

# The Duration and Robustness of Institutional Quality and Foreign Direct Investment in World Economies

Tarek Eldomiaty\*

*The American University in Cairo*

Jasmine Fouad

*The American University in Cairo*

Nouran Tarek Ezzeldin

*Central Bank of Egypt*

Nadine Fakhry Farouk Mohamed

*Arab Academy for Science, Technology & Maritime Transport*

Ahmed Fikri Mabrouk

*Misr International University*

---

## Abstract

This paper aims to quantify the effects of institutional change on net flows of foreign direct investment across a panel of 91 countries over the period 2002-2022. The paper contributes to the current literature in two ways. First, the paper considers the duration of institutional quality which is a new factor that carries significant implications to public policy in terms of the sustainability of comparative institutional arrangements across different economies. Second, the duration of institutional quality offers quantitative representation about the right time for FDI to enter/exist a host country. The results show that (a) three out of six institutional indicators have significant effect on net flows of FDI as a percentage of GDP, (b) political stability has a robust negative effect on absolute magnitude of FDI which indicates that foreign investments may find weak government governance an investment opportunity shall the government offer generous investment incentives which are usually reflected in high country risk premium, (c) the results are mainly significant to four regions namely, Europe & Baltics, Middle East and North Africa, East Asia and Pacific and South Asia, (d) institutional changes take on average between 16 to 17 years for an improvement in institutional indicators to have an effect on net flows of FDI as percentage of GDP.

Keywords: Worldwide Governance Indicators, Duration of Institutional Quality, absolute magnitude of FDI, World Economies, Robustness

JEL Classifications: C23, D02, F21, G18, O43

---

---

\* Tarek Eldomiaty

Email: Tarek\_eldomiaty@aucegypt.edu

School of Business

The American University in Cairo

AUC Avenue, P.O. Box 74 New Cairo 11835, Egypt

## 1. Introduction

The literature is quite rich in studies that offer significant evidence on Foreign Direct Investment (hereinafter FDI) being regarded one of the essential pillars that contributes to economic growth. The effects of conventional macroeconomic factors on FDI, being discussed extensively in the literature, depend on the quality of the institutions that manage those factors. Consensus is reached that the quality of institutions matters for attracting FDI. That is, the comparative institutional arrangements across countries explain the relative distribution of FDI. Nevertheless, the relationship between institutional changes and FDI is not spontaneous. Improvements in the institutional quality take time and are usually accompanied by a devotion of significant financial resources. In terms of public policy formulation, the assurance about institutional quality requires consideration of the time dimension. The setup for a time frame that helps improve institutional quality reassures that a quality will be reached. Needless to say, a quality without a time frame is merely a slogan. Given that a country is taking significant and progressive steps along the road of institutional improvements, it becomes quite essential that policy makers know how long it takes until an improvement in institutional quality leads to an increase in absolute magnitude of FDI.

### 1.1. Objectives

This paper aims at fulfilling the objectives that follow.

1. Examine the effects of the components of institutional quality on absolute magnitude of FDI.
2. Examine the effect of the duration of components of institutional quality on absolute magnitude of FDI.
3. Examine the comparative institutional differences among world economies.

### 1.2. Contribution

This paper contributes to current literature in two ways. First, the paper considers the duration of institutional quality which is a new factor that carries significant implications to public policy in terms of the sustainability of comparative institutional arrangements across different economies. Second, the duration of institutional quality offers empirical perspectives regarding the right time for FDI to enter/exist a host country. This contribution is quite critical as far as the current modes of entry take into consideration the expected cost/benefits outcomes rather than the institutional arrangements that help those outcomes materialize.

The rest of the paper is organized as follows. The first section discusses the link between time dimensions and the sustainability of institutional quality. The second section discusses the impact of institutional indicators and their ultimate significant effect on FDI. The third section discusses the data, variables, and statistical estimation. The fourth section discusses the empirical findings. The fifth section concludes.

## 2. Time Dimension, Sustainable Institutional Quality and Quantification of Entry/Exit Decisions

The literature of institutional quality has provided extensive attention to the arrangements that are required for achieving progress in an economic activity. The authors in this paper argue that time is to be examined as an additional dimension, without which institutional quality may remain within the context of recommendations. The examination of how long it takes to improve institutional quality helps ensure a sustainable institutional quality. The latter is a critical condition for the MNE to move to a host country. Ideally, stable institutions ensure that the expected benefits of foreign capital inflows are sustained. This view has been discussed in the literature in terms of the right timing to enter/exit a host country. In terms of transaction cost theory (Williamson, 1981, Dikova and van Witteloostuijn, 2007; Brouthers & Brouthers, 2003; Dikova, 2012; Brouthers, 2002; Chueke and Borini, 2014; Madhok, 1998; Meyer, 2001; Shapiro, 1983), the entry decision is much more critical than the exit. Shall a MNE decides to move its capital to a host country that enjoys stable institutional quality, the entry decision becomes quite profitable and sustainable. The vice versa is true, which is to exit a country become quite costly (Chen and Hu, 2002; Pennings and Sleuwaegen, 2004). Dut, et al., (2018), Bhaumik and Gelb (2005) and Canabal and White (2008) offer evidence on the effect of institutional quality on entry mode. In Vietnam that institutional quality matters to the mode of entry. That is, when institutional distance widens, MNEs prefers M&A rather than greenfield investment (Chen and Hu, 2002; Chun, 2009; Demirbag, et al., 2009; Harzing, 2002; Müller, 2007; Moon, 1997; Raff, et al., 2009; Slangen, and Hennart, 2008; You and Makino, 2002).

Carmignani (2002, 2009) and Halter, et al., (2014) conclude that high inequality might be helpful in the short run but harmful to economic growth in the long run. This conclusion is specifically significant in the case of the lower-middle income countries (Roelfsema and Zhang, 2012). Holcombe and Boudreaux (2013) considered the duration of institutional quality in terms of the tenure of the autocrats. They conclude that weak institutional quality is significantly associated with longer tenure of autocrats. Vita concludes that the efforts to improve institutional quality help significantly reduce the duration of civil disputes which carry significant contribution of institutional quality to social stability (Bergh and Öhrvall, 2018). Surdua et a., (2018) extend the time dimension not only to the entry but to the re-entry of FDI based on organizational learning. They conclude that institutional quality is quite a significant determinant of the re-entry to the host country.

The effects of duration of institutional quality are closely linked to sustainable development as far as countries are showing increasing concerns with the benefits of sustainable projects in the short term. Recent evidence is offered by the findings of Teng et al., (2021) and Khan et al., (2022). Eventually, Fomba et al., (2023) recommend that the fast dissemination of knowledge through education requires strong institutional quality. The authors in this paper emphasize that the duration dimension is not empirically examined in the current literature of the determinants of FDI. Therefore, the time factor is critical to multinational firms as much as it is to host countries. Ideally, the latter

are interested in bringing about the benefits of FDI in a short horizon. At the same time, multinational firms are interested in receiving benefits from investment abroad. This understanding requires that governments must design, and eventually improve, a variety of institutions that work as catalysts to utilize the benefits of FDI in reasonable investment horizons. In this case, economic growth and development can be beneficial. The authors in this paper examine the six pillars of World Governance Indicators (hereinafter WGIs) developed by the World Bank as measures of institutional quality. In addition, the authors introduce a measure of the time it takes for an institutional pillar to bring about an increase in absolute magnitude of FDI. The authors refer to this dimension as “duration” of WGI.

