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Institutional Quality and Foreign Direct Investment: Evidence from OECD Countries

*Emre GOKCELI**

Abstract

The main purpose of this research is to investigate the effect of institutional quality on FDI inflows in the Organization for Economic Cooperation and Development (OECD) countries by using the panel autoregressive distributed lag of pooled mean group (ARDL-PMG) over the period 1996 – 2017. The results reveal that institutional quality is an important factor attracting foreign direct investment (FDI) over the long term to countries with low quality of institutions. In the short term, in contrast, the relationship is not significant. Institutional quality does not play any significant role in attracting FDI to the countries with sound institutions in either long or short terms. When considering components of institutional quality, property rights have the greatest impact on FDI flows. Finally, when considering a non-linear relationship between institutional quality and FDI inflows, we find diminishing returns of institutional quality on FDI flows for the countries with stronger institutions. This paper contributes to the literature by considering both the different individual aspects of institutional quality and a broad composite measure of institutional quality in order to analyse their impact on FDI inflows. Additionally, the study applies the CS-ARDL method as a robustness check, in addition to the ARDL-PMG. The scope of this study is limited as it only examines the impact of institutional quality on overall foreign direct investment (FDI) inflows, rather than analysing sector-specific FDI flows.

Keywords: *institutional quality, foreign direct investment, Panel Autoregressive Distributed Lag-Pooled Mean Group (ARDL-PMG), OECD countries*

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Introduction

Countries have engaged in intense competition to attract more foreign direct investment (FDI) since the 1990s, (Aitken and Harrison, 1999), and worldwide FDI inflows have grown dramatically. Between 1990 and 2017, FDI inflows surged by 697 percent, from 204.8 billion to 1,632.6 billion US dollars.[1] Because of the fact that FDI has been recognised as a significant contributor to the growth rate of the host country via inflows of capital, facilitating transfer of advanced technology, managerial skills, organisational expertise, accessing or expanding international networks, etc. This being the case, the subject of FDI determinants has caught researchers' attention and been extensively studied throughout the years (Chowdhury and Mavrotas, 2005; Li and Liu, 2005; and Nath, 2009). Institutional quality plays a potential role in attracting FDI by reducing uncertainty and transaction costs (North, 1990; and Alguacil et al., 2011); alternatively, it may discourage FDI by increasing production costs, for instance due to excessive regulations (Busse and Groizard, 2008), as detailed in the literature review section. However, most studies either do not use institutional quality as determinants of FDI or only use them to a limited extent (Ren et al., 2012). The challenge of selecting a measurement to capture the institutional quality or availability of the data for a short period might account for its exclusion. Nonetheless, there is some recent research evaluating the relationship between FDI inflows and institutional quality, and the literature does not reach a conclusion regarding the effect of institutional quality on FDI inflows (Choi and Samy, 2008; Ali et al., 2010; and Peres et al., 2018).

Previous research has certain limitations in terms of identifying the relationship between FDI and institutional quality and yielded mixed findings. Some studies have revealed that the quality of institutions is an important factor in encouraging FDI (e.g., Lysandrou et al., 2016; and Herrera-Echeverri et al., 2014), while others have concluded that it discourages FDI inflows to the destination country (e.g., Ezeoha and Cattaneo, 2012; and Busse and Groizard, 2008). Even some studies have not found a significant relationship between the quality of institutions and FDI inflows (e.g., Belgibayeva and Plekhanov, 2019; and Peres et al., 2018). The following reasons may account for the contradicting findings in the literature: To begin, prior empirical research has focused exclusively on narrow aspects of institution, such as corruption, political stability, and democracy, obscuring the influence of other dimensions of institutions that are not included in the model (e.g., Wei, 2000; Addison and Heshmati, 2003; Masron and Abdullah, 2010). On the other hand, a number of studies focus only on broad composite measures of

[1] *Source*: UNCTAD. Available at: <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=96740>.

institutional quality, which causes the effect of individual dimensions of institutional quality to be blurred (e.g., Alguacil et al., 2011; Buchanan et al., 2012; Owusu-Nantwi, 2019), since various single variables may have a distinct effect on FDI inflows. Turedi (2018), for example, concludes that property rights are associated with attracting FDI whereas corruption does not have a significant effect on FDI. In addition, data scarcity may contribute to the inconclusive findings, as it is mostly available after the 2000s, particularly for developing countries. Finally, empirical research based on cross-country analysis may introduce difficulties with data comparability and heterogeneity, making the findings doubtful in nature (Ahmad et al., 2018).

