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Determinants of Foreign Direct Investments: Dynamic Panel Data Evidence

Mahmut Erdogan[1] & Mustafa Unver[2]

[1] Faculty of Economics and Administrative Sciences, Department of Business Administration, Gümüşhane University, Gümüşhane, Turkey

[2] Faculty of Economics and Administrative Sciences, Department of Economics, Gümüşhane University, Gümüşhane, Turkey

Correspondence: Mustafa Unver, Department of Economics, Faculty of Economics and Administrative Sciences, Gümüşhane University, 29100 Gümüşhane, Turkey. E-mail: mustafaunver@gumushane.edu.tr

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Abstract

This paper examines the determinants of foreign direct investment (FDI) for 88 countries in the 1985–2011 period, using a static and dynamic panel data analysis. The results show that urbanization rate, the ratio of population over the age of 65, social security spending and health spending have a negative and statistically significant impact on FDI, while per capita GDP, GDP growth, market size, inflation rate, unemployment rate, labor force growth, credit to private sector, market capitalization and control of corruption have a statistically significant positive impact on FDI inflows. In addition, financial openness and energy imports to the host nation have both statistically significant negative and positive impacts on FDI inflows.

Keywords: economic development, financial depth, foreign direct investment, social variables, panel data analysis

1. Introduction

Global FDI flows remain as the most stable and preferred component of external finance over the past decade, despite the financial and economic crises witnessed in the global economy (UNCTAD, 2014). In this regard, researchers have been strongly motivated to search for specific variables to attract FDI inflows, based on the positive effects of FDI on certain variables in the host economies (see also Borensztein, Gregorio, & Lee, 1998; Zhang, 2001; Konings, 2001; Kambayashi & Kiyota, 2014). This concern for the determinants of FDI has resulted specifically from the increasing importance of FDI inflows in the economic development of countries. There have been many previous studies with particular focus on identifying the potential determinants of FDI by looking from different perspectives, including macroeconomic, financial, demographic, political and social determinants (see also Scott-Green & Clegg, 1999; Alsan, Bloom, & Canning, 2006; Kimino, Saal, & Driffield, 2007). On the other hand, other examples of previous literature have analyzed empirically how these selected determinants affect FDI at national, regional and global levels (see also Bende-Nabende, Ford, & Slater, 2001; Busse & Hefeker, 2007; Birsan & Buiga, 2009).

The aim of this paper is to explore the determinants of FDI inflows at a global scale, with the intention of providing both policymakers and foreign investors with empirical results in this regard. Conversely, it has two distinguishing features in its comparison of the variations in literature. First, this paper compares two different approaches to panel data analyses, being static and dynamic (Hsiao & Hsiao, 2004; Naude & Krugell, 2007); and second, it assesses whether the determinants of FDI may have different results for the three measures of FDI used in literature. For example, while Bijsterbosch and Kolasa (2010) use gross FDI inflows as a share of value added, Büthe and Milner (2008) and Singh and Jun (1995) included inward FDI stocks as a percentage of GDP and FDI inflows as a percentage of GDP, respectively. We also explain here how these determinants influence FDI inflows by submitting a comprehensive review of existing literature. The most significant measures of the determinants of FDI inflows take into account GDP per capita, GDP growth, market size, market capitalization, secondary school enrollment ratio, labor force growth, over 65 population share, urbanization rate, energy import, financial openness, domestic credit to private sector, corruption, regulatory quality, political stability, social security spending, education spending and health spending.

This paper is organized as follows. Section 2 discusses the findings of empirical literature on the determinants of FDI; while Section 3 describes the data and methodology used in the paper. The empirical results are presented in Section 4, and conclusions are drawn in Section 5.

2. Review of Literature

The empirical variables used in this paper have been adopted from previous literature on the determinants of FDI, and in this section we provide a substantial overview of this literature. There have been a number of studies discussing the relationships between economic, financial, demographic, political and social indicators and FDI inflows.