### **3. The Impact of Institutional Indicators on FDI.**

This part reviews the relevant studies that interpreted the impact of institutional indicators and their significant effect on FDI. The notion of institutional factors and governance caught the interest and the attention of international economists and investors who consider these factors the basic influences in international markets. Consensually, economists, political scientists as well as international business scholars agree that absolute magnitude of FDI to developing nations are conditioned by the host country’s ability to offer effective institutional quality (Hondoyo, 2017; OECD, 2011; Kaufmann et al, 1999).

The institutional quality has been examined in the literature using the well-known World Governance Indicators compiled by the World Bank in an index. The latter includes six indicators which are: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruptions all of which bear direct influences on economic activity. Bota-Avram (2014), Baek et al, (2019) and Sabir et al (2019) conclude that improvement in conveying high-quality institutional factors intrinsically help low-quality host country in acquiring more economic benefits of attracting greater FDI ingress. Consequently, economies with a high score index of sound institutional indicators attract foreign investors guaranteeing a stable favorable investment environment that safeguards private investors from any negative expectancies. Relatively speaking, the more a country maintains institutional quality, the better improvement in economic growth and sustainable development at large (Raza et al, 2021; Sayari, 2019; Mohamed and Sidiropoulos, 2010). Accordingly, further studies emphasized the positive and crucial impact that institutional indicators have on FDI. Mizirak and Altıntaş (2018) investigated the empirical relation between FDI and these institutional factors on 12 countries for the years 2002-2015. The study concluded that there is a positive connection between FDI and governance. Chodisetty and Reddy (2019) ultimately considered the impact of the above-mentioned six institutional indicators on the BRICS nations' economies. The outcomes showed that FDI in Brazil is positively influenced by the institutional factors. Although, the regulatory Quality influence has not been found on significant to Russian FDI, the institutional indicators in India, China and South Africa showed high influence on FDI flows. Masron and Abdullah (2010) investigated the effect of institutional quality on FDI inflows into ASEAN in the period between 1996 and 2008. The results show that the existence of positive and

significant association between institutional indicators and FDI inflows. In Pakistan, Zeshen and Afza (2014) conclude that all the variables of governance indicators have positive and significant association with absolute magnitude of FDI.

Although the above-mentioned studies offer indications to the positive impact of institutional indicators on FDI, other findings offer the otherwise in terms of the level of impact each indicator has on absolute magnitude of FDI. Bhasin and Grag (2018) investigated the role of institutional environment in promoting investment in recent times taking a sample of 16 Asian economies over the period 2000–2012. The results showed that a positive connection exists between political stability and FDI inflow. Nevertheless, uncontrol of corruption and inefficient regulatory framework positively affect the absolute magnitude of FDI, indicating the preference of foreign investors for a regime with less control of corruption and regulations.

The following parts demonstrated the impact of each of the institutional factors on FDI.

### **3.1. Impact of Voice and Accountability on absolute magnitude of FDI**

The relevant studies in the literature reveal contradictory views related to the hypothesis that there is a positive and significant association between voice and accountability and the inward flow of FDI. Bota-Avram (2014) and Phung (2017) found that the impact of voice and accountability has less impact on FDI inflows. Kurul and Yalta (2017), Hondoyo (2017), Zeshen and Afza (2014) and Chodisetty and Reddy (2019) found that the voice and accountability has positive and significant effect on FDI.

### **3.2. Impact of Political Stability on absolute magnitude of FDI**

Elkomy et al (2016) and Siddica and Angkur (2017) conclude that even if a country is perceived as being politically stable, political change and political transition as well can have a significant impact on business and investment decision-making. Domestic political situation will determine the orientation and priority of the country in terms of how to effectively rule the government (Hondoyo, 2017). Amal et al (2009), Zeshen and Afza (2014) and Phung (2017) document that positive and significant association exists between political stability and FDI inflows. Furthermore, Bissoon (2011) and Bouchoucha and Yahyaoui (2019) emphasized the remarkable role of political stability in enhancing economic development and sustainable economic growth.

### **3.3. Impact of government effectiveness on absolute magnitude of FDI**

The effectiveness of government activity is meant to serve the interest of the general population and the cooperation between public and private sectors is crucial for ensuring benefits to society (Bissoon, 2011; Siddic and Angkur, 2017). Therefore, effective governance matters to investment flows in any society (Kurul and Yalta 2017; Bota-Avram, 2014; Zeshen and Afza, 2014). Rodríguez-Pose and Cols (2017) suggested that factors such as political stability, government effectiveness, lower corruption, voice and accountability and the rule of law are long-lasting influencing factors for African countries to attract FDI.

### **3.4. Impact of regulatory quality on absolute magnitude of FDI**

Number of related studies in the literature reveals positive and significant association between the quality of regulation and FDI inflows that can be increased when economic freedom is associated with an effective implication of law and sound regulations (Eldomiaty et al, 2016; Bota-Avram, 2014; Bouchoucha and Yahyaoui, 2019; Hayat, 2019). However, the results reported by Bokpin and Mensah (2017) offer a contradicting view that the genesis of a country's legal system blocks a great mass of FDI inflow as far as institutions alone cannot reach a high-quality level of attracting FDI.

### **3.5. Impact of the rule of law on absolute magnitude of FDI**

The rule of law is essential for companies that are doing business in certain countries and regions worldwide. Without any rule of law enforcement, the ultimate business sector will face uncertainty or risky investments abroad (Siddic and Angkur, 2017; Hayat, 2019; Bissoon, 2011).

### **3.6. Impact of control of corruption on absolute magnitude of FDI**

Hayat (2019); Kurul and Yalta (2017) and Zeshen and Afza (2014) conclude that control of corruption immensely related to the growth of FDI in host markets. The more the control of corruption, the more foreign investment decisions are improvised. Furthermore, Corruption carries negative impact on the attractiveness for international investors. The findings reported by Çule and Fulton (2013) indicate that the influence of institutional indicators on investment environment is revealed in an economy with a moderate level of bureaucracy. In addition, the presence of good instruments for curbing corruption enhances and encourages an effective investment environment that ultimately stimulates economic performance. Hakimi and Hamdi (2017) of an extended supportive view by analyzed the effects of corruption on investment and growth in 15 Middle East and North African (MENA) countries during the period 1985-2013. The results conclude that a high-level of corruption curb economic growth and deteriorates the business environment in host markets. It is also argued that a higher fiscal burden and a high level of corruption are strongly associated with larger unofficial economies (Friedman et al, 2000). Nevertheless, Hossain (2016) concludes that there is a positive association between the level of corruption and FDI as far as an increase in corruption leads to an increase in FDI ingress.

## **4. Data and Estimation Framework**

### **4.1. Data**

The data include the scores of WGIs and absolute magnitude of FDI in 91 countries worldwide covering the period 2002-2022. The data are extracted from World Development Indicators (World Bank Group, 2022). The World Governance Indicators (hereinafter WGIs) as used as proxies for institutional effects. These indicators include, (a) Voice and accountability, (b) Political stability, (c) Government effectiveness, (d) Rule of law, (e) Regulatory quality, (f) Control of corruption. The methodology of the calculation of WGIs scores is described in Kauffman, et al., (2010) and Kaufmann and Zoido-Lobaton (1999).

## 4.2. Variables

### 4.2.1. Dependent variable

absolute magnitude of FDI being measured as the net FDI inflows-Net FDI outflows as % of GDP. This measurement offers an advantage of reflecting the contribution of FDI to climate change (Corfee-Morlot et al., 2009; Buchner et al., 2011). It is worth noting that the magnitude of FDI reflects its contribution across world regions. The skewness is considered an effective measure to reflect the movements in a respective variable (Doane and Seward, 2011). Figure (1) shows the general trends in terms of average growth rates and the skewness of the net FDI inflows – net FDI outflows.

