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IES Working Paper: 9/2017



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Foreign Direct Investments, Institutional Framework and Economic Growth

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Abstract:

This paper explores the role of institutional quality in economic growth and more specifically the role it plays via the channel of foreign direct investments. This paper uses economic performance-relevant indicators of institutional quality (both an aggregated variable of institutional quality and individual indicators) to evaluate their direct impact on economic growth and their indirect impact on economic growth via foreign direct investments. This paper uses a larger dataset of 104 countries and applies GMM estimation method to a dynamic panel data and finds that FDI inflows cause stronger economic growth in countries with better institutional quality compared to countries with lower institutional quality. The same is true for individual institutional quality measure.

Keywords: Foreign Direct Investments, Institutional Quality, Economic Growth,
GMM

JEL: F23, F43, E23

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1. Introduction

Globalization has led to a greater opening of the world economies to foreign trade and investments. Foreign direct investments have been one big feature of this phenomenon. Countries around the world have opened their economies and created conditions to attract foreign investments in the hope of fostering economic growth. Theoretical support for such policies is provided by the endogenous growth model which suggests a FDI spillover to domestic firms and a positive effect on productivity and growth (Helpman & Grossman, 1991) (Barro & Sala-i-Martin, 1997). The increase in cross border investments has led to an enormous amount of energy and time being allocated towards finding out the impact of FDI on host economies.

However, while theoretical studies consistently report a positive effect of FDI for the domestic economy, empirical studies are still producing conflicting results. Therefore, the FDI-growth relationship is considered mixed at best (Gorg & Greenaway, 2004)¹. (Bruno & Campos, 2013) in a metadata study of 1102 estimates found that about 44% of the research papers discover a positive and significant impact of FDI on growth, 44% were insignificant while 12% of the studies reported a negative and significant effect of FDI on the home country economic growth.

Many recent studies have concluded that the FDI-growth relationship is contingent on other factors. These factors are related to the absorptive capacity of the host country and empirical studies have identified following ones: level of economic development (Blomstrom, Lipsey, & Zejan, 1994), financial markets development (Hermes & Lensink, 2003) (Alfaro L. , Chanda, Kalemli-Ozcan, & Sayek, 2004) (Azman-Saini, Siong, & Ahmad, 2010), human capital (Borensztein, De Gregorio, & Lee, 1998), economic stability and liberal markets (Bengoa & Sanchez-Robles, 2003), trade liberalization (Balasubramanyam, 1996), technology gap between the host and origin country (Havranek & Irsova, 2011) and shared ownership of the FDI firm (Javorcik, 2004). This paper agrees with the idea of absorptive captivity and its importance in defining the FDI-growth relationship. This paper, however, focuses on another very important and rather less explored link in the literature: the role of institutional quality in

¹ Gorg and Greenway (2004) reviewed a large number of firm-level studies conducted on FDI spillovers and found that a mere 24% reported a positive spillover.

defining the FDI-growth relationship. Countries with better institutions demonstrate better economic performance (James & Yanikkaya, 2006). Property rights are found to be strongly associated with investment and economic growth (Stephen & Philip, 1995). Institutions and different institutional quality variables like corruption (Shleifer & Robert, 1993; Mauro, 1995) rule of law, political rights and civil liberties (Sala-i-Martin, 1997) are consistently found to be significantly affecting economic growth.

Institutional heterogeneity is strongly associated with variations in economic performance across countries and regions; i.e. countries with weaker institutions perform badly while countries with better institutions tend to perform better. It is therefore an imperative to assume a significant role for institutional quality altering the FDI-growth nexus. While stronger institutions like good and efficient governance, rule of law and lack of corruption can speed up the process of technology spillover to domestic firms, weak institutions like presence of corruption, lack of rule of law and property rights could prevent domestic firms from reaping the benefits of the knowledge spillover from the FDI firms. Therefore, the same level of FDI could be expected to induce different level of growth in different countries with heterogeneous levels of institutional quality. While there is a strong focus in exploring the role of institutional quality on attracting foreign direct investments and studies have found institutions to be a strong determinant of FDI inflow (see (Busse & Hefeker, 2007) (Ali, Fiess, & MacDonald, 2010) (Daude & Stein, 1997)), very limited research is focused in exploring the FDI-growth altering effect of institutional quality (see (McCloud & Kumbhakar, 2012) (Farole & Winkler, 2012) (Jude & Levieuge, 2015)). Therefore, this study is an attempt to investigate the impact of some of the most relevant and precise institutional indicators like rule of law, control of corruption, government effectiveness and absence of violence and regulatory quality on the FDI-growth relationship.