In our paper, economic indicators have been correlated with GDP per capita, growth of GDP, market size, inflation rate, unemployment rate, growth of labor force and energy import in the host country. First of all, most papers attempted to examine the effects of GDP per capita and growth of GDP on FDI inflows to indicate the economic potential of the host economy. For instance, Büthe and Milner (2008) cite the percentage change in the country's real GDP and the log of per capita GDP as traditional determinants of FDI inflows. Estimates indicate that while there was a statistically significant positive coefficient between GDP growth and FDI inflows, the per capita GDP figures were not statistically significant. Furthermore, Bilgili, Tülüce and Doğan (2012) analyzed the major determinants of FDI with quarterly data set of Turkey for the 1988-2010 period, and recorded a positive and statistically significant coefficient on GDP growth rate. In contrast, Asiedu (2002) suggests that a connection exists between real GDP per capita and FDI inflows in sub-Saharan Africa (SSA) and non-SSA countries. This paper found a negative relationship between the two variables in the SSA, but a positive and statistically significant relationship in non-SSA. While domestic markets need to increase production to obtain more profit, foreign investors expect to find a favorable investment environment. In this regard, the existence of potential for market growth implies that high economic growth supports FDI inflows due to an increase in income and consumption effects (Noorbakhsh, Paloni, & Youssef, 2001, p. 1597) (see also Braga Nonnenberg, & Cardoso Mendonca, 2004; Dornean, Işan, & Oanea, 2012; Hecock & Jepsen, 2013).

Another important economic variable affecting FDI inflows is market size. The empirical relationship between market size and FDI is a general field of interest in FDI literature, with FDI inflow contributing to local markets by market size and market growth (Demirhan & Masca, 2008, p. 357). The reason for this is that a larger market size, usually measured by in terms of GDP, GDP per capita and the log of the country's population, is thought to lead to increased FDI inflows (Büthe & Milner, 2008, p. 748; Martinez & Allard, 2009, p. 87; Vijayakumar, Perumal, & Rao, 2010, p. 5). Market size has been described as a proxy for product demand, potential growth and production volume, and so it can be expected that there a positive relationship exists between market size and FDI inflows, owing to the greater expected profitability (Bevan & Estrin, 2004, p. 778; Dornean et al., 2012, p. 1014). That said, despite the positively significant relationships identified in numerous studies, including those of Bevan and Estrin (2004), Demirhan and Masca (2008), Wahid, Sawkut and Seetanah (2009), Ranjan and Agrawal (2011), Khachoo and Khan (2012) and Chan, Hou, Li and Mountain (2014), the papers of Gani (2007) and Büthe and Milner (2008) suggested a negatively significant relationship.

On the other hand, there is both theoretical and empirical evidence indicating that many countries have been forced to reach stable economic conditions. For example, some papers argue that inflation, especially when stable and low, plays an important role in stimulating FDI, the main reason being that a high inflation rate will emerge demand contractionary pressure, and so foreign company profits composed of income generation opportunities will be affected adversely (Gedik, 2013, p. 124). FDI inflows in this respect are associated closely with low inflation rate, which implies economic stability. In other words, the lower the inflation rate, the greater the increase in the FDI inflows (Demirhan & Masca, 2008, p. 366). While Braga Nonnenberg and Cardoso Mendonca (2004), Asiedu (2006), Busse and Hefeker (2007), Demirhan and Masca (2008) and Ranjan and Agrawal (2011) all found a significant negative relationship between inflation and FDI, while Asiedu (2002) and Gedik (2013) found no statistically significant relationship among them.

The unemployment rate, as an economic indicator, is used to measure labor cost. For example, Cassou (1997) includes the unemployment rate in his determinants of FDI. The results of this paper indicate that unemployment rate has a negative significant effect on FDI inflows; in other words, when unemployment rate in recessionary times is high, FDI inflows will be lower due to the low level of profit margins. On the other hand, all types of investment depend heavily on labor costs, in that they constitute the greatest share of production costs. In this regard, for an investor it is important to recognise that the unemployment rate influences labor cost due to the associated labor market competition. Consequently, a high unemployment rate can suggest profit opportunities for production in host countries (Janicki & Wunnava, 2004, p. 506). Coughlin, Terza and Arromdee (1991) and

Boudier-Bensebaa (2005) also recorded significantly positive results, while the study of Woodward (1992) identified significantly negative results and the study of Voyer and Beamish (2004) recorded insignificant results.

Furthermore, considering the concept of the growth rate of the labor force, the availability of labor affects labor costs to a significant level, in that an abundance of labor naturally results in low labor costs associated with productivity (Noorbakhsh et al., 2001, p. 1598). Although previous empirical papers by Voyer and Beamish (2004) and Ranjan and Agrawal (2011) recorded no statistically significant results, Noorbakhsh et al. (2001) identified a positively and statistically significant relationship between the growth rate of the labor force and FDI inflows. Some papers have used the labor cost variable as a determinant of FDI, in that low labor costs can be a substantial determining factor in the investment decisions of both domestic and foreign investors. Low labor costs resulting from high population growth in developing countries has been one of most important factors influencing FDI inflows. In this regard, they are normally encouraged to invest in areas of investment where wages are subnormal. For foreign investors, it also ensures competitiveness in reaching one's objective in terms of the market share (Gedik, 2013, p. 123). In the meantime, low wage levels may mean two different approaches to foreign investors, being efficiency-seeking and market-seeking. The first of these implies that low labor cost might increase the capacity for competitiveness, while the second may lead foreign investors to have strong market expectations for the sale of produced goods. Ultimately, lower labor costs attract efficiency-seeking investors, as market-seeking investors prefer host countries in which the markets are characterized by high and rising wages (Estrin & Uvalic, 2014, p. 298). Wahid et al. (2009), Khachoo and Khan (2012) and Gedik (2013) found that labor cost was a negatively significant factor in determining FDI inflows.