Taking into account the existing discussion on the effect of institutional quality on FDI flows, we aim to contribute to the literature in the following ways. First, we utilised the panel autoregressive distributed lag of pooled mean group (ARDL-PMG) model introduced by Pesaran et al. (1999) to investigate the impact of institutional quality on FDI flows in the short and long terms in OECD countries.[2] Country-specific heterogeneity is taken into consideration with the usage of this approach (Samargandi et al., 2015; Ditzen, 2018). The panel ARDL approach is applicable when all variables are cointegrated at level or first difference (Attiaoui et al., 2017). Moreover, this method is best suited for datasets where the cross section (N) is smaller than the period (T). Notably, by incurporating lags of endogenous and exogenous factors, this method also overcome the potential endogeneity issue and produces consistent and effective findings. (Samargandi et al., 2015; Attiaoui et al., 2017; and Asteriou et al., 2021). In addition to the ARDL-PMG technique, we used the Cross-sectional-autoregressive-distributed lag (CS-ARDL) method, which acts as a robustness check because of its consideration of cross-sectional dependence, as explained in the section on methods. Additionally, we employed both comprehensive overall indicators of institutional quality and individual particular sub-categories constituting the overall index to check if distinct measures produce comparable outcomes.

We will try to answer the following questions, considering the previously mentioned key points: Does institutional quality have an impact on FDI inflows? If yes, does the effect of institutional quality on FDI vary across different country groups? Is it feasible for the relationship between institutional quality and FDI flows to be nonlinear? The remainder of this study is structured as follows: The literature review section presents a short review of the literature on the relationship between institutions and FDI and discusses the mixed findings of this literature.

[2] Countries are divided into two groups based on their total institution score: Countries with weaker institutional quality and countries with stronger institutional quality. See the data section for details.

The data section explains the variables considered as determinants of FDI flows to host economies. The next section discusses the diagnostic tests and econometric methods utilised in the empirical analysis. The results and discussion section presents the empirical findings and their interpretations. The final section concludes and discusses policy implications.

1. Literature Review

In the literature, the relationship between foreign investment and the quality of institutions has yielded mixed results. However, the majority of studies have found a positive correlation between the two (see Alguacil et al., 2011; Buchanan et al., 2012; and Owusu-Nantwi, 2019). Nonetheless, some research suggests the relationship between institutions and FDI flows is negative (e.g., Barro, 2000; Aseidu, 2002; Sethi et al., 2003) as well as some findings indicating a reverse link between them (e.g., Egger and Winner, 2005; Busse and Groizard, 2008; Baklouti and Boujelbene, 2014). In order to demonstrate the mixed outcomes of research regarding the relationship between institutional quality and FDI inflows, we presented several studies that concluded a positive, negative, and insignificant effect of institutional quality on FDI, respectively, along with explanations. Additionally, we have compiled further studies in Table 1 to showcase the inconclusive findings on this topic.

Benassy-Quere et al. (2007) examine the effect of institutional quality on FDI and reach the conclusion that institutional quality plays an important role in attracting FDI to countries in Africa. They also provide several reasons why institutional quality may be relevant in drawing in foreign investment. Initially, they assert that superior institutions (such as effective governance and strong enforcement of property rights) make a country more trustworthy, which in turn makes it an appealing investment destination for foreign investors. A second argument is that bad institutions are viewed as an additional cost to FDI, especially in the event of corruption, which makes each stage of the bureaucratic process costly. Finally, they claim that due to significant sunk costs, FDI is highly susceptible to any type of uncertainty coming from policy reversals, bribery, or inadequate enforcement of property rights. Similarly, Buchanan et al. (2012) argue that poor institutional quality creates an unstable investment climate in the host country, which discourages foreign entrepreneurs and raises the volatility of FDI. Tun et al. (2012) use an aggregate index of institutional quality to examine the link between institutions and FDI. They claim that institutional quality can provide a better investment climate for investors in terms of fewer operating costs, less uncertainty, and more productivity prospects. The study by Masron and Nor (2013), Lysandrou et al.

(2016), Aziz (2018) and Owusu-Nantwi (2019) lend support to the attraction effect of better institutional quality of host countries on FDI.