The main contribution of this paper is as follows. This paper develops conceptual arguments exploring the channels through which institutional quality might affect economic growth and more important to show how the institutional quality differences might explain the heterogeneous FDI-growth relationship across countries. Secondly the paper uses a larger dataset of 104 countries and it uses comprehensive and the most economic performance-

relevant indicators of institutional quality. These indicators are based on Worldwide Governance Indicators (WGI)² project (Kaufmann, Kraay, & Zoido-Lobaton, 2002).

Thirdly and more importantly this paper uses a dynamic panel data model and uses GMM estimation based on (Arellano & Bond, 1991) to investigate the FDI-growth relationship and the potential role the institutional quality plays in altering this FDI-growth relationship. The dynamic nature of the model enables us to capture the impact of any relevant variables ignored in the model through the lagged value of the dependent variable. The model uses lagged FDI as an instrument for the FDI which is considered to be endogenous.

FDI induced growth enhancement effect of institutional quality is further explained in the next section. The role of each institutional quality indicator is estimated in order to distinguish among them and evaluate the relative importance of each indicator in attracting foreign direct investments and boosting economic growth.

This paper finds a strong positive impact of institutional quality on economic growth. While this paper finds a significant impact of FDI inflow on country economic growth, it also concludes that better institutional quality of the receiving country enhances that FDI-induced growth. Investigating individual institutional quality indicators, this study finds that control of corruption and rule of law has a significant positive impact on economic growth as well as enhancing the FDI-induced growth. Government effectiveness and regulatory quality both have a significant positive impact on economic growth through FDI. However, government effectiveness doesn't have any significant direct effect on economic growth while regulatory quality is found to have a negative direct effect on economic growth.

This paper is organized as follows: Section II describes the main arguments explaining the channels through which institutional quality might affect economic growth and alter the play in altering the FDI-growth relationship. Section III describes the data and methodology used in the paper while section IV presents the findings of the paper. Section V concludes the paper.

² WGI indicators database and methodology can be accessed at <http://info.worldbank.org/governance/wgi/#home>

2. Why Institutional Quality May Alter the FDI-Growth Relationship?

Many studies have considered the role of institutional quality in attracting FDI into the country (see (Bénassy-Quéré, Coupet, & Mayer, 2005; Daude & Ernesto, 2007; Ali, Fiess, & MacDonald, 2010)). However, there are very few studies conducted that investigate the FDI-growth relationship altering effect of institutional heterogeneity across countries. In this section, this paper focuses on building up the conceptual framework of the channels through which institutional quality affects the FDI-growth relationship.

The role of FDI in economic growth of the host country is twofold. The first and most important effect of FDI on the host country economic growth is the knowledge spillover. The spillover happens through domestic firms imitating the technology demonstrated by the multinational enterprise (MNE), competition, skilled labor mobility and backward and forward linkages (Crespo & Fontoura, 2007). In another study of the FDI spillovers (Fosfuri, Motta, & Ronde, 2001), the authors conclude that knowledge spillovers are generated through MNE skilled labor moving to the domestic firms. Good institutions like the rule of law, lack of corruption, efficient government and good regulations can create synchronization between the domestic and foreign firms by providing them with competitive play field and encourage them for healthy competition. Bad institutions on the other hand lead to increasing transaction costs and higher risks which will further lead to lowering of investments and long term commitment of the foreign firms towards the country. At the same time, many studies have shown that institutional heterogeneity and differences in government efficiency and in political freedom are responsible for differences in capital accumulation and labor productivity (see for example (Hall & Jones, 1999) (La Porta, 1999)). Therefore, we consider the institutional quality to be vital for the knowledge spillovers to take place. Quality institutional framework motivates and enables domestic firms to react to the foreign firms entering the country which creates the spillover effect of FDI (Meyer & Sinani, 2009). While good quality institutions are associated both with the better economic performance³ and the ability to attract into the country the FDI with high spillovers potential, bad institutional quality is very much likely to attract resource extracting FDI which have just a limited potential for spillover and growth (Jude & Levieuge, 2015). Better institutional quality like rule of law and efficient governance also provide confidence to the investor and it might

³ (see (Rodrik, Subramanian, & Trebbi, 2004) (Acemoglu & Johnson, 2005))

affect the mode of FDI entry into the country, making greenfield entry more likely than merger and acquisitions, which would be the FDI mode of choice in a riskier environment. Greenfields are associated with larger growth enhancing potential (Wang & Wong, 2009). Therefore, by encouraging greenfield investments instead of mergers and acquisitions institutional quality is potentially influencing the spillover effect of FDI.

