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Relationship between Institutional Factors and FDI Flows in Developing Countries: New Evidence from Dynamic Panel Estimation

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Abstract: In this paper, we revisit the relation between institutional factors and foreign direct investment (FDI) inflows in developing countries by employing a dynamic panel methodology, which enables us to deal with the persistency of FDI flows and endogeneity issues. We also contribute to the literature by using various measures of institutions to identify which aspects of institutional quality affect FDI in the developing world. Our empirical findings based on 113 developing countries over the period 2002–2012 show evidence that some institutional factors matter more than others in attracting more FDI flows. We also found that the financial crisis in 2008 and 2009 had a negative impact on FDI flows.

Keywords: institutions; foreign direct investment (FDI) flows; dynamic panel estimation; developing countries

JEL Classification: F21; C23; D73; P48

1. Introduction

The link between institutions and FDI flows has received considerable attention in recent years. It is well known that foreign investors pay a great deal of attention to the institutional framework of the countries in which they undertake an investment (OECD 2012). Therefore, it is emphasized in the literature that developing countries should try to establish strong and high quality institutions to attract more FDI flows (Daude and Stein 2007).

Not surprisingly, there is a growing body of literature on the relation between institutional factors and FDI inflows. Reviewing the existing literature, it is observed that the majority of the studies utilize static panel data estimation techniques with OLS or pooled time series methods, neglecting the dynamic nature of the link between institutions and FDI flows. However, the persistent nature of the FDI flows requires a dynamic panel data analysis. To the best of our knowledge, only Busse and Hefeker (2007) and Daude and Stein (2007) employ the difference GMM method of Arellano and Bond (1991) to explore the relationship between institutions and FDI. However, these studies have limited country coverage and sample periods. Although Okada (2013) and Asiedu (2013) adopt dynamic panel estimation methods as well, they particularly attempt to show the indirect effect of institutions on the relation between FDI and other variables such as financial openness and natural resource abundance. Therefore, we aim to fill this gap in the literature by empirically examining the linkages between foreign direct investment and institutional factors by using the dynamic panel estimation model of Arellano and Bover (1995) and Blundell and Bond (1998).

Aside from empirical methodology, we aim to contribute to the literature in the following ways. First, we consider various dimensions of institutions as the decisions of foreign investors might depend

on different aspects of institutions. For example, in addition to corruption or political regime, investors might consider the regulatory system, the security of property rights, enforcement of law and order, transparency, predictability of government policy, the guarantee of civil liberties, and the political structure of the host country. As a result, rather than focusing only on one of the institutional factors like some of the earlier studies did (Wei 2000; Jensen 2003; Ahlquist 2006), we analyze the impacts of different dimensions of institutions in order to identify which aspects of institutional quality affect FDI the most. Undertaking such an approach also allows us to prescribe different policy recommendations based on various institutional measures.

Second, we use an extensive data set covering 113 developing countries over the period of 2002–2012. By extending the time period, we take into account the impact of the financial crisis in 2008 on the FDI flows. Furthermore, in our analysis, we include recent discussions regarding the effects of global liquidity and global volatility on FDI flows. The econometric results from our dynamic panel regression model show that control of corruption, government effectiveness, and voice and accountability measures of institutions positively affect FDI flows. However, we did not find any significant effect of the other institutional factors on FDI flows.

The rest of the paper is organized as follows. Section 2 provides a brief literature on the link between institutional factors and FDI flows. Section 3 explains the econometric methodology and describes the data. Section 4 presents the econometric findings. Finally, Section 5 concludes by discussing policy implications of our findings.

2. Literature Review

There is a growing body of empirical literature that examines the role of institutions on FDI flows. The literature on this issue can be divided into three strands. One strand of literature focuses mainly on identifying the effects of a specific institutional dimension such as corruption and political regime on FDI. For instance, Wei (2000) shows that corruption has a negative impact on FDI location preferences of multinationals by increasing the cost of doing business and uncertainty. Jensen (2003); Ahlquist (2006) state that more democratic countries attract more FDI than authoritarian countries because democratic regimes tend to reduce political risks of nationalization and expropriation and increase the credibility of the host country for foreign investors. Li and Resnick (2003) contrarily find that democracy in a host country has a negative effect on FDI inflows because of the impact of the provision of a lower cost work force, the repression of labor unions, entry deals, and operation affordance in authoritarian regimes.