Another indicator that has been used to clarify such characteristics as labor cost, quality of labor force and productivity is the secondary school enrollment variable, implying that the human capital in an economy can be used as a proxy for the flow of investment in human capital (Noorbakhsh et al., 2001, p. 1597). Nevertheless, foreign direct investors tend to focus not only on the labor costs in host country, but also on the quality of the labor force, in that a well-educated labor market may provide more profitable economic activity and be easily trained in the use of new technologies. In this regard, human capital can be used as a determinant of accessibility to skilled labor, which is an important feature in attracting foreign investors (Wahid et al., 2009, p. 6). A positive and statistically significant relationship has been identified by Noorbakhsh et al. (2001), Braga Nonnenberg and Cardoso Mendonca (2004), Egger and Winner (2005) and Wahid et al. (2009), while in contrast, Hecock and Jepsen (2013) found no empirical evidence of the effect of secondary school enrollment on FDI inflows.

Finally, a useful economic variable that may contribute to increased FDI inflows is energy imports for the production of goods and services. If a country is dependent on energy from abroad, it will generally come at a high cost. In this regard, the availability of energy is a strategic determinant of production costs, and is also necessary to reach effective industrial targets and to solve production problems (Noorbakhsh et al., 2001, p. 1598). Braga Nonnenberg and Cardoso Mendonca (2004, p. 8) examined the effect of energy consumption on location decision of FDI inflows, based on a study of 33 host countries from 1975-2000. In their paper, energy consumption was measured as per capita energy consumption, which indicates the degree of development of the industrial structure, with data collected from WDI (World Development Indicators). According to their results, energy consumption maintains a negatively and statistically significant relationship with FDI inflows, although they anticipated a positive empirical relationship among them (see also Noorbakhsh et al., 2001; Braga Nonnenberg, & Mendonca, 2004).

Having explained the economic determinants of FDI, we can now interpret the financial indicators within the host country. Various studies have attempted to explain the relationship between financial variables and FDI inflows. The financial variables addressed here will be, in turn, financial openness, credit to private sector and market capitalization. Recently, studies of financial openness or capital controls have used the KAOPEN index developed by Chinn and Ito (2002), which helps in the measurement of the intensity of capital controls (Chinn & Ito, 2006; Arestis & Caner, 2009; Grieco, Gelpi, & Warren, 2009). Asiedu and Lien (2004), on the other hand, investigated the effect of capital control policies on FDI, excluding the KAOPEN index, and mention that FDI may be decreased through capital controls, and therefore when the capital account is open in the host country, FDI inflows will be attracted there (see also Büthe & Milner, 2008). There have also been a number of papers assessing the role of the credit market on FDI inflows. For example, Noorbakhsh et al., (2001, p. 1598) used the credits to the private sector as a percentage of GDP variable rather than financial depth. Bank credits to private sector as a measure of the depth of a financial system in a comparison with the public sector is a satisfactory sign of financial development, in that the private sector is more likely to make an efficient utilization of financial resources than the public sector (Ang, 2009, p. 1597) (see also Noorbakhsh et al., 2001; Ang, 2008). Some papers use other variables as a proxy for financial factors determining FDI inflows. While arguments examine

the relationship between stock markets and FDI outflows and inflows (Dahlquist & Robertsson, 2001; Chiou, Hung, & Shu, 2013), others have embodied the market capitalization variable, as a ratio of stock market capitalization to GDP, to express the importance of financial deepening and market development (Durham, 2004; Di Giovanni, 2005).

Previous researches into FDI inflows have examined the effect of the demographic variables used in the empirical section of this paper, such as the urbanization rate and the share of population aged 65 and over. For example, low levels in urbanization rate for Brazil, India and South Africa will positively continue for future perspectives. In these economies, the share of population of working age will tend to grow by 2050, while China and Russia have worsening risks for this age group. In short, countries with a low urbanization rate may see low labor costs in the future; and furthermore, a low urbanization ratio may support a falling working age ratio through the migration of the unemployed rural workforce to urban areas in countries like China, where the urbanization rate is low (Vijayakumar et al., 2010, pp. 2-3). FDI inflows tend to come to the urbanized areas in China as a result of the agglomeration effect, which provides such advantages as the rapid spread of knowledge and economies of scale and scope (Wei, Liu, Parker, & Vaidya, 1999, p. 864) (see also He, 2002; Chen, 2009; Fan, Morck, Xu, & Yeung, 2009; Hecock & Jepsen, 2013).