Another very important channel of effect is that foreign investments are expected to increase competition in their industry (Blomström & Kokko, 2003) (Driffield & Love, 2007), what will lead to efficiency and innovations in the industry as a whole. Especially the leading domestic firms adopt innovations and insure efficiency in order to meet the challenge of intensified competition. (Brahim & Rachdi, 2014) argue that institutional quality creates incentives and influences competition in the market and knowledge spillovers. Quality institutional framework incentivizes investments into innovations and meets the challenges of increased competition (Peng, Wang, & Jiang, 2008).

The second main channel through which FDI affects economic growth in the host country is through the capital accumulation. While some studies have shown that FDI has a crowding out effect in the short run (Mody & Murshid, 2005), others have argued that better institutional quality would encourage foreign investors to invest into industries with the lesser density of domestic firms. This will encourage greater capital accumulation in the sector and the potential benefits for the domestic economy are expected to be high. Sound institutions lead to a surge in demand in industries propelled by the presence of foreign firms. Finally, studies have shown that low institutional quality shifts exports from manufacturing goods to non-manufacturing goods (Kaufmann, Kraay, & Zoido-Lobaton, 1999) which in turn lower domestic economic performance.

In line with all the above arguments, this paper expects the FDI-growth relationship to be conditional on the quality of institutions in the host country. It expects that better institutional quality contributes to the FDI induced growth both through spillovers enhancement and through capital accumulation.

3. Methodology and Data

There are numerous studies conducted which are focused on the absorptive capacity of the receiving country. The role of different variables as absorptive capacity enhancement variables and their impact on the FDI-growth relationship have been explored. In a cross-country study (Alfaro L. , Chanda, Ozcan, & Sayek, 2010) studied the role that financial markets play in enhancing the absorptive capacity of the home country and ultimately enabling the country to receive higher FDI spillovers. (Harms & Meon, 2011) studied the comparative impact of greenfield FDI and mergers and acquisitions and concluded against any role of political stability or corruption in the FDI-growth relationship.

Most of the existing studies conducted on the absorptive capacity of the host country are based on panel data fixed/random effect models or LSDV models. Most of these models are based on the assumption of homogeneity of effect across the panel which is a strong assumption to make.

This paper uses a dynamic panel data model and GMM estimation method to investigate the impact of FDI inflow on economic growth and the role of institutional quality in altering that FDI-growth relationship. In the first step, a simple dynamic panel data model is estimated to evaluate the impact of FDI on economic growth.

$$Y_{it} = \alpha Y_{it-1} + \gamma FDI_{it} + X_{it} \beta + v_{it} \quad (1)$$

where Y_{it} is real GDP growth rate per capita, Y_{it-1} is the lagged value of real GDP growth rate per capita, FDI is the ratio of foreign direct investments inflow to GDP, X represents the control variables including population growth rate, initial real GDP per capita, inflation rate (CPI), ratio of domestic investments to GDP, ratio of government spending to GDP, ratio of trade volume to GDP and the ratio of money supply (M2) to GDP and v_{it} is the random error term. The estimation of the above model will enable to see what impact do FDI inflow and institutional quality have on the real economic growth of the host country.

With the estimation of the above model, some specification issues are expected, first and foremost the endogeneity of FDI. Many studies have adopted different techniques and used different variables in order to deal with the issue of FDI endogeneity. Lagged value of FDI is widely used as an instrument for FDI to deal with the issue (see (Alfaro L. , Chanda, Kalemli-Ozcan, & Sayeknomics, 2004). This is because FDI is considered to be reinforcing itself

overtime (Wheeler & Mody, 1992). The dynamic nature of the model enables us to deal with this issue and therefore lagged value of FDI is used to deal with the endogeneity issue.