The second strand of the literature deals with analyzing the importance of different dimensions of institutional quality. Gastanaga et al. (1998) find that low levels of corruption, nationalization risk, and much better contract enforcement lead to an increase in FDI flows. Asiedu (2006) shows that inefficient institutions such as corruption, a lack of the rule of law, and political instability deter FDI inflows. By testing a set of institutional variables, Daude and Stein (2007) also examine which dimensions of the quality of governance institutions affect the investment decisions of foreign investors and find that unpredictable policies, excessive regulatory burden, and a lack of commitment of government discourage FDI inflows. Gani (2007) shows that improvements in control of corruption, political stability, regulatory quality, and effectiveness of government have positive effects on FDI inflows for some Latin American countries.

The third strand of the literature explores the effect of a composite institutional indicator, which is constructed by combining different dimensions of institutional variables. For example, Wheeler and Mody (1992) find that a composite index that considers a broad dimension of institutions, such as bureaucratic red tape, corruption, political instability, and the effectiveness of the legal system, does not affect the location decisions of US multinationals. Globerman and Shapiro (2002) and Buchanan et al. (2012) obtained a composite index using control of corruption, rule of law, regulatory environment, and political stability and concluded that the index of governance infrastructure has a positive effect on FDI flows. Similarly, Buchanan et al. (2012) state that, while institutional quality

index positively influences FDI flows, it negatively affects the volatility of FDI flows. More recently, [Asiedu \(2013\)](#) found evidence that the FDI risk variable, which consists in contract viability, profit repatriation, and payment delay indicators, does not have a significant effect on the amount of FDI flows.

Overall, there is substantial literature linking the quality of institutions with FDI inflows. However, the dynamic relation between institutions and FDI flows has not received enough attention. We address this gap in the literature and empirically focus on the association between institutional factors and FDI flows in the following sections.

3. Empirical Methodology

Our empirical analysis is based on a panel of 113 developing countries over the period 2000–2012. The dependent variable, FDI flows, is captured by the annual data for the net FDI inflows as a percent of GDP from World Development Indicators.

In this study, our baseline model is as follows:

$$FDI_{it} = \beta_1 FDI_{i,t-1} + \beta_2 INS_{it} + \beta_3 X_{it} + u_{it} \quad (1)$$

where FDI_{it} represents the ratio of FDI inflows to GDP. We use the ratio of FDI inflows to GDP to control for the scale effects. $FDI_{i,t-1}$ is the first lag of the dependent variable. INS_{it} shows the vector of institutional indicators of the host country, and X_{it} is the vector of control variables that potentially affect FDI inflows.

We employ a dynamic panel approach to determine the impact of institutions on FDI inflows in developing countries. Modeling FDI with simple OLS regression might lead to several econometric problems. First, it could lead to an autocorrelation problem when we include a lagged dependent variable in the regression. The presence of time-invariant fixed effects in the error term may be correlated with the explanatory variables, and, more seriously, there may be an endogeneity problem between the dependent variable and explanatory variables. Furthermore, the regressor may be correlated with the error term. The endogeneity problem can be solved by adopting an instrumental variable (IV) estimation. However, with weak instruments, the fixed-effects IV estimators are likely to be biased similar to OLS estimators. Instead of IV estimation, we could use the ([Arellano and Bond 1991](#)) difference GMM estimator first proposed by [Holtz-Eakin et al. \(1988\)](#). The difference GMM uses first differences of the dependent variable and a regressor to transform the regression in order to remove fixed country-specific effects, and makes the regressors time-invariant. In the difference GMM estimation, the first-differenced lagged dependent variable is also instrumented with its past levels, so the autocorrelation problem can be eliminated. However, the lagged levels of the regressors may sometimes be poor instruments for the first-differenced regressors and this decreases efficiency. In order to increase efficiency in the estimation, the system GMM estimator developed by [Arellano and Bover \(1995\)](#) and [Blundell and Bond \(1998\)](#) can be used. The system GMM estimator creates a system of two equations; while one equation is differenced, the second remains in levels. Afterwards, the variables in levels in the second equation are instrumented with their own first differences, and the variables in differences are instrumented with the lags of their own levels ([Bover et al. 2001](#)). The soundness of the instruments is assessed by two diagnostic tests. First, the Hansen test is used for over-identifying restrictions. The null hypothesis of this test is that the instruments are uncorrelated with the error term. The second diagnostic test includes first-order and second-order autocorrelation tests (AR 1 and AR 2), which tests serial correlations of the error terms.