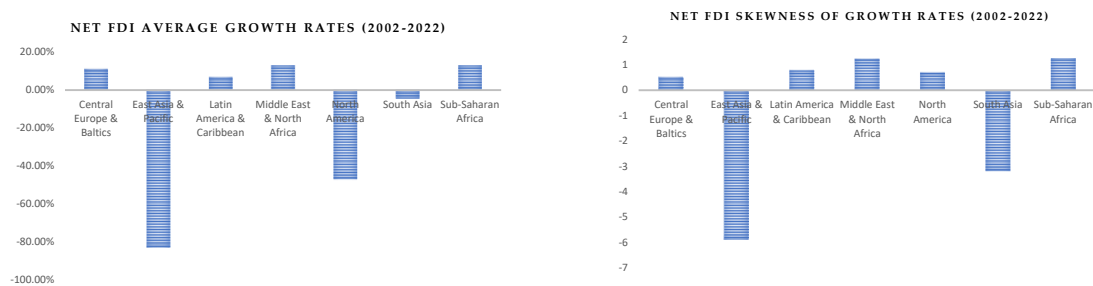


Figure 1. The Magnitude of Net FDI across world regions (Sources: The authors)

Figure (1) shows that the average net FDI outflows are greater than net FDI inflows in three regions namely, East Asia & Pacific, North America, and South Asia. In terms of priorities, East Asia & Pacific is characterized by significant increases of FDI outflows, followed by North America, then South Asia. Nevertheless, the skewness of the magnitude of FDI shows that the net FDI outflows being carried out by East Asia & Pacific and South Asia are much greater than North America. The latter seems to be receiving an increasing FDI from other parts of the world.

### 4.2.2. Independent variables

These include three groups. The first group includes the six WGI. The second group includes dummy variables that measure the regional effects. The third group includes the duration effect. The latter refers to the time (in this paper being measured in years) it takes until the Magnitude of FDI as a percentage of GDP increases as a result of an increase (improvement) in WGIs simultaneously. That is, when the Magnitude of FDI as a percentage of GDP increases in the year 2002 as a result of improvement in WGIs simultaneously, the variable (Duration 1) = 1, otherwise = 0. This process is repeated over the years from 2002 to 2022. The measurement uses binary values = 1 when absolute magnitude of FDI increases simultaneously as WGIs increase, otherwise = 0. The data includes 17 duration dummy variables that correspond to seventeen years of data. Table (1) summarizes the variables in this paper.

Table 1. List of the Institutional Proxies, Region's Effect and Duration Effect

	Variables	Measure
1	Voice and Accountability <sup>1</sup>	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 media.
2	Political Stability <sup>2</sup>	The likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism
3	Government Effectiveness <sup>3</sup>	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.
4	Regulatory Quality <sup>4</sup>	the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
5	Rule of Law <sup>5</sup>	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
6	Control of Corruption <sup>6</sup>	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.
7	Magnitude of FDI as a percentage of GDP <sup>7</sup>	net FDI inflows-Net FDI outflows as % of GDP
8	dummy variables	Seven dummy variables that take the value of 1 for a certain region and 0 otherwise. World Seven regions (Central Europe & Baltics; East Asia & Pacific; Latin America & Caribbean; Middle East & North Africa; North America; South Asia; Sub-Saharan Africa)
9	Duration	17 Dummy variables that correspond to 17 years of annual data. The variable takes value = 1 for a certain year, and 0 otherwise.
10	Time	Nominal values for every year

Source: 1, 2,3,4,5,6 World Governance Index (Kauffman, et al., 2011); <http://info.worldbank.org/governance/wgi/index.aspx#home>

7 World Development Indicators <https://databank.worldbank.org/source/world-development-indicators>

Table (A) in the appendix reports the descriptive statistics of the variables being examined in this paper. It is worth noting that observable differences exist between the components of institutional quality across world economies. Figures (2) and (3) illustrate the movements in the institutional quality by measuring the skewness of the scores across the years 2002-2022.



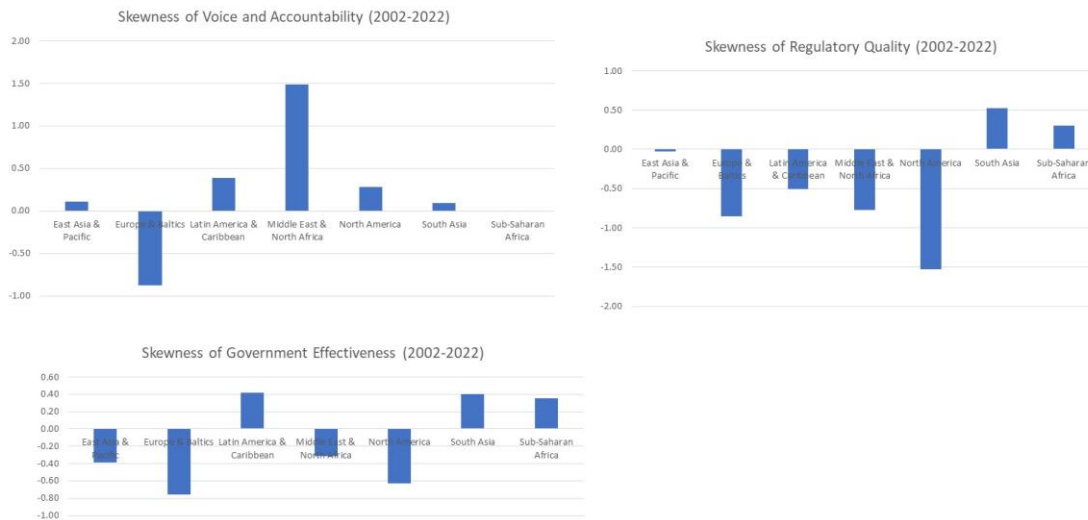


Figure 2. The Skewness of Voice & Accountability; Regulatory Quality, and Government effectiveness (Sources: The authors)

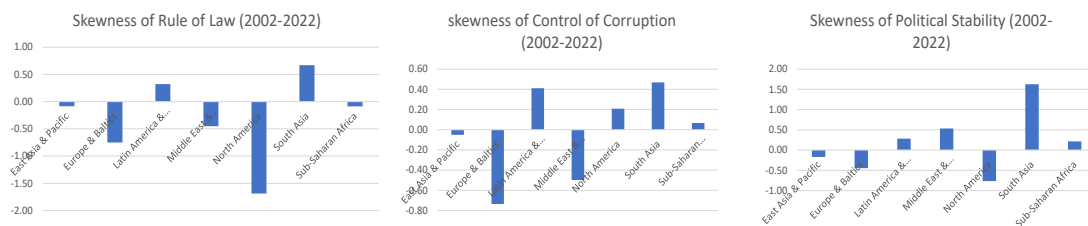


Figure 3. The Skewness of Rule of Law; Control of Corruption, and Political Stability (Sources: The authors)

In general, Figures (2) and (3) show improvements in institutional quality (the bars above zero level) and deteriorations in institutional quality (the bars below the zero level). Interestingly, an inference can be reached that developed (developing) economies are not associated with improvements (deteriorations) in institutional quality. This is a generic call for world economies to consider the improvement in institutional quality as an on-going process.

### 4.3. Hypotheses

The authors develop three hypotheses based on the relevant above-mentioned literature. The three hypotheses are as follows.