Busse and Groizard (2008) analyse the relationship between institutional quality and FDI and propose an explanation for the negative impact of institutional quality on FDI inflows. They argue that excessive regulations used as a measure of institutional quality are likely to restrict the flow of capital in the form of FDI. A lot of government regulations can make it hard for businesses to start and close because they make entrepreneurs go through a lot of bureaucratic procedures that take up their time and money. This discourages the investment of other potential foreign investors in the host economy or restricts the extension of the current foreign affiliates. The findings are parallel to the conclusion of Foreman (2007) who reveals that government intervention, which is a measure of institutional quality in their study, discourages MNEs from investing in host nations. Another restricted effect of regulations on FDI inflows might occur in the labour market. The strict regulations on hiring and laying off workers are also a major source of concern for foreign investors operating in or planning to invest abroad (Javorcik and Spatareanu, 2005). This conclusion is supported by the findings of Haaland et al. (2003), who indicate a negative correlation between FDI and a flexible labour market. Similarly, Ezeoha and Cattaneo (2012) utilise property rights measurement as a proxy for institutional quality based on Sub-Saharan African countries. They conclude that the effect of better-designed property rights is not clear and may even potentially discourage FDI flows to these countries. The negative effect may arise from the ineffectiveness and insufficiency of property and contract rules in these nations to stimulate the flow of FDI. Caetano and Galego (2009) also reach a similar conclusion that property rights and trade freedom as proxies for institutional quality discourage the inflow of FDI to EU nations. They explain that the negative relationship may be due to the performance of some new EU countries, which exhibit weaker-designed property rights and lower trade openness volumes but perform well in terms of FDI inflows. Baklouti and Boujelbene (2014) also look at the impact of institutional quality on FDI by using the fixed effects for 8 countries for the period 1996 – 2008. They reveal that the quality of institutions, as measured by the indicators of regulation quality and corruption, has a detrimental impact on FDI inflows.

Peres et al. (2018) use the instrumental variable method to examine the impact of institutional quality on foreign direct investment (FDI) in 110 countries (both developed and developing) during the period of 2002 – 2012. To measure institutional quality, they created a governance measure by combining two indicators – control of corruption and rule of law. Their findings suggested that for developing countries, the impact of institutional quality on FDI is insignificant due to the

inadequate quality of their institutional structure. Similarly, Belgibayeva and Plekhanov (2019) use corruption as a measure of institutional quality for a sample of 52 countries by employing the fixed effect method. The results show that institutional quality has no significant effect on FDI inflows in some regressions. The reason for the insignificant effect is that despite corruption being a conventional obstacle for foreign investments, certain cases exist in which investors, especially those from corrupt nations, may perceive corruption as a favorable avenue for getting around regulatory frameworks.

Table 1 summarises the existing empirical studies on the relationship between institutional quality and FDI inflows to host economies. There is some other research on institutions and FDI; however, the selected studies are considered to be the most representative of the literature's mixed results.

2. Data

The data set covers 36 OECD countries from 1996 to 2017. The starting year of our research, 1996, is motivated by the availability of institutional quality data for the whole countries. In this section, we will define the dependent, independent and control variables that have been used widely in prior research as drivers of FDI flows (see Daude and Stein, 2007; Ali et al., 2010; Buchanan et al., 2012; and Aziz, 2018).[3]

FDI (%GDP) used as a dependent variable is measured as the net inflows of foreign direct investment divided by GDP (Alfaro et al., 2009). The data for FDI is taken from the World Bank's World Development Indicators.

This research utilises data from three sources in order to evaluate the quality of institutions: the Index of Economic Freedom (EF), the Worldwide Governance Indicators (WGI), and the International Country Risk Guide (ICRG).

First, we employed the EF index from the Heritage Foundation to examine the link between institutional quality and FDI flows. It is comprised of 12 indices, ranging from property rights to financial freedom, with each receiving a score between 0 and 100. The higher the scores, the greater the quality of the institution. The advantage of using data from Heritage Foundation is that it provides an overall score of institutional quality, eliminating the requirement to apply the principal component analysis (PCA) technique to obtain an overall index.

Furthermore, the data is provided for annual frequency beginning with 1996. The log of the index of economic freedom is employed as a proxy of institutional quality.

[3] See Table A and Table B in the Appendix for Data Descriptions.