A dominant driver of FDI inflows can be found in an analysis of the political landscape, referring to corruption, regulatory quality and the level of political stability or instability. Previous literature includes many studies analyzing the relationship between corruption and FDI, revealing that that corruption and the institutional environment of a host country are important determinants of FDI location choice (Egger & Winner, 2005, p. 933). The corruption variable, as a measure of institutional quality, shows the level of nepotism, excessive patronage and bribery in the political system (Asiedu, 2006, p. 69), although there are different empirical results, both positive and negative, indicating the effect of corruption on FDI inflows. While Egger and Winner (2005) and Busse and Hefeker (2007) make positive and statistically significant estimates, Smarzynska and Wei (2000), Voyer and Beamish (2004), Asiedu (2006), Gani (2007), Hecock and Jepsen (2013) came up with negative and statistically significant results. According to the Worldwide Governance Indicators, regulatory quality, as another political variable, is comprehensively identified as the sensation that the power of the government is able to adopt credible policies in the presence of regulations, and thus also contributes private sector development (see also Rammal & Zurbruegg, 2006; Gani, 2007). Finally, the political instability variable, or how the host country is evaluated in terms of its political and institutional environment, has emerged as an important indicator for the entry of multinational corporations (Wahid et al., 2009, p. 6) (see also Li & Resnick, 2003; Zhao, 2003; Asiedu & Lien, 2004; Asiedu, 2006; Büthe & Milner, 2008; Wahid et al., 2009; Gedik, 2013 for negative and significant results; Asiedu, 2002; Demirhan & Masca, 2008 for insignificant results).

From the perspective of investors, there is strong empirical evidence in literature that investments in developing countries are promoted through appropriate policies, in particular, through very high education spending, but political leaders consider that social spending should be deducted for social programs because there is no any contribution of these resources for investors. It is implied, therefore, that leaders should fund better social investment programs to attract FDI from abroad (Hecock & Jepsen, 2013, p. 157). As an example of this funding, it is understood that improving the quality of education leads to the generation of a higher quality labor force with better skills, which ensures the reduction of labor costs for investors in all sectors (Hecock & Jepsen, 2013, p. 158) (see also Chen, 2009; Hecock & Jepsen, 2013). Another illustration of this can be seen in the study of Alsan et al. (2006) of the effect of population health on gross inflows of FDI for 74 industrialized and developing countries between 1980 and 2000, whose findings, consistent with literature, showed that rising life expectancy increases FDI inflows in developing countries (see also Hecock & Jepsen, 2013).

3. Data and Methodology

In an attempt to analyze the determinants of FDI, 1,929 observations from 88 countries related to the 1985-2011 period were garnered from the WDI. In this study, three different dependent variables are used to represent FDI, p. First is ***fdigdp,*** referring to the ratio of FDI (%) within GDP, following the study of Hecock and Jepsen (2013); second is ***fdiva,*** representing FDI value added, following Cipollina, Giovannetti, Pietrovito and Pozzolo (2012); and third is ***fdinward,*** referring to the amount of FDI transferred from one country to another within a specified year, following Estrin and Uvalic (2014).

The explanatory variable is ***lpcgdp,*** representing the log value of per capita GDP to control for economic development level. In order to control for economic development, we use the ***gdpg*** variable, representing the percentage of change in the country's GDP. Furthermore, we used the ***marketsize*** variable to represent the logarithmic value of the country population to control for market size of host country, and the ***inflation*** variable