Hypothesis 1: A positive and significant association exists between Institutional indicators and FDI.

Hypothesis 2: A positive and significant association exists between world regions and efforts to attract FDI.

Hypothesis 3: The improvements in Institutional indicators take a long time to influence FDI.

## 5. Discussion

This section reports the empirical results of examining each of the WGI pillars along with the regional and duration effects. The results are reported in Table (2).

Table 2. The Effects of World Governance Indicators, World Regions and Duration on FDI

Variables	Model 1	Model 2
Constant	-0.215 (0.202)	-0.632** (0.189)
Voice and Accountability	-0.517*** (0.137)	-0.701*** (0.172)
Political Stability	0.642*** (0.152)	0.635*** (0.156)
Government Effectiveness	0.0138 (0.252)	-0.002 (0.261)
Regulatory Quality	0.822*** (0.226)	0.981*** (0.232)
Rule of Law	-0.791*** (0.3004)	-0.199 (0.333)
Control of Corruption	-0.247 (0.285)	-0.630** (0.293)
Latin America & Caribbean		0.373*** (0.088)
Central Europe & the Baltics		-0.148*** (0.068)
East Asia & Pacific		-0.1708** (0.083)
duration for 16 years		0.211*** (0.146)
duration for 17 years	0.243** (0.1307)	0.165** (0.129)
Time	-0.0062*** (0.0052)	-0.006*** (0.005)
Adjusted R Square	0.073	0.0966
N	1911	1911
F stat.	5.903***	6.336***
Std. Error of the Estimate	0.978	0.965
Durbin- Watson	1.082	1.127

\*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%. Standard errors of estimated coefficients are reported in parenthesis. Table (2) reports only the significant coefficients of durations and the significant coefficients of world regions.

Standard statistical tests are carried out. The Normality test is carried out using Kolmogorov-Smirnov and Shapiro-Wilk (Shapiro, Wilk, & Chen, 1968). The results are reported in appendix Table (B). Testing for Linearity Vs Nonlinearity is carried out using the Regression Equation Specification Error Test, RESET (Ramsey, 1969; Thursby and Schmidt, 1977; Thursby, 1979; Sapra, 2005; Wooldridge, 2006; Bahng and Jeong, 2012; Pao and Chih, 2005). The results are reported in the

appendix Table (C). Testing for Heteroskedasticity is carried out using Breusch-Pagan (1979), Cook-Weisberg (1982, 1983) test. The results are reported in appendix Table (D). The general estimating equation of a nonlinear model takes the form of Least Squares Dummy Variables (LSDV), is as follows.  $y_{ik} = \alpha_k + \sum_{i=1}^k \beta_{ik} X_{ik}^3 + \lambda_k + \nu_{ik}$  where  $t = 1, \dots, n$ ;  $k =$  number of countries in each group;  $y$  = net FDI inflows-Net FDI outflows as % of GDP;  $Xs$  = The independent variables include two models. Model 1 includes the six pillars of WGIs, the associated duration and time effect. Model 2 adds the world regions effect.  $\lambda_k$  = Random error term due to the individual effect.  $\nu_{ik}$  = Random error. Duration refers to the time (years) it takes until the absolute magnitude of FDI as a percentage of GDP increases as a result of an increase (improvement) in the Government Governance indicators. The measurement uses binary values = 1 when absolute magnitude of FDI increases simultaneously as WGIs increases, otherwise = 0. The data includes seventeen duration dummy variables that correspond to seventeen years of data. The estimation method is OLS regression algorithm. Multicollinearity is examined. All variables are associated with  $VIF < 5$ . The long-run covariance estimate; Bartlett Kernel, Andrews bandwidth = 24.00. The coefficients estimates are adjusted using White heteroskedasticity-consistent standard errors and covariance.

### 5.1. Discussion of the effects of Voice and Accountability on FDI

Voice and accountability are considered the magnitude to which a country's civilians practice democracy. The results reported in table (2) show negative impact of Voice and Accountability of FDI. This result can be interpreted in terms of the process of FDI that has to be approved at high administrative levels in any country. It is quite evident that the approval of absolute magnitude of FDI is not part of democracy. The results for the region's effect offer support to this argument. That is, the results above-mentioned are significant in two regions which are Latin America and Caribbean region.

The results for the duration effect reveal that it takes between 16 to 17 years until an improvement in Voice and Accountability has a positive effect on DFI inflows. Indeed, these results offer updates to other studies in different. Further studies previously stated in the literature part suggest that all institutional indicators bear positive and significant effects on the amount of FDI inflows (Hondoyo, 2017) Specifically, Kurul and Yalta (2017) found that the variable of voice and accountability has positive and significant effect on FDI. Chodisetty and Reddy (2019) conclude that Voice and Accountability have positive influence on FDI flows in Brazil.

### 5.2. Discussion of the effects of Political Stability on FDI

The results in table (2) show that political stability has a positive impact on FDI. This result goes in line with other studies in literature (Sabir et al, 2019; Phung, 2017 and Amal et al., 2009). Bhasin and Garg (2018) reported that only two indicators of governance, namely, political stability and regulatory quality have significant impacts on FDI inflows. Sayari, (2019) and Hondoyo (2017) suggest that foreign investments are usually attracted to countries that are politically stable and investors' rights are safeguarded. The region's effect shows that political stability is significant in

Latin America. The same effect is reported in Amal et al (2009) and (Bouchoucha and Yahyaoui, 2019) on a panel of 49 African countries. Nevertheless, political stability has negative effect in Europe and Central Asia, which is also reported by Chodisetty and Reddy (2019) in Brazil. In terms of duration, as in the case of Voice and Accountability, the results reveal that it takes between 14 to 17 years until an improvement in political stability has a positive effect on DFI inflows.

### **5.3. Discussion of the effects of Regulatory Quality on FDI**

The results in table (2) show that regulatory quality has a positive and significant impact on the absolute magnitude of FDI. This result is quite relevant and realistic taking into consideration that the process of FDI is exposed to condensed regulations in any country. The results for the region's effect show that regulatory quality has positive effects in Latin America and Caribbean but negative effects in Europe and Central Asia. In terms of duration, a trend of WGI is observed. That is, it takes between 16 to 17 years until an improvement in Regulatory Quality has a positive impact on DFI inflows.

The above-mentioned results offer updates to related studies in the literature such as Eldomiaty et al, (2016), Zashan and Talat (2014) and Sabir et al, (2019) indicated that both political stability and regulatory quality are on the top of investors and multinationals' interests. Sayari (2019) and Hondoyo (2017) conclude that institutional quality gives a positive signal to foreign investors as a transparent investment climate is favorable to protect their ultimate business establishments. However, the negative impact of Regulatory Quality on FDI in Europe and Central Asia is also documented by Bhasin and Garg (2018). They report that regulatory inefficiency affects FDI inflows positively, indicating that foreign investors may prefer a country where laws can be circumvented, and regulations are fragile.

### **5.4. Robustness Test**

In this section the authors test the robustness of the results reported in table (2). The results show that only three pillars of WGIs have consistent estimates in terms of sign and statistical significance namely, Voice & Accountability, Political Stability and Regulatory Quality. The objective of the robustness test is to examine the extent to which the variations in the three WGIs may have effects on the absolute magnitude of FDI. To serve this objective, the authors construct an index of WGIs in order to estimate the sensitivity of the absolute magnitude of FDI to the time-varying weights of WGIs. To reach this objective, the process goes in two steps.