4. Data

In order to analyze the role of institutions on the FDI flows, we use institutional indicators from World Bank Worldwide Governance Indicators developed by [Kaufmann et al. \(1999\)](#), which is the primary source of empirical research on institutions. [Kaufmann et al. \(1999\)](#) construct this dataset based on wide variety of cross country surveys and polls of experts and by using an unobserved components

model. These indicators can be categorized in six broad groups, each of which represents a different aspect of institutional quality in a country. These are *Control of Corruption*, *Government Effectiveness*, *Political Stability and Absence of Violence*, *Regulatory Quality*, *Rule of Law*, and *Voice and Accountability*. The unbundling of institutions allow us to examine which of these different dimensions matter for FDI flows in developing countries.

Control of Corruption measures perceptions of corruption, bribes, illegal activities of bureaucrats, and protection of foreign investors from illegal payments to public officials. *Government Effectiveness* includes the quality of bureaucracy, the competence of civil servants, the quality of public service provision, the credibility of government's commitments to policies, and the independence of civil servants from political pressures. Hence, *Government Effectiveness* is expected to affect foreign investors by reducing the discretionary power of public authorities. *Political Stability and Absence of Violence* is an indicator of the ability of government to stay in office and measures the risk of removal of government in a violent and illegal way. *Political Stability and Absence of Violence* eases doing business through stable political systems and induces more FDI. *Regulatory Quality* includes the perceptions on market-unfriendly policies and the ability of excessive government regulation such as price controls and inadequate bank supervision. *Regulatory Quality* influences FDI by eliminating intrusion of public power and excessive regulation on the market and unofficial activities. *Rule of Law* considers the issues such as effectiveness and predictability of judicial system, enforceability of contracts, and perceptions of incidence of crime. By reducing the uncertainty and easing the business activities, *rule of Law* encourages FDI flows. Finally, *Voice and Accountability* captures the indicators that are related to the political process, civil rights, and the ability of citizens to control government actions. *Voice and Accountability* is expected to increase FDI flows by encouraging political reliability, participation in the political system, and promoting democratic institutions. All of these indicators are reported in such a way that they all have mean zero and unit standard deviation and take values between -2.5 and $+2.5$. The larger values indicate better institutional quality.

In our analysis, a set of push and pull factors that captures the common determinants of FDI flows are selected through the previous literature¹. As push factors, we use a global liquidity and a global risk measure in order to analyze how important global shocks are for FDI. Much of the recent literature after the global financial crisis has especially focused on the role of global risk and liquidity (Milesi-Ferretti and Tille 2011; Forbes and Warnock 2012). As argued in OECD (2012); Forbes and Warnock (2012), a change in global liquidity due to rapid changes in global leverage or specific crisis events can induce changes in the pattern of capital flows. To measure the global liquidity, we use the weighted average of broad money growth of G7 countries. The data for money growth rates is taken from the World Development Indicators (WDI) database. Global risk in financial markets is another external factor that is included in recent empirical studies. This variable is measured by the implied volatility of S & P 500 index options as proposed by Milesi-Ferretti and Tille (2011), Fratzscher (2012), and Ghosh et al. (2014). The data for global risk measure is obtained from a database of the Bank of International Settlements (BIS).

Among pull factors, in order to represent market size, we include GDP per capita, as did Neumayer and Spess (2005) and Bénassy-Quéré et al. (2007); to account for market potential, we use the lagged levels of annual GDP growth rate of host country as argued by Chakrabarti (2001). We consider the change in nominal exchange rates as a driver of FDI flows in order to address the effect of uncertainty resulting from exchange rate volatility. We also include financial development as a pull factor and proxy this variable by the M2 growth rates of countries. To represent the trade-oriented policy of the host country, we use trade openness, as the ratio of the total volume of trade to GDP; to measure capital account openness, we use the Chinn–Ito index.

¹ Control variables that affect FDI flows are selected through several studies in the literature on the determinants of FDI such as Fernandez-Arias (1996); Taylor and Sarno (1997); Milesi-Ferretti and Tille (2011); Arbatli (2011); Asiedu (2013); Fratzscher (2012) and Ahmed and Zlate (2014).

is taken from a paper by [Chinn and Ito \(2006\)](#). We also control for natural resource rents to identify the potential impact of natural resource abundance. Finally, to reflect the impact of financial crisis on the relationship between FDI flows and institutions, we use a dummy variable that distinguishes the relation in crisis years 2008 and 2009. All data for pull factors, except the Chinn–Ito index, are taken from the WDI database²

5. Empirical Results

Following Equation (1), we consider the relationship between institutions and FDI flows and report the results in Table 1. Table 1 also presents the Hansen test of over identification and serial autocorrelation tests of second order autocorrelation (AR 2) statistics. These tests indicate that the disturbances at levels are uncorrelated. In our estimations, all of the institutional indicators (control of corruption, government effectiveness, political stability and absence of violence, regulatory quality, rule of law, and voice and accountability) are separately analyzed to avoid multicollinearity problems.