as a proxy for economic stability. The ***unemployment*** variable is included another indicator of labor cost while the ***laborfg*** variable, which is an indicator for labor growth rate, measures labor presence rather than labor costs, and given that as growth rate increases, labor costs decrease, it can be used for an indicator for labor costs as well. We used the ***enrol*** variable to represent secondary school enrollment ratio to show the impact of human capital on investments, quality of labor force and labor cost for productivity, and energy is one of the main infrastructure components when considering a location in which to invest, with investors choosing locations with cheaper energy resources so as to decrease manufacturing costs. In this regard, this study adopts the ***energy*** variable as a production cost, defining the presence of energy, as ratio of the net energy import by dividing energy use after subtracting energy production from energy use. The ***finop*** variable, formed by the KAOPEN index, as an indicator of the openness of the country's capital account, representing financial openness and also financial freedom is an important factor in the sustainability of capital flow to developing countries; hence, to define the depth of the financial sector, private sector credits are used, defined by the ***creps*** variable; and the ***markcap*** variable, defining capital market development, is represented by the ratio of the outstanding stock value to GDP. The ***urban*** variable shows the rate of urbanization; the ***over65*** variable represents the ratio of population over the age of 65 within total. The ***socialsec*** variable represents the ratio of social security expenditures to GDP; ***educ*** shows the ratio of education expenditures to GDP; the ***health*** variable shows the ratio of health expenditures to GDP. FDI is affected by both economic and political variables. Corruption, regulations and political stability in an invested country fall among these variables. The level of ***corruption*****,** as a measure of the rate of corruption in a country, is scored in a range of 1 and 10, with higher values referring to a lower rate of corruption. The ***regul*** variable refers to governments' skill in designing and executing regulations in support of the private sector; with higher values implying better applications, and lower values indicating poor applications. The ***polstab*** variable shows the perception of potential political instability, and is sourced from World Bank Worldwide Governance Indicators.

This study adopts both static and dynamic panel data methods. The following equation (1) was formed using the static panel method.

$$FDI_{it} = \alpha + \beta_1 X_{it} + e_{it} \text{ for } i = 1, \ldots, N \text{ and } t = 2, \ldots, T \quad (1)$$

Where FDI_{it} the level of FDI for country i at the time t as percentages of GDP; X_{it} is a vector of explanatory variables for country i at the time$t$. There could be a problem using past levels of dependent variable which is correlated with error term in dynamic panel data models. In order to overcome these problems, when first difference equations are calculated, the variability between groups is filtered from dynamic panel data model. In this study, FDI determinants are also analyzed by a dynamic model, as shown in Equation (2):

$$FDI_{it} = \alpha FDI_{it-1} + \beta_1 X_{it} + \beta_2 X_{it-1} + \eta_i + \nu_{it} \text{ for } i = 1, \ldots, N \text{ and } t = 2, \ldots, T \quad (2)$$

Where, $e_{it} = \eta_i + \nu_{it}$ is the usual 'fixed effects' decomposition of the error term. FDI_{it-1} is the ratio of net foreign direct investments to GDP in country *i* at the time *t*-1. X_{it-1} shows the control variables in a country *i* at the time *t*-1.

4. Empirical Findings

The empirical analysis of this study is divided into two parts. The first part looks at the fixed effect results of FDI, while the second analyses the GMM system results of FDI. A fixed effect panel regression has been adopted in previous studies (Tintin, 2013; Dornean et al., 2012; Villaverde & Maza, 2012). Table 1 shows the results in which fdigdp was used as a dependent variable. Following Büthe and Milner (2008), we developed Model 1, which included market size, economic growth and economic development, as well as financial openness, private sector credits and secondary school enrollment. In line with our expectations and economic theory, the lag of lpcgdp variable is found to be positive and statistically significant at 1% level. This empirical finding supports Parletun and Thede (2008); Ang (2008); Demirhan and Masca (2008); and Vijayakumar et al.'s (2010)'s results, implying that economic development encourages FDI into an economy, and that GDP has a significant positive effect on FDI inflows. In Table 2, where FDI value added is used as a dependent variable, we find a positive significant relation, while in Table 3, usage of fdinward as a dependent variable did not show significant statistically powerful evidence.

The gdpg variable had positive and statistically significant coefficients in all models, as shown in Table 1, Table 2 and Table 3. As fast growing economies will have more opportunities for gain than those that are slow growing, in that they will attract more FDI. This empirical finding proves that an economic growth rate that is realized on previous terms is an important factor in attracting more FDI, which is very sensitive to economic growth. The findings related to economic growth are similar to the results from Noorbakhsh et al. (2001).

FDI realized in previous years is one of the important components of further FDI. In all models, the lag of FDI variable is found to be positive and statistically significant with FDI. In this regard, FDI realized in previous years increases the current level, and this finding supports those of Noorbakhsh et al. (2001) and Hecock and Jepsen (2013). Our empirical findings for related to financial openness on FDI are rather controversial. In Table 1 we found that it has a positive effect on FDI, while the opposite was true in Table 3, in which it is found that it impacts FDI negatively. In contrast, marketsize variable is positive and statistically significant only in Model 1 in Table 1, which indicates that economies with low labor costs attract more FDI.