In order to investigate the role of institutional quality on economic growth and further its role in altering the FDI-growth relationship, the following equation (2) is estimated using GMM estimation.

$$Y_{it} = \alpha Y_{it-1} + \gamma FDI_{it} + \theta Inst_{it} + \varphi (FDI_{it} * Inst_{it}) + X_{it} \beta + \eta_{it} \quad (2)$$

where $\eta_{it} = \mu_i + \delta_{it}$

$Inst_{it}$ is the institutional quality and $(FDI_{it} * Inst_{it})$ is the interaction term between the FDI inflow and institutional quality.

This equation quantifies the impact of institutional quality, FDI, lagged value of economic growth and the control variables on economic growth. The dynamic nature of the equation with the lagged value of the dependent variable included as an explanatory variable enables us to capture any relevant variable excluded from the model. This equation enables us to check if institutional quality and FDI inflow have an impact on economic growth and if inclusion of institutional quality variable in the model will alter the FDI-growth relationship or not. A similar dynamic panel data model was used by (Acemoglu & Johnson, 2005) to estimate the role of democracy in economic growth. This paper adopts a similar dynamic panel data model to evaluate the impact of institutional quality on economic growth and FDI-growth relationship.

In order to investigate the effect of FDI on host country economic growth and the FDI-growth relationship, this paper uses the annual real GDP per capita growth rate and FDI inflows as a share of GDP. FDI as a share of GDP is used by most of the studies conducted on the subject and it allows us to take into account the relative size of the country's economy. In order to control for the determinants of economic growth, the study uses gross domestic capital formation, the population growth rate, trade openness, the annual inflation rate and the government expenditure. Trade volume is used as proxy variable for trade openness and government expenditure is used as proxy variable of the government fiscal policy. There is an unanimity about the use of these variables in the recent literature about the economic growth. Data on all these variables are obtained from the World Bank database⁴.

⁴ World Bank database can be accessed from <http://databank.worldbank.org/data/home.aspx>

Table 1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Real GDP Growth/Capita	2.516	3.761	-18.874	33.030
FDI/GDP	0.056	0.197	0.00	4.767
Initial GDP/Capita	13789.14	17728.53	155.764	102910.4
Population Growth	1.423	1.520	-3.820	17.624
Inflation	0.223	5.996	-0.048	244.1
Investment/GDP	0.231	0.067	0.002	0.579
Trade/GDP	0.816	0.462	0.156	4.396
Govt Spending/GDP	0.155	0.048	0.020	0.330
M2/GDP	0.584	0.374	0.085	2.504
<i>Institutional Quality Variables</i>				
Institutional Quality	0.152	0.877	-1.629	1.985
Government Efficiency	0.253	0.951	-1.604	2.431
Control of Corruption	0.160	1.035	-1.513	2.585
Rule of Law	0.140	0.982	-1.841	2.120
Regulatory Quality	0.278	0.878	-2.205	2.262

In order to measure the institutional quality and governance, this paper uses the data on institutional and governance variables from the Worldwide Governance Indicators (WGI). The WGI database is produced by World Bank group and this paper considers all the institutional quality and governance indicators produced by the WGI: rule of law, control of corruption and political stability and absence of violence, regulatory quality and government effectiveness. These indicators range from -2.5 to +2.5 where -2.5 reflects weak institutional and governance quality and +2.5 reflects strong institutional and governance quality.

The data sample used in the paper comprises of 104 countries from developed, developing and the least developed countries classified according to the World Bank database. This paper is based on the yearly balanced panel data from the year 1996 to 2015. The time period and selection of countries is mainly due to the availability of data and due to the fact that WGI started reporting the index from the year 1996.

Table 1 above presents descriptive statistics for all the variables including macroeconomic indicators that affect real GDP growth per capita as well as the institutional quality and governance variables. The table shows a great deal of variation in the variables with FDI ranging from a zero FDI inflow to a maximum of 400.7% of GDP in Malta. The same is true

for real GDP growth per capita, where a minimum of -18.87% growth was recorded and a maximum of 33.03% growth was recorded. Population growth rate ranges from a minimum of -3.82 to maximum value of 17.62 percent. A constant number 4 is added to the population growth rate before taking logarithm in order to avoid logarithm of negative numbers. Thus, the variable used in this paper is $\log(4 + \text{pop growth rate})$. Negative numbers in inflation are dealt with the same way. M2 is the log of the ratio of money supply (M2) to GDP $\log[(M2/GDP)]$ and inflation is $\log(1 + \text{average inflation rate})$. Government spending is the log (the ratio of government spending to GDP). The trade volume of is the log (sum of exports and imports as a share of GDP) for the period. The institutional quality variables all vary between the -2.5 and 2.5 range - that was described above in the data section.

