assumptions in Bayesian model averaging with applications to growth regression. *Journal of Applied Econometrics*, *24*(4), 651–674. https://doi.org/10.1002/jae.1057

Ley, E., & Steel, M. F. J. (2012). Mixtures of g-priors for Bayesian model averaging with economic applications. *Journal of Econometrics*, *171*(2), 251–266. https://doi.org/10.1016/j.jeconom.2012.06.009

Magnus, J. R., Powell, O., & Prufer, P. (2010). A comparison of two model averaging techniques with an application to growth empirics. *Journal of Econometrics*, *154*(2), 139–153. https://doi.org/10.1016/j.jeconom.2009.07.004

Masron, T. A., & Nor, E. (2013). FDI in ASEAN-8: Does institutional quality matter? *Applied Economics Letters*, *20*(2), 186–189. https://doi.org/10.1080/13504851.2012.687090

Mathur, A., & Singh, K. (2013). Foreign direct investment, corruption and democracy. *Applied Economics*, *45*(8), 991–1002. https://doi.org/10.1080/00036846.2011.613786

Moosa, I. A. (2002). *FDI Theory, Evidence and Practice*. Palgrave Macmillan.

OECD. (2009). *OECD Benchmark definition of foreign direct investment* (Fourth Edi). Paris: OECD Publishing. https://doi.org/10.1787/9789264045743-en

Okafor, G., & Webster, A. (2015). Foreign direct investment in transition economies of europe and the former soviet union. In Hölscher, J. & Tomann, H. (Eds.), *Palgrave Dictionary of Emerging Markets and Transition Economics* (pp. 133–152). London: Palgrave Macmillan. https://doi.org/10.1007/978-1-137-37138-6_8

Páez, L. (2011). *Liberalizing financial services and foreign direct investment: Developing framework for commercial banking FDI*. Palgrave Macmillan.

Raftery, A. E., Madigan, D., & Hoeting, J. (1997). Bayesian model averaging for linear regression models. *Journal of the American Statistical Association*, 92(437), 179–191. https://doi.org/10.1080/01621459.1997.10473615

Sánchez-Martín, M. E., De Arce, R., & Escribano, G. (2014). Do changes in the rules of the game affect FDI flows in Latin America? A look at the macroeconomic, institutional and regional integration determinants of FDI. *European Journal of Political Economy*, *34*, 279–299. https://doi.org/10.1016/j.ejpoleco.2014.02.001

Sethi, D., Guisinger, S. E., Phelan, S. E., & Berg, D. M. (2003). Trends in foreign direct investment flows: a theoretical and empirical analysis. *Journal of International Business Studies*, *34*(4), 315–326. https://doi.org/10.1057/palgrave.jibs.8400034

Solomon, B., & Ruiz, I. (2012). Political risk, macroeconomic uncertainty, and the patterns of foreign direct investment. *The International Trade Journal*, *26*(2), 181–198. https://doi.org/10.1080/08853908.2012.657592

UNCTAD. (2009). UNCTAD training manual on statistics for FDI and the operations of TNCs - Volume 1 FDI Flows and Stocks. In *United Nations Conference on Trade and Development Division on Investment and Enterprise,* United Nations New York and Geneva

UNCTAD. (2018). *World investment report 2018: Investment and new industrial policies*. Geneva: United Nations Publication.

United Nations. (2018). *World Economic Situation and Prospects 2018*. New York: United Nations Publication

Vernon, R. (1966). International investment and international trade in the product cycle. *The Quarterly Journal of Economics*, *80*(2), 190–207. https://doi.org/10.2307/1880689.

Vijayakumar, N., Sridharan, P., & Rao, K. C. S. (2010). Determinants of FDI in BRICS countries: A panel analysis. *International Journal of Business Science and Applied Management*, *5*(3), 1–13.