Table 1. The determinants of foreign direct investments

Dependent Variable	(1)	(2)	(3)	(4)
Fdigdp	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
L.lpcgdp	3.838***	4.819**	5.019**	5.091**
	(1.183)	(2.242)	(2.423)	(2.364)
L.gdpg	13.77***	18.23***	18.72***	18.48***
	(2.000)	(3.050)	(3.310)	(3.316)
L.fdigdp	0.374***	0.310***	0.328***	0.328***
	(0.0217)	(0.0284)	(0.0303)	(0.0302)
L.enrol	-0.739	-1.442	-0.648	-0.809
	(0.888)	(1.609)	(1.853)	(1.834)
L.finop	0.236***	0.115	0.138	0.144
	(0.0868)	(0.181)	(0.200)	(0.197)
L.marketsize	4.556**	-2.070	-0.0737	0.599
	(2.136)	(5.723)	(5.859)	(5.837)
L.creps	0.868**	0.911	0.898	0.960
	(0.347)	(0.567)	(0.651)	(0.653)
Laborfg		15.19*	18.33**	18.13**
		(7.980)	(8.824)	(8.796)
Corruption		0.461*		
		(0.271)		
Regul			0.359	
			(0.667)	
Polstab				0.565
				(0.488)
Constant	-45.17***	-3.369	-16.83	-21.64
	(14.13)	(38.56)	(38.84)	(38.88)
Observations	1,929	1,209	1,093	1,093
R-squared	0.246	0.154	0.167	0.168
Number of id	88	88	88	88
Hausman test	372.87	229.24	397.82	951.12

Note. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

For all models in the three tables, the creps variable coefficient is positive and statistically significant at a 1% level, and there is empirical evidence that as the private sector credits increase, the economy becomes more attractive for foreign investment. Increase in labor force is one of the factors impacting FDI positively, and in all models in Table 1 and Table 2, except for Model 1 in Table 1, the laborfg variable was found to be positive and statistically significant.

Table 2. The determinants of foreign direct investments

Dependent Variable	(1)	(2)	(3)
fdiva	Fixed Effects	Fixed Effects	Fixed Effects
L.lpcgdp	0.0191	0.0482**	0.0555*
	(0.0335)	(0.0208)	(0.0300)
L.gdpg	0.240***	0.183***	0.224***
	(0.0485)	(0.0289)	(0.0371)
L.fdiva	0.378***	0.362***	0.321***
	(0.0368)	(0.0253)	(0.0301)
L.finop	-0.000844	0.00222	0.000996
	(0.00248)	(0.00141)	(0.00224)
L.marketsize	-0.0883	0.0526	-0.0415
	(0.0843)	(0.0383)	(0.0688)
creps	0.0580***	0.0254***	0.0306***
	(0.0106)	(0.00522)	(0.00702)
laborfg	0.185	0.121*	0.169*
	(0.117)	(0.0711)	(0.0970)
socialsec	-0.00757**		
	(0.00371)		
over65		-0.269*	-0.507**
		(0.147)	(0.220)
corruption			0.00790**
			(0.00330)
Constant	0.563	-0.527**	0.0982
	(0.575)	(0.253)	(0.468)
Observations	724	1,505	1,108
R-squared	0.246	0.231	0.178
Number of id	54	82	82
Hausman test	161.69	325.60	392.64

Note. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

There is a positive statistically significant relationship between the corruption index and FDI. Economies with higher corruption attract less FDI, and this empirical finding is in line with Alsan et al.'s (2006) finding that the type or means of corruption impacts the economy. These economic variables explain about 24% of the changes in variance of FDI, and in addition, the urban variable is found to be negatively statistically significant in Model 2 in Table 3. In this regard, an increase in qualified labor alongside increased urbanization results in a decrease in FDI.

The socialsec variable in Table 2 has a negative and statistically significant coefficient. Economies with high social security expenditures attract less FDI, just as economies with an older population attract less FDI as well (Table 1 and 2). There is also evidence that less FDI is made in economies with high health expenditures (Table 3). On the other hand, the markcap variable is found to be positive and statistically significant at a 1% level, which makes a developed market capital economy more attractive for FDI (Table 3). The energy variable coefficient is found to be positive and statistically significant, and as energy usage increases, economies attract more FDI.

Table 3. The determinants of foreign direct investments

Depenedent Variable	(1)	(2)
fdinward	Fixed Effects	Fixed Effects
L.lpcgdp	0.125	-0.875
	(3.763)	(4.153)
L.gdpg	21.65***	19.54***
	(4.657)	(4.679)
L.fdinward	0.336***	0.309***
	(0.0400)	(0.0401)
L.finop	-0.625***	-0.594**
	(0.241)	(0.238)
L.marketsize	2.063	7.471
	(11.73)	(11.68)
creps	4.087***	4.479***
	(0.925)	(0.910)
urban	-18.78	-25.70*
	(12.61)	(14.04)
socialsec	-0.178	0.556
	(0.393)	(0.460)
educ	0.285	0.384
	(0.336)	(0.333)
health		-0.810***
		(0.256)
over65		20.79
		(26.64)
markcap	0.0351***	0.0344***
	(0.00653)	(0.00647)
energy	1.339*	1.714**
	(0.772)	(0.774)
enrol	-2.397	
	(2.528)	
Constant	-1.871	-32.90
	(76.61)	(74.78)
Observations	487	487
R-squared	0.361	0.375
Number of id	48	48
Hausman test	154.43	158.30