First Step: The authors estimate a weight for every WGI in order to construct an index of WGIs that reflects the relative importance of every pillar to a respective country. The weights are estimated as Eigenvector of a 6x6 matrix. The latter includes estimated Eigenvalues (or Characteristic Roots) that are associated with the advantage of having non-zero absolute solution (Bapat, 2000; Pouriyanezhad et al., 2021; Shen et al., 2016). This advantage reflects the reality of WGIs that each pillar must have a relative effect in every year for every respective country. The algebraic algorithm takes the form that follows.

$(A - \lambda I) X = 0$ ; Where:  $A = 6 \times 6$  matrix of WGIs;  $\lambda =$  the eigenvalue;  $I =$  identity matrix; and  $X =$  value of Eigenvector being associated with  $6 \times 6$  matrix of WGIs. The value of the individual Eigenvalues, then the Eigenvector can be reached using Goal Seek in Excel spreadsheet.

Second Step: the sensitivity of the absolute magnitude of FDI is measured by the variations (or slope) of each individual pillar against the WGI index. The slope ( $\beta_j$ ) calculates as follows.  $\beta_j = \frac{\sigma_{jM}}{\sigma_M^2}$ , where  $\sigma_{jM}$  the covariance of an individual WGI and the index, and  $\sigma_M^2 =$  the variance of the index. The slope is first computed on a time-varying (or rolling) for two years, then rolling over time. In this case, the slope reflects the time-varying sensitivity of WGIs. Usually, the slope has a benchmark of 1. The slope value that is greater than one shows that the country governance indicator improves faster than other countries in the index. The vice versa is true. The negative slope shows that the country governance indicator deteriorates in comparison to other countries in the index. It is interesting to examine the effects of the speed of institutional arrangements on the absolute magnitude of FDI. In this case, each of the three pillars (table 2) is divided into three distinct levels of beta; namely, greater than one, less than one and negative beta. The results are reported collectively in Table (3).

Table 3. The Results for the Robustness test

	Model 1: Voice & Accountability $\beta > 1$	Model 2: Beta Voice & Accountability $\beta < 1$	Model 3: Negative $\beta$ Voice & Accountability	Model 4: Political Stability $\beta > 1$	Model 5: Political Stability $\beta < 1$	Model 6: Negative $\beta$ Political Stability	Model 7: Regulatory Quality $\beta > 1$	Model 8: Regulatory Quality $\beta < 1$	Model 9: Negative $\beta$ Regulatory Quality
Voice and Accountability	-2.67*** (0.427)	-1.73*** (0.399)	-1.43*** (0.491)						
Political Stability				-0.11 (0.28)	-0.44* (1.86)	0.84*** (0.35)			
Regulatory Quality							-0.05 (0.13)	0.02 (0.05)	-0.85 (1.41)
Sub-Saharan Africa		-1.92*** (0.166)			-0.18* (0.83)				-1.42*** (0.61)
Latin America and Caribbean				-0.69*** (0.81)		1.21*** (0.31)	-0.37* (0.85)		
Europe & Baltics	-1.21*** (0.128)	0.48*** (0.104)	-0.18*** (0.191)	-0.63*** (0.15)		-0.14* (0.77)			-0.39** (0.14)
Middle East and North Africa	-1.11*** (0.327)	-0.71*** (0.137)	-0.59*** (0.274)		-0.24* (0.67)				
East Asia and Pacific			-1.21*** (0.551)						
South Asia		-0.42*** (0.338)							
duration for 16 years	0.721** (0.186)	0.778*** (0.331)		0.237** (0.263)			0.24** (0.319)	-1.49*** (3.8)	
duration for 17 years	0.183*** (0.28)		1.62*** (0.97)	0.601*** (0.15)	0.48* (0.74)		0.53*** (0.95)	1.11*** (0.81)	
$\bar{R}^2$	0.2971	0.8851	0.4317	0.2641	0.0824	0.1701	0.1988	0.7783	0.1104
N	1076	114	721	196	189	1526	644	57	1210
F statistic	4.62***	18.92***	8.22***	3.0102***	1.4888*	5.7126***	2.0128**	6.4861**	1.74**
Std. Error of the Estimate	0.1242	0.1581	0.2311	0.2141	0.5398	1.0601	0.6103	0.1986	0.2887
Durbin- Watson	2.45	2.61	2.06	1.43	1.72	1.01	1.27	2.04	1.55

\*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%. Standard errors of estimated coefficients are reported in parenthesis.

Standard statistical tests are carried out. The Normality test is carried out using Kolmogorov-Smirnov and Shapiro-Wilk (Shapiro, Wilk, & Chen, 1968). The results are reported in the appendix Table (A). Testing for Linearity Vs Nonlinearity is carried out using the Regression Equation Specification Error Test, RESET (Ramsey, 1969; Thursby and Schmidt, 1977; Thursby, 1979; Sapra, 2005; Wooldridge, 2006; Bahng and Jeong, 2012; Pao and Chih, 2005). The results are reported in appendix Table (B). Testing for Heteroskedasticity is carried out using Breusch-Pagan (1979), Cook-Weisberg (1982, 1983) test. The general estimating equation of a nonlinear model takes the form of Least Squares Dummy Variables (LSDV), is as follows. 
$$y_{ik} = \alpha_k + \sum_{i=1}^3 \beta_{ik} X_{ik} + \lambda_k + v_{ik}$$
 where  $t = 1, \dots, n$ ;  $k =$  number of countries in each group;  $y$  = net FDI inflows-Net FDI outflows as % of GDP;  $X_s$  = The independent variables include the significant variables reported in table (2), in addition to dummy variables to measure the regional effects and duration effect.  $\lambda_k$  = Random error term due to the individual effect.  $v_{ik}$  = Random error. Duration refers to the time (years) it takes until the absolute magnitude of FDI as a percentage of GDP increases as a result of an increase (improvement) in the Government Governance indicators. The measurement uses binary values = 1 when absolute magnitude of FDI increases simultaneously as WGI increases, otherwise = 0. The data includes seventeen duration dummy variables that correspond to seventeen years of data. The estimation method is OLS regression algorithm. Multicollinearity is examined. All variables are associated with  $VIF < 5$ . The long-run covariance estimate; Bartlett Kernel, Andrews bandwidth = 9.00. The coefficients estimates are adjusted using White heteroskedasticity-consistent standard errors and covariance.

#### **5.4.1. The Robustness of Voice & Accountability**

The negative estimate of the Voice & Accountability is stable as it is also negative in table (2). Nevertheless, as far as the three levels of beta are quite different from each other, the negative estimate across the three levels indicates that Voice & Accountability cannot differentiate between the three different levels. Therefore, the effect of Voice & Accountability on absolute magnitude of FDI cannot be considered robust.

#### **5.4.2. The Robustness of Political Stability**

The positive estimate of political stability is stable relatively as it matches the same result in table (2). But the robustness results show that less politically stable countries (beta less than 1) have adverse effect of DFI inflows. In case of negative beta, the positive estimate of political stability indicates that as countries are becoming instable (opposite to the WGI index), absolute magnitude of FDI may find it an investment opportunity shall the government offer generous investment incentives which are usually reflected in high country risk premium.

#### **5.4.3. The Robustness of Regulatory Quality**

The effect of regulatory quality is neither stable nor significant all the way through the three levels of beta. In table (2) the negative estimate of Regulatory Quality was marginally significant. Nevertheless, the speed of regulatory quality using beta turned out insignificant.

In terms of regional effect, the negative effects of weak WGIs are evident across all regions. In terms of the duration of institutional quality, the results of the robustness test show that the duration of 17 years is robust across different levels of WGIs.