Table 1
Summary of the Studies on the Link between Institutions and FDI

Author(s)	Sample and Period	Estimation Method	Aspects of institutional quality	Effect on FDI
Lee and Mansfield (1996)	14 countries, 1990 – 1992	OLS, Tobit	Intellectual property protection	Positive effect.
Wei (2000)	45 countries, 1980 – 1999	OLS, Modified Tobit	Corruption	Negative effect.
Globerman and Shapiro (2002)	114 countries, 1995 – 1997	Tobit	Governance infrastructure	Positive effect.
Addison and Heshmati (2003)	110 countries, 1970 – 1999	OLS, GLS, and Fixed effects	Democracy	Positive effect.
Sethi et al. (2003)	28 countries, 1981 – 2000	OLS,	Political stability	Insignificant effect.
Egger and Winner (2005)	73 countries, 1995 – 1999	Fixed effects, Hausman Taylor	Corruption	Positive effect.
Jakobsen and de Soysa (2006)	53 countries, 1984 – 2004	Panel corrected standard error (PCSE), Generalised estimation equation (GEE)	Democracy, property rights protection	Positive effect.
Daude and Stein (2007)	80 countries, 1982 – 2002	OLS, IV estimation, random effects, fixed effects, GMM	Six dimensions of institutions used separately (from WGI)	Different effects of various aspects. Negative effects of unpredictable policies, an excessive regulatory burden, and a lack of commitment.
Kapuria-Foreman (2007)	76 countries, 1990 – 1989	OLS, 2SLS	Overall index, property rights, regulation, government intervention, barriers to capital flows.	Insignificant effect of overall index. Positive effects of government intervention, barriers to capital flows. Negative effect of protection of property rights.
Naudé and Krugell (2007)	43 countries, 1970 – 1990	OLS, GMM	Political stability, accountability, regulatory, and rule of law	Positive effect.
Choi and Samy (2008)	90 countries, 1985 – 2005	OLS, fixed effects, random effects, ECM	Democracy	Positive effect (but weak).
Caetano and Galego (2009)	42 countries, 1995 – 2005	Fixed effects	Property rights, trade freedom, corruption, business freedom and government size	Insignificant effect of corruption and business freedom. Negative effect of property rights and trade freedom.
Ali et al. (2010)	69 countries, 1981 – 2005	Random effects	Property rights security	Positive effect.

Masron and Abdullah (2010)	8 members of ASEAN, 1996 – 2008	Fixed effects	Property rights security	Positive effect.
Alguacil et al. (2011)	26 countries, 1976 – 2005	OLS, GMM	Overall score (WGI)	Positive effect.
Buchanan et al. (2012)	164 countries, 1996 – 2006	IV method	Overall score (WGI)	Positive effect.
Ezeoha and Cattaneo (2012)	38 countries, 1995 – 2009	GMM	Rule of law	Negative effect (but weak).
Staats and Biglaiser (2012)	17 countries, 1996 – 2007	PCSE, Fixed effects	Judicial strength and rule of law	Positive effect.
Tun et al. (2012)	77 countries, 1981 – 2005	GMM	Aggregate index	Positive effect.
Baklouti and Boujelbene (2014)	8 countries, 1996 – 2008	Fixed effects	Regulation quality, government effectiveness, and corruption	Negative effect of regulation and corruption. Positive effect of government effectiveness.
Herrera-Echeverri, et al. (2014)	89 countries, 2004 – 2009	PCSE, random effects GLS	Overall score (WGI)	Positive effect.
Belgibayeva and Plekhanov (2019)	52 countries, 2004 – 2011	Pooled-OLS, Fixed effects	Corruption	Insignificant effect.
Lysandrou et al. (2016)	52 countries, 2006 – 2012	GMM	Public governance, private governance	Positive effect.
Ahmad et al. (2018)	Pakistan	ARDL	Single indicator obtained by PCA method (data from ICRG)	Insignificant effect in the primary sector. Positive effect in the manufacturing and services sectors in the long run.
Aziz (2018)	16 countries, 1984 – 2012	GMM	Doing business, economic freedom, and ICGR	Positive effect.
Peres et al. (2018)	110 countries, 2002 – 2012	OLS, IV	Corruption, rule of law	Positive effect in developed countries. Insignificant impact in developing countries.
Turedi (2018)	49 countries, 2002 – 2015	OLS, Fixed and Random effects, GMM	Rule of law, corruption	Positive effect of rule of law. Insignificant effect of corruption.
Owusu-Nantwi (2019)	South America, 1996 – 2015	2SLS, fixed effects	Overall score (WGI)	Positive effect.

Source: Own table based on the existing literature.

We used the data from WGI to evaluate the reliability of findings in which the economic freedom index is used as a measure of institutions. WGI comprises six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Corruption Control. Each component's value ranges from 0 to 100 (greater value indicates better institutional quality). Utilizing PCA techique, institutional quality can be measured with a single score.

Table 2 reports the principal component analysis results. As seen, approximately 85% of the variance in the dependent variable is explained by the first component, which is the only one with an eigenvalue larger than 1. Consequently, it is evident that the first principal component has the highest explanatory ability. Therefore, we will use it to measure the quality of institutions.