4. Analysis of Results

This section of the paper presents and analyzes the results of the estimated models. Table 2 below shows estimated results of equation (1). As the table shows the coefficient of FDI is positive and significant which is an indication that FDI inflow significantly enhances economic growth for the sample set analyzed in this paper. The coefficient of our interest in equation (1) is $\frac{dY}{dFDI} = \gamma$ which shows the magnitude of change in economic growth caused by changes in FDI. The estimated coefficient is $\hat{\gamma} = 8.243$ which is significant at 1% confidence interval and it means that a single standard deviation increase in FDI inflow leads to a 0.08 percentage points increase in economic growth of the host country. This result is very much in line with major studies on the role of FDI in economic growth. The rest of the coefficients of the explanatory variables are very much as expected. Lagged value of GDP growth per capita is positive and significant which shows that economies that were growing in the previous years grow faster in the following year as well. Coefficients of trade volume and domestic investment are positive as expected while the coefficients of population growth rate, inflation and government spending are negative and significant.

Equation (2) is estimated with explanatory variables of FDI inflow, institutional quality and an interaction term between the FDI and institutional quality. The interaction term enables us to estimate the impact of institutional quality on FDI-growth relationship. The institutional quality variable is constructed as an average value of six different indicators of institutional quality: control of corruption, rule of law, regulatory quality and government efficiency, voice and accountability and political stability. The results are shown in table 3 below.

Table2: Foreign Direct Investments and Economics Growth: GMM Estimation of the Dynamic Panel Data Model: Dependent Variable: Real GDP Per Capita Growth (1996-2015)

Variables	Coefficients
GDPGPC _{t-1}	0.122*** [0.006]
FDI	8.466*** [0.1.606]
Initial GDP	0.769*** [0.089]
Population Growth	-7.009*** [0.679]
Investment	4.688*** [0.434]
Inflation	-2.131*** [0.157]
Trade Volume	7.136*** [0.139]
Government Spending	-2.445 [0.284]
Money Supply	-10.372*** [0.183]
No of Observations	919
No of Instruments	187

***indicates a significance at a 10% confidence interval ** indicates a significance at a 5% confidence interval.
* indicates a significance at a 1% confidence interval.

Note here that, $\frac{dY}{dFDI} = \gamma$, therefore the coefficient of our interest for FDI is $\hat{\gamma} = 8.243$ which tell us about the size of the impact of FDI on economic growth ignoring the institutional quality. However, after taking into account the institutional heterogeneity of the host country, the net effect of FDI inflow on economic growth of the host country is as given below.

$$\frac{dY}{dFDI} = \hat{\gamma} + \hat{\phi} * (Inst)$$

The estimated impact of FDI inflow on economic growth after taking into account institutional heterogeneity is given as $\frac{dY}{dFDI} = 8.243 + 7.104 * (Inst)$. Therefore, considering average level of institutional quality $\overline{Inst} = 0.173$, the net impact of FDI inflow on economic

Table:3 *FDI-Growth Nexus: Does Institutional Quality Alter the Relationship? GMM Estimation of the Dynamic Panel Data Model: Dependent Variable: Real GDP Per Capita Growth (1996-2015)*

Variables	Coefficients
GDPGPC _{t-1}	0.120*** [0.004]
FDI	8.243*** [1.760]
Institutions	1.482*** [0.365]
(FDI X Institutions)	7.104*** [1.418]
Initial GDP	0.288*** [0.101]
Population Growth	-6.606*** [0.947]
Investment	5.529*** [0.378]
Inflation	-2.079*** [0.203]
Trade Volume	6.898*** [0.348]
Government Spending	-3.275*** [0.318]
Money Supply	-9.338*** [0.317]
No of Observations	919
No of Instruments	134

*** indicates a significance at a 1% confidence interval, **indicates a significance at a 5% confidence interval and * indicates a significance at a 10% confidence interval. Standard errors are presented in parenthesis.