Note. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 4 summarizes the GMM system estimation results that define FDI factors. A one-year delay in FDI is found to be positive and statistically significant in all models, and this result supports the studies of Walsh and Yu (2010), Blonigen and Piger (2011), and Gedik (2013). Similarly, the gdpg variable is also positive and statistically significant at a 1% level in Model 2, and this empirical result reinforces the finding that states that countries with increasing economic growth attract more FDI. There is no statistically significant proof of the effect of urbanization on FDI, while the unemployment variable is found to be positive and statistically significant in every model. High unemployment rates decrease labor costs in a country, which will thus attract more FDI. These results support the studies of Walsh and Yu (2010), Ranjan and Agrawal (2011), and Gedik (2013). Unlike in the static models, the marketsize variable is found to be positive and statistically significant in every model–a 1 percent increase in the marketsize variable leads to a greater than 1% increase in FDI, which shows that foreign investors are very sensitive to market sizing. The corruption variable is positive but not statistically significant in every model, while the over65 variable is negative and statistically significant only in Model 3. Surprisingly, a positive and statistically significant relationship exists between inflation and FDI only in Model 1; and the energy variable is negative and statistically significant at a 10% level in Model 2. The lpcgdp variable is positive and statistically significant in Model 3, which has satisfactory supportive statistics.

Table 4. System GMM results for the determinants of FDI

	(1)	(2)	(3)
Dynamic	GMM System	GMM System	GMM System
L.fdigdp	1.533***	1.765***	1.846***
	(0.131)	(0.202)	(0.204)
gdpg		17.62***	
		(6.502)	
urban	-1.010	-0.654	-3.315
	(1.155)	(1.425)	(2.210)
unemployment	4.567**	4.967*	11.67***
	(2.051)	(2.824)	(3.510)
marketsize	1.256***	1.496***	1.994***
	(0.449)	(0.541)	(0.599)
corruption	0.203	0.223	0.0962
	(0.129)	(0.180)	(0.162)
over65	-2.349	-1.583	-16.51*
	(4.008)	(6.119)	(8.288)
inflation	1.269*	0.906	1.116
	(0.699)	(1.998)	(0.875)
health	-0.0171	0.0410	-0.0415
	(0.0632)	(0.107)	(0.0884)
creps	-0.348	0.246	-0.608
	(0.320)	(0.424)	(0.498)
enrol	-0.0380	-0.432	-0.882
	(0.782)	(1.224)	(1.176)
markcap	7.85e-05	-0.00416	-0.00584
	(0.00357)	(0.00502)	(0.00507)
finop	0.00579	-0.0897	0.00995
	(0.104)	(0.155)	(0.151)
energy	-0.144	-0.253*	-0.108
	(0.0889)	(0.131)	(0.105)
lpcgdp			3.009**
			(1.260)
Constant	-11.33***	-15.24***	-25.15***
	(3.756)	(4.683)	(7.122)
Observations	1,071	987	1,064
Number of id	74	73	74
m1	-2.76(0.006)	-2.44(0.015)	-2.42(0.016)
m2	0.56(0.574)	0.55(0.580)	0.52(0.606)
Sargan	125.40(0.000)	48.42(0.000)	41.32(0.000)
Hansen	3.77(0.287)	1.53(0.466)	1.17(0.558)

Note. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

5. Conclusion

Although there have been many studies of indicators of FDI, discussions about the direction of the effects of these indicators have not yet been concluded. Most analyses come up with empirical findings by making estimations that take into account strong internalization problems. This study aims primarily to identify the static and dynamic determinants of FDI, and to this end, the FDI indicators of 88 countries for the 1985-2011 period are analyzed through both static and dynamic panel data methods and the GMM estimation method.

This empirical study investigates three different components of FDI, defined as fdigdp, fdiva and fdinward, and the results show that social security expenditures, health expenditures and corruption levels, which have been overlooked in previous studies, have statistically significant effects on FDI. It is also revealed that FDI is significantly affected by previous FDI levels, and economic growth and development rates. Moreover, the degree of financial openness, market size, private sector credits and labor force growth rates are other important factors

affecting increases in FDI.