## **6. Conclusion**

This paper extends the literature that examines the effects of institutional factors on absolute magnitude of FDI. Although studies in literature offer support to the significant impact of the quality of institutional arrangements on FDI, this paper offers two new perspectives. The first perspective takes into consideration world regions rather than certain countries.

The results in this paper show that four regions are characterized by significant differences in institutional quality. These four regions are Europe & Baltics, Middle East and North Africa, East Asia and Pacific and South Asia. The monotonic results indicate the necessity that countries in these four regions need further institutional reforms. The second new perspective is the duration of institutional arrangements. It is quite plausible to comprehend the fact that institutional efforts take time. The results indicate that the attraction of absolute magnitude of FDI is a condensed process that usually occurs in the long term in emerging economies (Behera et al., 2020). The results in this paper show that the improvement in institutional quality takes between 16 to 17 years to bring about a magnitude effect of FDI.

The effect of time is quite informative as well. In the above-mentioned four regions, the Global Economic Prospects, 2018 (2018) reports that net FDI as a percentage of GDP has been declining constantly from 2005 until 2019.

## References

- Amal, M., H. Raboch, and B. T. Tomio, (2009), "Strategies and Determinants of Foreign Direct Investment (FDI) from Developing Countries: Case Study of Latin America," *Latin American Business Review*, 10(2-3), 73-94.
- Bapat, R. B., (2000), *Linear Algebra and Linear Models*. 2<sup>nd</sup> edition, Springer.
- Baek, H. Y., P. K. Maskara, and L. S. Miller, (2019), "Does Improved Governance Lead to a Higher Share of FDI in Foreign Equity Investments?" *Asia-Pacific Journal of Financial Studies*, 48(4), 561-586.
- Behera, C., B. R. Mishra, B. T. Priyadarsini, and L. D. Satpathy, (2020), "Institutional Quality and Foreign Direct Investment Inflows: Evidence from Cross-country Data with Policy Implication," *International Journal of Economics and Business Administration*, 8(2), 302-316.
- Bergh, A. and R. Öhrvall, (2018), "A sticky trait: Social trust among Swedish expatriates in countries with varying institutional quality," *Journal of Comparative Economics*, 46, 1146-1157.
- Bhasin, N. and S. Garg, (2018), "Does Host Country Institutional Quality Act as a Differentiator in Intra-regional FDI Evidence from Selected Asian Economies," *Foreign Trade Review*, 53(2), 81-97.
- Bhaumik, S. K. and S. Gelb, (2005), "Determinants of entry mode choice of MNCs in emerging markets: Evidence from South Africa and Egypt," *Emerging Markets Finance and Trade*, 41(2), 5-24.
- Bissoon, O., (2011), "Can Better Institutions attract more Foreign Direct Investment? Evidence from Developing Countries," *International Conference on Applied Economics (ICOAE)*, 59-70.
- Bokpin, G. A. and L. Mensah, (2017), "Legal source, institutional quality and FDI flows in Africa," *International Journal of Law and Management*, 59(5), 687-69.
- Bota-Avram, C., (2014), "Good governance and doing business: evidence from a cross-country survey," *Transylvanian Review of Administrative Science*, 10(41), 27-45.
- Bouchoucha, N. and I. Yahyaoui, (2019), "Foreign direct Investment and economic growth: The role of the governance," *Economics Bulletin*, 39(4), 2711-2725.
- Breusch, T. S. and A. R. Pagan, (1979), "A simple test for heteroscedasticity and random coefficient variation," *Econometrica*, 47(5), 1287-1294.
- Brouters, K. D. and L. E. Brouters, (2003), "Why service and manufacturing entry mode choices differ: The influence of transaction cost factors, risk and trust," *Journal of Management Studies*, 40(5), 1179-1204.
- Brouters, K. D., (2002), "Institutional, cultural and transaction cost influences on entry mode choice and performance," *Journal of International Business Studies*, 33(2), 203-221.

- Buchner, B., J. Brown, and J. Corfee-Morlot, (2011), "Monitoring and Tracking Long-Term Finance to Support Climate Action," *OECD/IEA Climate Change Expert Group Papers 2011/3*, OECD Publishing (<https://ideas.repec.org/p/oec/envaab/2011-3-en.html>).
- Canabal, A. and G. O. White, (2008), "Entry mode research: Past and future," *International Business Review*, 17(3), 267-284.
- Carmignani, F., (2002), "New evidence on the politics and economics of cabinet duration," *Scottish Journal of Political Economy*, 49(3), 249-279.
- Carmignani, F., (2009), "The distributive effects of institutional quality when government stability is endogenous," *European Journal of Political Economy*, 25(4), 409-421.
- Chen, H. and M. Y. Hu, (2002), "An analysis of determinants of entry mode and its impact on performance," *International Business Review*, 11(2), 193-210.
- Chueke, G. V. and F. M. Borini, (2014), "Institutional distance and entry mode choice by Brazilian firms: An institutional perspective," *Management Research: The Journal of the Iberoamerican Academy of Management*, 12(2), 152-175.
- Chun, B. G., (2009), "Firm's choice of ownership structure: An empirical test with Korean multinationals," *Japan and the World Economy*, 21(1), 26-38.
- Cook, R. D. and S. Weisberg, (1982), *Residuals and Influence in Regression*, New York: Chapman and Hall.
- Cook, R. D. and S. Weisberg, (1983), "Diagnostics for heteroscedasticity in regression," *Biometrika*, 70(1), 1-10.
- Chodisetty, M. and L. Reddy, (2019), "Impact of Institutional Indicators Influence on FDI Flows with Reference to BRICS Countries: An Empirical Research," *International Journal of Innovative Technology and Exploring Engineering*, 8(6S4), 798-803.
- Corfee-Morlot, J., B. Guay, and Kate M. Larsen, (2009), "Financing Climate Change Mitigation: Towards a Framework for Measurement, Reporting, and Verification," *OECD-IEA*. [www.oecd.org/dataoecd/0/60/44019962.pdf](http://www.oecd.org/dataoecd/0/60/44019962.pdf).
- Conover, W. J., (1980), *Practical Nonparametric Statistics*. 2<sup>nd</sup> edition, John Wiley & Sons.
- Çule, M. and M. E. Fulton, (2013), "Corporate Governance and Subjective Well-Being," *Applied Economics Letters*, 20(4), 364-367.
- Dikova, D. and A. Van Witteloostuijn, (2007), "Foreign direct investment mode choice: Entry and establishment modes in transition economies," *Journal of International Business Studies*, 38(6), 1013-1033.
- Dikova, D., (2012), "Entry mode choices in transition economies: The moderating effect of institutional distance on managers' personal experiences," *Journal of East-West Business*, 18(1), 1-27.