Notes: The regressions have a constant term. Standard errors are given in parentheses. Population growth is the average growth rate for the period. FDI is the log of FDI inflow to GDP ratio. Institutional quality is the average of six different institutional indicators: Rule of Law, Government Efficiency, Regulatory Quality and Control of Corruption Political Stability and Voice and Accountability.

growth would be $\frac{dY}{dFDI} = 8.243 + (7.104) * (0.173) = 9.471$, which clearly is a larger impact than the impact of FDI without taking into account the institutional quality. The statistical significance of the estimate 9.471 is tested by re-running the regression by replacing the simple interaction term (i.e. FDI*Inst) with $FDI * (Inst - \overline{Inst})$ (as described by (Wooldridge, 2012)). Running this new regression gives the new standard error for $\frac{dY}{dFDI} = \hat{\gamma} + \hat{\phi} * (\overline{Inst}) = \hat{\gamma} + \hat{\phi} * (0.173) = 9.471$ as 1.4178. This yields the t-statistics of $t = \frac{9.471}{1.4178} = 6.680$. Therefore, at an average institutional quality value (i.e. 0.173) the FDI is statistically significant and positively affects economic growth.

For countries with the highest institutional quality e.g. Finland with an institutional quality of $Inst = 1.985$, the impact of FDI on economic growth would be $\frac{dY}{dFDI} = 8.243 + (7.104) * (1.985) = 22.344$ which means a unit increase in FDI inflow brings about 0.22 percentage point increase in per capita GDP. Again, the statistical significance is tested by re-running the regression with the interaction term replaced by the term $FDI * (Inst - Inst_{Finland}) = FDI * (Inst - 1.985)$. Running this new regression gives the standard error for $\frac{dY}{dFDI} = \hat{\gamma} + \hat{\phi} * Inst_{Finland} = \hat{\gamma} + \hat{\phi} * (1.985) = 22.344$ as 1.742 which yields the t-statistics of $t = \frac{22.344}{1.742} = 12.826$ which indicates statistical significance. Therefore, it is clear that better institutional quality boosts the FDI induced growth institutional quality however, also has a direct significant positive impact on economic growth of the host country.

The results of equation (2) estimation based on different institutional quality measures are presented in the table 4 below. This is an attempt to differentiate between the different measures of institutional quality and to measure the relative importance of each institutional quality indicator in affecting economic growth directly and indirectly via the channel of foreign direct investment. GMM estimation based on Arellano and Bond for each measure of institutional quality is applied. Controlling for the institutional measure “control of corruption” the impact of FDI on economic growth is $\frac{dY}{dFDI} = \hat{\gamma} + \hat{\phi} * (CC)$. The estimated impact is $\frac{dY}{dFDI} = 4.833 + 6.786 * (CC)$. Therefore, for a country with an average level of control of corruption i.e. $\overline{CC} = 0.184$ the impact of FDI inflow on economic growth is $\frac{dY}{dFDI} = 4.833 + 6.786 * (0.184) = 6.081$. Similar to as done above, the statistical significance is tested by re-running the same regression only to replace the interaction term (FDI*CC) by

the $FDI * (CC - 0.184)$. The standard error for term $\frac{dY}{dFDI} = \hat{\gamma} + \hat{\phi} * (0.184) = 6.081$ obtained from the new regression is 1.414. The subsequent t-statistics for the coefficient 6.081 is $t = \frac{6.081}{1.414} = 4.300$ which indicates a significant positive impact of FDI on economic growth in a country with average level of institutional quality.

For a country, e.g. Finland with $\overline{CC} = 2.585$, the impact of FDI inflow on economic growth grows up to $\frac{dY}{dFDI} = 4.833 + 6.786 * (2.585) = 22.374$. The standard error for the coefficient 22.374 is 1.283 and the t-statistics is $t = \frac{22.374}{1.283} = 17.438$ which clearly indicates that stronger control over corruption leads to significantly faster economic growth and it also enhances FDI-induced economic growth. The variable control of corruption also has a direct positive and significant effect on economic growth.