Our results reveal that the effect of institutions depends on the type of institutional indicator. We find that control of corruption positively and significantly affects FDI inflows indicating that high corruption control serves to reduce FDI. As displayed in Table 1, the measure of government effectiveness is also positively correlated with FDI inflows, suggesting that supportive and less distortionary government policies are important motivators of FDI. Moreover, our results show that voice and accountability positively and significantly influences FDI inflows as a comprehensive indicator of fundamental rights and liberties, the functioning of the political system and a striking figure of country. The remaining three dimensions do not significantly affect FDI inflows. Therefore, developing countries that are deficient in control of corruption, government effectiveness, and voice and accountability, may attract less FDI.

In our model, we also consider some pull and push factors. In all regressions, the statistically significant positive coefficients of lagged values of FDI flows show that FDI flows are influenced from the previous year's FDI. Test results also show that the global liquidity measure is insignificant. This finding makes sense because FDI flows are known to be more stable when compared to portfolio investment such that the changes in global liquidity conditions might be less potent on FDI flows, as argued in [Milesi-Ferretti and Tille \(2011\)](#). However, the coefficient of the global risk measure based on the VIX index is negative and significant in most of the specifications. This result supports that an increase in global risk in financial markets leads foreign investors to reduce their investments. It is known that foreign investors tend to be more attentive to cash balances when there are global financial fluctuations, and they prefer to wait for stabilization of the markets. This finding is also consistent with the studies of [Milesi-Ferretti and Tille \(2011\)](#), [Forbes and Warnock \(2012\)](#), and [Ghosh et al. \(2014\)](#).

On the pull side, the only variable that is positively and significantly influential on FDI flows is trade openness. This is because of the large consumer demand in the foreign markets or widened export-based production facilities in the host country. Our result for trade openness is also consistent with the evidences of [Singh and Jun \(1995\)](#), [Chakrabarti \(2001\)](#), and [Asiedu \(2002\)](#). When we add a financial crisis dummy for the years 2008 and 2009, it is seen that global financial crisis has a significant negative effect on the level of FDI flows, and this is also viable entirely in the trends of FDI flows in the period of 2008–2009. This result seems to be consistent with that of [Ahmed and Zlate \(2014\)](#), which demonstrate a decline in total net capital inflows in crisis years. However, we do not find that exchange rates, financial development, or capital account openness have a significant effect on FDI flows. Although the impact of capital account openness on FDI is ambiguous in the literature, we find evidence similar to that of [Carlson and Hernández \(2002\)](#) and [Hernandez et al. \(2001\)](#). We finally control for natural resource abundance as another driver of FDI inflows, and we find a negative but insignificant relationship similar to [Asiedu \(2013\)](#).

² Details for the variables and data sources are given in the Appendix A Section A2 and Section A3.

Table 1. FDI Flows and Different Dimensions of Institutions—Results of System GMM.

Variables	Control of Corruption	Government Effectiveness	Political Stability and Absence of Violence	Regulatory Quality	Rule of Law	Voice and Accountability
FDI ($t-1$)	0.479 *** (0.083)	0.480 *** (0.083)	0.475 *** (0.084)	0.479 *** (0.090)	0.479 *** (0.084)	0.477 *** (0.082)
GL	-0.109 (0.185)	-0.110 (0.184)	-0.090 (0.178)	-0.086 (0.169)	-0.098 (0.179)	-0.120 (0.187)
GR	-0.629 *** (0.240)	-0.694 *** (0.261)	-0.369 * (0.216)	-0.325 (0.336)	-0.479 ** (0.219)	-0.791 *** (0.271)
Lagged GDPGRW	0.189 (0.180)	0.189 (0.180)	0.187 (0.179)	0.189 (0.183)	0.188 (0.180)	0.191 (0.190)
GDPPC	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
EXC	-0.087 (1.262)	-0.127 (1.259)	-0.109 (1.261)	-0.193 (1.278)	-0.079 (1.269)	-0.182 (1.253)
M2GRW	0.002 (0.016)	0.002 (0.016)	0.001 (0.016)	-0.000 (0.017)	0.001 (0.017)	0.003 (0.015)
TRADE	0.034 *** (0.009)	0.034 *** (0.009)	0.036 *** (0.012)	0.036 *** (0.011)	0.035 *** (0.010)	0.035 *** (0.009)
KAOPEN	0.881 (0.897)	0.884 (0.899)	1.040 (0.945)	1.054 (1.229)	0.937 (0.958)	0.579 (0.879)
NR	0.037 (0.025)	0.036 (0.024)	0.025 (0.023)	0.024 (0.021)	0.0314 (0.022)	0.040 (0.026)
Institutions	3.140 ** (1.454)	3.162 ** (1.574)	0.204 (1.741)	-0.074 (2.777)	1.431 (1.706)	3.131 *** (1.153)
DUM_0809	-1.112 * (0.642)	-1.122 * (0.661)	-1.211 * (0.663)	-1.457 ** (0.736)	-1.180 * (0.648)	-1.030 * (0.622)
AR (1)	0.003	0.003	0.003	0.003	0.002	0.002
AR (2)	0.315	0.312	0.312	0.312	0.314	0.314
Hansen Test	0.139	0.133	0.124	0.107	0.131	0.132