While countries with low corruption levels attract more investments, countries with high social security and health expenditures, which tend to have high levels of urbanization and have older populations, attract less investments. Likewise, the level of development of the capital markets and higher energy utilization are also important factors in attracting more foreign investment.

Policies supporting the inflows of FDI could be speed technologically advanced investments up in the economy. This study claims that policymakers should take into account elevation of barriers restricting the access of foreign investors to the markets. Further studies can replicate this studies analysis using a different sample of data so as to identify if there are some special characteristics of selected countries which may affect the intensity of variables on FDI. However further studies can look for how much government policies could help in inviting FDI to economies. Also what can governments do to attract more FDI? is an important question for further research.

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Appendix A. List of Countries

Countries	Years	Countries	Years	Countries	Years
Albania	1992-2011	Greece	1985-2011	Paraguay	1985-2011
Algeria	1985-2011	Hong Kong	1998-2011	Peru	1985-2011
Argentina	1985-2011	Hungary	1990-2011	Philippines	1985-2011
Australia	1985-2011	Iceland	1985-2011	Poland	1990-2011
Austria	1985-2011	Indonesia	1985-2011	Portugal	1985-2011
Barbados	1985-2011	Iran	1985-2011	Romania	1990-2011
Belgium	1985-2011	Ireland	2000-2011	Russian Federation	1992-2011
Belize	1985-2011	Israel	1985-2011	Serbia	1997-2011
Bolivia	1985-2011	Italy	1985-2011	Slovakia	1993-2011
Brazil	1985-2011	Japan	1985-2011	Slovenia	1992-2011
Bulgaria	1990-2011	Jordan	1985-2011	South Africa	1985-2011
Canada	1985-2011	Kazakhstan	1992-2011	Spain	1985-2011
Chile	1985-2011	Korea Republic	1985-2011	Sri Lanka	1985-2011
China	1985-2011	Kuwait	1995-2011	Sudan Republic	1985-2011
Colombia	1985-2011	Kyrgyzstan	1994-2011	Sweden	1985-2011
Costa Rica	1985-2011	Latvia	1992-2011	Switzerland	1985-2011
Croatia	1995-2011	Lithuania	1993-2011	Syrian Arab Republic	1985-2011
Cuba	1985-2011	Macedonia	1994-2011	Tajikistan	1992-2011
Cyprus	1985-2011	Malaysia	1985-2011	Thailand	1985-2011
Czech Republic	1993-2011	Malta	1985-2011	Trinidad and Tobago	1985-2011
Denmark	1985-2011	Mauritius	1985-2011	Tunisia	1985-2011
Ecuador	1985-2011	Mexico	1985-2011	Turkey	1985-2011
Egypt	1985-2011	Moldova	1922-2011	Ukraine	1992-2011
El Salvador	1990-2011	Morocco	1985-2011	United Kingdom	1985-2011
Estonia	1995-2011	Netherlands	1985-2011	United States	1985-2011
Fiji	1985-2011	New Zealand	1985-2011	Uruguay	1985-2011
Finland	1985-2011	Nicaragua	1985-2011	Uzbekistan	1992-2011
France	1985-2011	Nigeria	2000-2011	Venezuela	1985-2011
Georgia	1997-2011	Norway	1985-2011		
Germany	1985-2011	Pakistan	1985-2011		

Appendix B. Definitions and Sources of Variables

Variable Name	Definition	Source
fdigdp	FDI, net inflows (% of GDP)	WDI
fdiva	FDI inflow (Net inflows, BoP current US$)/value added at factor cost (current US$)	WDI
fdinward	FDI, net inwards (% of GDP)	UNCTAD
lpcgdp	Log of GDP per capita (constant 2005 US$)	WDI
gdpg	Growth of GDP (constant 2005 US$)	WDI
marketsize	Log of the country population	WDI
inflation	Consumer prices (annual % change)	WDI
unemployment	Unemployment rate	ILO
laborfg	Growth of labor force	WDI
enrol	Secondary school enrollment (% of gross)	WDI
energy	Energy import, (energyuse-energyproduction)/energyuse	WDI
finop	Financial openness (KAOPEN index)	The Chinn-Ito Index
creps	Domestic credit to private sector (% of GDP)	WDI
markcap	Market capitalization of listed companies (% of GDP)	WDI
urban	Urban population (% of total population)	WDI
over65	Population ages 65 and above (% of total population)	WDI
socialsec	Social security spending (% of GDP)	WHO
educ	Education spending (% of GDP)	WDI
health	Health spending (% of GDP)	WHO
corruption	Control of corruption	WDI
regul	Regulatory Quality	WDI
polstab	Politic stability and absence of violence/terrorism	WDI