The second measure of institutional quality used is the rule of law (ROL). The impact of FDI inflow on economic growth taking into account the ROL measure is estimated to be $\frac{dY}{dFDI} = 5.488 + 8.224 * (ROL)$. The impact of FDI inflow on economic growth for a country with an average level of $\overline{ROL} = 0.163$ is $\frac{dY}{d(FDI)} = 5.488 + 8.224 * (0.163) = 6.828$. The relevant standard error is 1.2777 and the t-statistics is $t = \frac{6.828}{1.2777} = 5.242$ which shows the significance of the coefficient. This means that on an average level of ROL a single standard deviation increase in FDI inflow will lead to 0.068 percentage points increase in the GDP per capita. However, for a country with the highest level of ROL, i.e. Finland with a $ROL=2.120$, the impact of FDI on economic growth is estimated to be $\frac{dY}{d(FDI)} = 5.488 + 8.224 * (2.120) = 22.922$ with a standard error 1.563 and t-statistics $t = \frac{22.922}{1.563} = 14.665$ which indicates a significant and sizeable increase on the impact of FDI on economic growth for countries with an average level of ROL. Besides the FDI channel ROL is also estimated to have positive and significant impact on economic growth. The measure of government effectiveness (GE) is estimated to have no significant direct effect on economic growth of the country. However, it is estimated to have significant FDI induced growth enhancing impact. The impact of FDI after controlling for government effectiveness is estimated to be $\frac{dY}{dGE} = 5.522 + 7.899 * (GE)$ which for an average level of $\overline{GE} = 0.275$ is estimated to be $\frac{dY}{dGE} = 5.522 + 7.899 * (0.275) = 7.694$.

Table 4: FDI Institutions and Growth: Alternative Measures of Institutional Quality

<i>Arellano and Bond Estimation of the Dynamic Panel Data Model</i>				
Institutional Variable	Control of Corruption (CC)	Rule of Law (ROL)	Government Effectiveness (GE)	Regulatory Quality (RQ)
GDPGPC _{t-1}	0.128*** [0.007]	0.124*** [0.004]	0.121*** [0.007]	0.125*** [0.004]
FDI	4.833** [1.921]	5.488*** [1.588]	5.522** [2.306]	5.179*** [1.231]
Institutional Quality (FDI X Institutions)	4.392*** [0.342]	1.861*** [0.314]	-0.277 [0.0.367]	-1.575*** [0.367]
Initial GDP	6.786*** [1.069]	8.224*** [1.527]	7.899*** [1.716]	4.906*** [1.699]
Population	0.650* [0.104]	0.196* [0.102]	0.341*** [0.097]	0.407*** [0.118]
Investment	-7.246*** [0.710]	-7.429*** [0.584]	-7.084*** [1.064]	-6.673*** [0.772]
Inflation	4.636*** [0.276]	5.836*** [0.428]	5.163*** [0.285]	5.311*** [0.330]
Trade	-2.081*** [0.195]	-2.118*** [0.232]	-2.052*** [0.131]	-2.012*** [0.180]
Government Spending	7.699*** [0.419]	7.468*** [0.322]	7.061*** [0.334]	7.102*** [0.328]
M2	-2.973*** [0.366]	-2.865*** [0.322]	-3.329*** [0.329]	-3.656*** [0.365]
Observations	-9.642*** [0.286]	-9.349*** [0.319]	-9.401*** [0.314]	-9.197*** [0.324]
Number of Instruments	919	919	919	919

*** indicates a significance at a 1% confidence interval ** indicates a significance at a 5% confidence interval.

* indicates a significance at a 10% confidence interval. Standard Errors shown in parenthesis

By the same method as mentioned before for other measures, the relevant standard error for the coefficient 7.694 is estimated to be 1.456. Hence the t-statistics is $t = \frac{7.694}{1.456} = 5.284$. This shows that the coefficient is significant and that FDI inflow in a country with the average level of GE has a significant positive impact on economic growth.

However, for a country with the highest level of GE i.e. Singapore with a $GE = 2.431$, the impact of FDI on economic growth is estimated to be $\frac{dY}{dGE} = 5.522 + 7.899 * (2.431) = 24.724$. The standard error for the coefficient 24.724 is 1.650 and the t-statistic is $t = \frac{24.724}{1.650} = 14.984$ which shows a strong significant impact of the FDI inflow on economic growth in Singapore which has the highest level of government effectiveness.

The last measure of institutional quality considered in this paper is the regulatory quality (RQ) of the country. The coefficient of regulatory quality is significant but negative, which indicate a negative impact of regulatory quality on the economic growth. However, the indirect effect through FDI inflow is still positive and significant. The impact of FDI after controlling for the regulatory quality is $\frac{dY}{dRQ} = 5.179 + 4.906 * (RQ)$ which for an average level of $\overline{RQ} = 0.295$, the estimated impact is $\frac{dY}{dRQ} = 5.179 + 4.906 * (0.295) = 6.626$. The standard error for the statistical significance of the coefficient 6.626 is 1.700 which gives a t-statistics of $t = \frac{6.626}{1.700} = 3.895$ which indicates the significance of the coefficient 6.626.