Standard errors are given in the parenthesis. *, **, *** represent 10%, 5%, and 1% significance levels, respectively. For AR (1), H_0 = there is no autocorrelation; for AR (2), it is defined that H_0 = there is an autocorrelation. For the Hansen test, the null hypothesis is defined such that H_0 = all instruments are exogenous as a group.

6. Conclusions

What role institutional quality plays and which institutional factors drive FDI flows are important policy questions in developing countries. This paper revisits the association between different institutional factors and FDI flows for a panel of 113 developing countries over the period of 2002–2012. We contribute to the literature by employing a dynamic panel data methodology, by extending the time period to include the global financial crisis in 2008–2009 and by using different aspects of institutions.

Our findings reveal that not all indicators of institutional quality have a significant effect on foreign investors' decisions in developing countries. We find that control of corruption, government effectiveness, and the voice and accountability have significant positive impacts on FDI flows. This finding indicates that reducing corruption and the excessive burden of bureaucracy, improvements in the political system, and transparency and accountability in politicians lead to an increase in FDI inflows and encourage multinationals to bring capital into a developing country. Furthermore, exercising policies to enhance the participation of citizens in a political system, e.g., by selecting their government, as well as the protection of civil rights, might increase FDI flows. These results lead us to conclude that countries that reflect weaknesses in control of corruption, effective government, transparency in government policies, accountable bureaucracy, and trust and participation in the political system should start to reform their institutional policies and arrangements to attract more FDI flows. Improving institutional factors for a favorable investment environment should be an important guideline for policy in developing countries.

Author Contributions: The first and corresponding author, Zühal Kurul contributed the sections of literature review, data, empirical methodology and empirical results. The second author A. Yasemin Yalta contributed the section of introduction and conclusion of the manuscript. She also supervised the conception of the work and the interpretation of the empirical results.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix

A1. 113 Developing Countries

Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahamas, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Dem. Rep., Congo, Rep., Costa Rica, Cote d'Ivoire, Croatia, Dominica, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Equatorial Guinea, Eritrea, Fiji, Gabon, Georgia, Ghana, Grenada, Guatemala, Guinea, Haiti, Honduras, India, Indonesia, Jordan, Kazakhstan, Kenya, Korea, Rep., Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Macedonia FYR, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Romania, Russian Federation, Samoa, Senegal, Seychelles, Sierra Leone, Solomon Islands, South Africa, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Swaziland, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, Uruguay, Venezuela RB, Vietnam, Zambia.

A2. Definitions of Variables and Data Sources

Variable	Definition	Source
FDI_GDP	FDI as a percentage of GDP	World Development Indicators
GL	Global liquidity indicator that measures as the weighted averages of M2 growth rates of G7 countries	World Development Indicators
GR	Global Volatility index that measures the implied volatility of S&P 500 index options.	Bank of International Settlements
GDPGRW	The growth rate of GDP	World Development Indicators
GDPPC	GDP per capita	World Development Indicators
EXC	The logarithmic change in the real exchange rate	World Development Indicators
M2GRW	The rate of growth of M2	World Development Indicators
TRADE	The sum of imports and exports as a percentage of GDP	World Development Indicators
KAOPEN	Chinn–Ito index of capital account openness	Chinn & Ito Database
NR	Natural resource exports minus net production costs as a percentage of GDP	World Development Indicators

A3. Definitions of Institutional Factors

Control of corruption: Control of corruption captures 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.

Government effectiveness: Government effectiveness captures 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 and implementation, and the credibility of the government’s commitment to such policies.

Regulatory Quality: Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

Rule of Law: Rule of law captures 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.

Political Stability and Absence of Violence: Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence.

Voice and Accountability: Voice and accountability captures perceptions of the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free press.

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