- Doane, David P. and E. Lori Seward, (2011), "Measuring Skewness: A Forgotten Statistic?" *Journal of Statistics Education*, 19(2), 1-18.
- Dut, V. V., Y. H. Akbar, N. H. Dang, and N. K. Hanh, (2018), "The Impact of Institutional Distance on the Choice of Multinational Enterprise's Entry Mode: Theory and Empirical Evidence from Vietnam," *Asian Journal of Business and Accounting*, 11(1), 71- 95.
- Eldomiaty, T. I., T. B. Al Qassimi, A. F. Mabrouk, and L. S. Abdelghany, (2016), "Institutional quality, economic freedom, and stock market volatility in the MENA region," *Macroeconomics and Finance in Emerging Market Economies*, 9(3), 262-283.
- Elkomy, S., H. Ingham, and R. Read, (2016), "Economic and Political Determinants of the Effects of FDI on Growth in Transition and Developing Countries," *Thunderbird International Business Review*, 58(4), 374-362.
- Fomba, B. K., D. Ne Dort Fokam Talla, and P. Ningaye, (2023), "Institutional Quality and Education Quality in Developing Countries: Effects and Transmission Channels," *Journal of the Knowledge Economy*, 14(1, No 5), 86-115.
- Friedman, E., S. Johnson, D. Kaufmann, and P. Zoido-Lobaton, (2000), "Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries," *Journal of Public Economics*, 76(3), 459-493.
- Global Economic Prospects. 2018. *The Turning of the Tide?*  
<https://openknowledge.worldbank.org/entities/publication/edf1cdb6-2c2b-50c9-8163-61eec9479d45>
- Hakimi, A. A. and H. Hamdi, (2017), "Does corruption limit FDI and economic growth? Evidence from MENA countries," *International Journal of Emerging Markets*, 12(3), 550-571.
- Halter, D., M. Oechslin, and J. Zweimüller, (2014), "Inequality and growth: the neglected time dimension," *Journal of Economic Growth*, 19, 81-104.
- Harzing, A. W., (2002), "Acquisitions versus greenfield investments: International strategy and management of entry modes," *Strategic Management Journal*, 23(3), 211-227.
- Hayat, A., (2019), "Foreign Direct Investment, Institutional Quality, and Economic Growth," *The Journal of International Trade & Economic Development*, 28(5), 561-579.
- Holcombe, Randall G. and Christopher J. Boudreaux, (2013), "Institutional quality and the tenure of autocrats," *Public Choice*, 156, 409-421.
- Hondoyo, Sofik., (2017), "An Exploratory Study on the Relationship of Public Governance and Ease of Doing Business," *Asia-Pacific Management and Business Application*, 6(2), 75-88.
- Hossain, S., (2016), "Foreign direct investment and corruption: Is it a major hindrance for encouraging inward FDI?" *African Journal of Business Management*, 10(10), 256-269.

- Kauffman, D., A. Kraay, and M. Mastruzzi, (2010), "The Worldwide Government indicators: Methodology and Analytical issues," The World Bank Development Research Group, Macroeconomics and Growth Team, *Policy Research Working Paper* 5430, pp.3-4.
- Kaufmann, D., A. Kraay, and P. Zoido-Lobaton, (1999), Aggregating Governance Indicators. World Bank Policy Research, *Working Paper* No. 2195, The World Bank.
- Khan, H., L. Weili, and I. Khan, (2022), "The role of institutional quality in FDI inflows and carbon emission reduction: evidence from the global developing and belt road initiative countries," *Environmental Science and Pollution Research*, 29, 30594-30621.
- Kurul, Z. and A. Yasmien. Yalta, (2017), "Relationship between Institutional Factors and FDI Flows in Developing Countries: New Evidence from Dynamic Panel Estimation," *MDPI Economies*, 1-10.
- Madhok, A., (1998), "The nature of multinational firm boundaries: Transaction costs, firm capabilities, and foreign market entry mode," *International Business Review*, 7(3), 259-290.
- Masron, Tajul A. and A. Hussin, (2010), "Institutional Quality as a Determinant for FDI Inflows: Evidence from ASEAN," *World Journal of Management*, 2(3), 115-128.
- Meyer, K. E., (2001), "Institutions, transaction costs, and entry mode choice in Eastern Europe," *Journal of International Business Studies*, 32(2), 357-367.
- Mizirak, Z. and Altintas. K., (2018), "The nexus between governance factors and foreign direct investments: Evidence from panel data," *Journal of Administrative and Business Studies*, 4(1), 1-8.
- Mohamed, Sufian E. and Moise G. Sidiropoulos, (2010), "Another Look at the Determinants of Foreign Direct Investment," *Journal of Economic Development*, 35(2), 75-95.
- Moon, H. Chang, (1997), "The choice of entry modes and theories of foreign direct investment," *Journal of Global Marketing*, 11(2), 43-64.
- Müller, T., (2007), "Analyzing modes of foreign entry: Greenfield investment versus acquisition," *Review of International Economics*, 15(1), 93-111.
- Pennings, E. and L. Sleuwaegen, (2004), "The choice and timing of foreign direct investment under uncertainty," *Economic Modelling*, 21(6), 1101-1115.
- Pao, Hsiao T. and Yao Y. Chih, (2005), "Comparison of Linear and Nonlinear Models for Panel Data Forecasting: Debt Policy in Taiwan," *Review of Pacific-Basin Financial Markets and Policies*, 8(3), 525-541.
- Phung, H., (2017), "Impact of Institutional and Political Variables on Foreign Direct Investment in Developing Countries," *The Park Place Economist*, 25(1), 88-97.
- Pouriyanezhad, E., H. Rahami, S. M. Mirhosseini, (2021), "Truss optimization using eigenvectors of the covariance matrix," *Engineering with Computers*, 37, 2207-2224.

- Raff, H., Ryan, M. and F. Stähler, (2009), "The choice of market entry mode: Greenfield investment, M&A and joint venture," *International Review of Economic and Finance*, 18(1), 3-10.
- Roelfsema, H. and Y. Zhang, (2012), "The causal effect of institutional quality on outsourcing," *The Journal of International Trade & Economic Development*, 21(6), 895-920.
- Ramsey, J. B., (1969), "Tests for Specification Errors in Classical Linear Least Squares Regression Analysis," *Journal of Royal Statistical Society B*, 31(2), 350-371.
- Raza, S. A., N. Shah, and I. Arif, (2021), "Relationship Between FDI and Economic Growth in the Presence of Good Governance System: Evidence from OECD Countries," *Global Business Review*, 22(6), 1471-1489.
- Rodríguez-Pose. A. and G. Cols, (2017), "The determinants of foreign direct investment in sub-Saharan Africa: What role for governance?" *Regional Science Policy & Practice*, 9(2), 63-81.
- Sabir, S., A. Rafique, and K. Abbas, (2019), "Institutions and FDI: evidence from developed and developing countries," *Financial Innovation*, 5(8), 1-20.
- Sapra, S., (2005), "A regression error specification test (RESET) for generalized linear models," *Economics Bulletin*, 3(1), 1-6.
- Sayari, K., (2019), "Institutional Efficiency and Attraction of Foreign Direct Investment to Developing Countries," *International Journal of Economics and Finance*, 11(7), 54-60.
- Shapiro, S. S. and M. B. Wilk, (1965), "An analysis of variance test for normality (complete samples)," *Biometrika*, 52(3/4), 591-611.
- Shapiro, S. S., M. B. Wilk, and H. J. Chen, (1968), "A comparative study of various tests for normality," *Journal of the American Statistical Association*, 63(324), 1343-1372.
- Shapiro, D. M., (1983), "Entry, Exit and the Theory of the Multinational Corporation," In Charles P. Kindleberger and David B. Audretsch, Eds, *The Multinational Corporation in the 1980s*. MIT Press.
- Shen, D., H. Shen, and J. S. Marron, (2016), "A general framework for consistency of principal component analysis," *Journal of Machine Learning Research*, 17(150), 1-34.
- Siddic, A. and M. T. N. Angkur, (2017), "Does Institution Affect the Inflow of FDI? A Panel Data Analysis of Developed and Developing Countries," *International Journal of Economics and Finance*, 9(7), 214-221.
- Slangen, A. H. L. and J. F. Hennart, (2008), "Do foreign Greenfields outperform foreign acquisitions or vice versa? An institutional perspective," *Journal of Management Studies*, 45(7), 1301-1328.
- Smirnov, N., (1948), "Table for estimating the goodness of fit of empirical distributions," *Annals of Mathematical Statistics*, 19(2), 279-281.