However, the impact with a country of highest regulatory quality would get $\frac{dY}{dRQ} = 5.179 + 4.906 * (2.262) = 16.276$ with a standard deviation estimated to be 2.227 and t-statistics is $t = \frac{16.276}{2.227} = 7.308$ which indicates significance of the coefficient and that a single standard deviation increase in the FDI inflow results in a 0.16 percentage points increase in the per capita GDP of the country.

Institutional quality aggregate variable as well as the separate institutional quality measures all enhance the FDI-induced economic growth in the host country. Besides the FDI-induced growth enhancing, institutional quality and different measures also impact economic growth directly except for the measure of government effectiveness and regulatory quality.

5. Conclusion

Institutional quality is believed to have a positive effect on the economic growth of a country. This paper investigates the still debated question of FDI-growth relationship and the impact of institutional quality heterogeneity on the FDI-growth relationship.

This paper uses different indicators of institutional quality in order to distinguish between the usefulness and show the growth relevance of different institutional quality variables. This paper uses a larger dataset of 104 countries and applies GMM estimation based on Arellano and Bond to a dynamic panel data model in order to show the impact of institutional quality on economic growth as well as FDI-growth relationship. The problem of endogeneity is controlled for by using lagged value of FDI inflow as an instrument.

This paper finds that better institutional quality leads to faster economic growth directly and it also enhances growth through the channel of FDI inflows. It is found that FDI inflows lead to stronger economic growth in countries with better institutions compared to countries with low institutional quality. The same is true for all four institutional quality measures for control of corruption, rule of law, government effectiveness and regulatory quality. FDI inflow in countries with better institutional quality measures in each case leads to stronger economic growth compared to countries with lower quality of institutional quality measures. The direct impact of individual institutional quality measure on economic growth, however, is positive and significant only for the measures control of corruption and rule of law while government effectiveness doesn't have a direct impact on economic growth.

This clearly shows the importance of institutional quality and the role it plays in attracting foreign investment and in boosting economic growth directly and indirectly through foreign direct investment. The clear policy implications of this paper are that countries aspiring to grow faster need to improve their institutional quality especially control corruption and establish the rule of law in the country. This improved institutional quality will lead to speeding up economic growth in the country as well as attract FDI and result in enhanced FDI-induced economic growth. The policy implications are especially more relevant for developing countries with low per capita GDP and low level of institutions. These countries can achieve faster growth and prosperity by improving the quality of their institutions.

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Appendix

A1

Variable	Description	Source
FDI	The Ratio of FDI Inflow to GDP	WDI
GDP	Growth Rate of Real GDP Per capita	WDI
Inflation	Rate of growth of consumer price index	WDI
Trade	Ratio of import and export to the gross domestic product	WDI
Government expenditure	Ratio of government expenditure to the GDP	WDI
Initial GDP	Gross domestic product at the start of the period of data	WDI
Population Growth Rate	Growth rate of population of the country	WDI
Investment	Gross domestic capital formation (Gross domestic investment)	WDI
Rule of Law	Rule of law reflects the reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	WGI
Control of Corruption	Control of corruption reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	WGI
Regulatory Quality	Regulatory Quality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	WGI
Government Effectiveness	Government effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation.	WGI

A2 Countries Included in the Study

Albania Algeria Argentina Australia Austria Azerbaijan Bahrain Bangladesh Barbados
Belarus Belgium Belize Bolivia Botswana Brazil Brunei Darussalam Bulgaria Burkina Faso
Cameroon Canada Chile China Colombia Costa Rica Cote d'Ivoire Croatia Cyprus Czech
Republic Denmark Dominican Republic Ecuador Egypt, Arab Rep. El Salvador Fiji Finland
France Germany Ghana Greece Guatemala Honduras Hungary Iceland India Indonesia
Ireland Israel Italy Jamaica Japan Jordan Kazakhstan Kenya Korea, Rep. Kuwait Madagascar
Malawi Malaysia Mali Malta Mexico Morocco Mozambique Netherlands New Zealand
Nicaragua Nigeria Norway Oman Pakistan Panama Paraguay Peru Philippines Poland
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