- Surdua, I., K. Mellahib, Keith W. Glaisterc, and G. Nardellaa, (2018), “Why wait? Organizational learning, institutional quality and the speed of foreign market re-entry after initial entry and exit,” *Journal of World Business*, 53, 911-929.
- Teng, Jian-Zhou., M. K. Khan, M. I. Khan, M. Z. Chishti, and M. O. Khan, (2021), “Effect of foreign direct investment on CO<sub>2</sub> emission with the role of globalization, institutional quality with pooled mean group panel ARDL,” *Environmental Science and Pollution Research*, 28, 5271-5282.
- Thursby, Jerry G., P. Schmidt, (1977), “Some Properties of Tests for Specification Error in a Linear Regression Model,” *Journal of the American Statistical Association*, 72(359), 635-641.
- Thursby, J. G., (1979), “Alternative Specification Error Tests: A Comparative Study,” *Journal of the American Statistical Association*, 74(365), 222-225.
- Van der Waerden, B. L., (1927), “Beweis einer Baudetschen Vermutung, Nieuw Archief voor Wiskunde,” 15, 212-216.

## Appendix

Table A. Descriptive statistics of the variables being examined in this paper.

	Mean	Standard Error	Skewness	Minimum	Maximum	Count
net FDI inflows-Net FDI outflows as % of GDP	0.13	0.02	14.22	-0.58	18.47%	1911
Voice and Accountability	0.57	0.01	-0.08	0.02	1	1911
Political Stability	0.51	0.01	-0.06	0.00	1	1911
Government Effectiveness	0.64	0.01	-0.24	0.06	1	1911
Regulatory Quality	0.64	0.01	-0.34	0.03	1	1911
Rule of Law	0.61	0.01	-0.15	0.04	1	1911
Control of Corruption	0.60	0.01	-0.19	0.01	1	1911
Sub-Saharan Africa	0.12	0.01	2.33	0	1	1911
Latin America & Caribbean	0.15	0.01	1.92	0	1	1911
Central Europe & Baltics	0.34	0.01	0.67	0	1	1911
Middle East & North Africa	0.16	0.01	1.81	0	1	1911
East Asia & Pacific	0.15	0.01	1.92	0	1	1911
North America	0.03	0.00	5.24	0	1	1911
South Asia	0.03	0.00	5.24	0	1	1911
Duration1	0.03	0.00	5.68	0	1	1911
Duration2	0.04	0.01	4.65	0	1	1911
Duration3	0.05	0.01	3.99	0	1	1911
Duration4	0.06	0.01	3.61	0	1	1911
Duration5	0.08	0.01	3.13	0	1	1911
Duration6	0.08	0.01	3.05	0	1	1911
Duration7	0.09	0.01	2.89	0	1	1911
Duration8	0.09	0.01	2.83	0	1	1911
Duration9	0.11	0.01	2.57	0	1	1911
Duration10	0.11	0.01	2.46	0	1	1911
Duration11	0.12	0.01	2.39	0	1	1911
Duration12	0.12	0.01	2.34	0	1	1911
Duration13	0.13	0.01	2.24	0	1	1911
Duration14	0.13	0.01	2.18	0	1	1911
Duration15	0.14	0.01	2.03	0	1	1911
Duration16	0.16	0.01	1.90	0	1	1911
Duration17	0.16	0.01	1.85	0	1	1911
Time	9	0.1246	0	1	17	1911



Table B. The Results of Kolmogorov-Smirnov and Shapiro-Wilk test for Normality

	Tests of Normality					
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Absolute magnitude of FDI being measured as the net FDI inflows-Net FDI outflows as % of GDP	0.361	1911	0.000	0.228	1911	0.000
Voice and Accountability	0.064	1911	0.000	0.944	1911	0.000
Political Stability	0.086	1911	0.000	0.961	1911	0.000
Government Effectiveness	0.098	1911	0.000	0.973	1911	0.000
Regulatory Quality	0.032	1911	0.000	0.995	1911	0.000
Rule of Law	0.018	1911	0.000	0.988	1911	0.000
Control of Corruption	0.097	1911	0.000	0.917	1911	0.000

a. Lilliefors Significance Correction

The table reports the results of the normality test using Kolmogorov-Smirnov and Shapiro-Wilk (Shapiro, Wilk, & Chen, 1968) test is carried out under the hypotheses that follow. H0: The data are drawn from normal distribution, H1: The data are drawn from non-normal distribution. The results of normality show that all variables are not normally distributed.

Therefore, an approximation to normality is carried out using van der Waerden method (Conover, 1980; van der Waerden, 1927, 1930, 1931; Wright, 2000) based on smoothed ranks. The signed ranks are smoothed by converting them to quantiles of the normal distribution (normal scores) using the

$$A_{ij} = \Phi^{-1} \left( \frac{R(x_{ij})}{T+1} \right), \quad A_{ij} = \text{Normal score of each observation in a variable } (x_{ij});$$

equation that follows.

$R(x_{ij})$  = The ordinary rank where observations of a variable ( $x_{ij}$ ) are ranked in an ascending order;

$\left( \frac{R(x_{ij})}{T+1} \right)$  = cumulative probabilities of each observation in a variable ( $x_{ij}$ ). Ranks are smoothed through the computation of the probability associated with each observation; T = Total number of observations in a variable ( $x_{ij}$ )  $\Phi^{-1}$  = the quantile of the normal distribution is the inverse of each

probability given by  $\left( \frac{R(x_{ij})}{T+1} \right)$

Table C. The Results of RESET Test using the F test

F stat. (P-Value)	28.341
	(0.0004)

The Testing for Linearity Vs Nonlinearity is carried out using the Regression Equation Specification Error Test, RESET (Ramsey, 1969; Thursby and Schmidt, 1977; Thursby, 1979; Sapra, 2005; Wooldridge, 2006; Bahng and Jeong, 2012; Pao and Chih, 2005) is employed to test the two hypotheses that follow.  $H_0 : \hat{\gamma}^2, \hat{\gamma}^3 = 0; H_1 : \hat{\gamma}^2, \hat{\gamma}^3 \neq 0$ . The null hypothesis refers to linearity and the alternative refers to nonlinearity. The RESET test follows the F distribution. The results show that data fits the assumption of nonlinearity. Accordingly, the independent variables are raised to the power of 3 as an approximation to nonlinear form. The power of 3 is an odd number that preserves the intrinsic trend of the data.

Table D. Breusch-Pagan / Cook-Weisberg Test for Heteroskedasticity Result

Testing for Heteroskedasticity is carried out using Breusch-Pagan (1979), Cook-Weisberg (1982, 1983) test. The test examines the extent to which the FDI as percentage of GDP are heterogeneous. The test is run under the hypotheses that follow, H0: “Error variances are all equal (Homoskedastic)”, H1: “Error variances are not equal (Heteroskedastic).”

Chi Square stat	74.82
(P-Value)	(0.0000)

The results show that Heteroskedasticity exists. Accordingly, a transformation to homoscedastic data is carried out by dividing all variables by the standard error of the main regression equation (Hill, et al., 2001).

### Data Sharing Availability Statement

The data that support the findings of this study are available in two sources:

- The World Bank. These data were derived from the following resources available in the public domain: World Governance Indicators (<http://info.worldbank.org/governance/wgi/index.aspx#home>)
- World Development Indicator (<https://databank.worldbank.org/source/world-development-indicators>)