T a b l e 2

Principal Component Analysis for the Data from WGI

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	5.0950	4.5760	0.8490	0.849
Comp2	0.5190	0.3550	0.0865	0.936
Comp3	0.1640	0.0571	0.0273	0.963
Comp4	0.1060	0.0359	0.0177	0.981
Comp5	0.0704	0.0252	0.0117	0.992
Comp6	0.0453	.	0.0075	1.000

Source: Author's calculation.

We also utilised ICRG data to check the reliability of findings estimated by the economic freedom index as a measure of institutions. The following is the list of ICRG indicators spanning political and social factors. Investment profile (its value ranges from 0 to 12 points), corruption (from 0 to 12), law and order (from 0 to 6), bureaucratic quality (from 0 to 4), democratic accountability (from 0 to 6), and internal conflict (from 0 to 12). For each indication, a greater value indicates a higher quality. Principal Component Analysis (PCA) is used again to generate a single measure to represent the institutional quality.

T a b l e 3

Principal Component Analysis for the Data from ICRG

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.877	3.0590	0.651	0.646
Comp2	0.818	0.3640	0.136	0.782
Comp3	0.453	0.1070	0.075	0.858
Comp4	0.346	0.0011	0.057	0.915
Comp5	0.345	0.1850	0.056	0.973
Comp6	0.160	.	0.026	1.000

Source: Author's calculation.

The results of the PCA are presented in Table 3. The only component with an eigenvalue larger than 1 is the first component, which accounts for around 65% of the variation in the dependent variable. We will thus employ it to measure the quality of institutions in this study.

As was previously stated, focusing on the aggregate score may hide the effect of individual dimensions, as various dimensions may have different impacts on FDI flows. Taking this possibility into account, we chose the three aspects of institutions – property rights, corruption, and democratic accountability – that are most commonly used in the literature.

Inflation is measured as the change in the consumer price index. It shows the yearly percentage change in the cost to the average consumer of obtaining a standardized basket of goods and services. The data on inflation is obtained from the database of the International Monetary Fund.

Trade openness is the ratio of exports plus imports to GDP. The data is gathered from the World Bank's World Development Indicators.

GDP used in the log form is employed to capture the market size of the receiving country. GDP is converted from domestic currencies to US dollars using 2010 official exchange rates. The data is obtained from the World Development Indicators of the World Bank.

Tariff rate is defined as the unweighted average of effectively applied rates for all products subject to tariffs calculated for all traded goods. The data is gathered from the World Bank's World Development Indicators.

Countries are classified into two groups according to their total institutional quality score. To begin, the mean of the sample nations' overall scores is computed, and any country scoring below the mean is included in the group of countries with weaker institutional quality, while those rated above the mean are included in the group of countries with stronger institutional quality. The reason of splitting countries into two groups is to analyse whether the effect of institution quality on foreign investment is similar between the two groups. Since the institutional quality of countries in the stronger group was already better at the start of the period, and improvement in this group has been relatively low. On the other hand, the institutional quality of countries in the weaker group has improved significantly. There are 20 countries in the group of stronger institutional quality, while 16 countries are included in the other group.[4]

[4] See Table C in the Appendix for the list of countries.

3. Methodology

We first conducted some preliminary tests before proceeding with the Panel ARDL method. Initially, we use the cross-sectional dependence (CD) test to check the availability of cross-sectional dependence in the error term based on the following equation:

$$CD = \sqrt{2T / N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \rho_{ij} \tag{1}$$

where $CD \rightarrow N(0,1)$ for $N \rightarrow \infty$ (De Hoyos and Sarafidis, 2006). The null hypothesis suggests that there is no cross-sectional dependence.

The literature employs first-generation and second-generation unit root tests to examine whether there is a unit root in the variables. If cross-sectional dependence is present, the first-generation test is unsuitable for determining the stationarity of the predictors, as it generates large biases in the predicted results (Sabir et al., 2020). On the other hand, second-generation tests rely on the assumption of heterogeneity and address cross-sectional dependence, leading to more precise results (Uzar, 2020).

Pesaran (2007) developed a second-generation unit root test based on extending the Augmented Dickey-Fuller (ADF) test by incorporating lagged cross-sectional averages and its first difference into the model to address the issue of cross-sectional dependence (Okumus, et al., 2021). This test is known as CADF, and it can be used in both N < T and N > T situations (ibid). We follow the equation, which is similar to that of Mercan and Karakaya (2015).

$$Y_{i,t} = (1 - \Phi_i)\mu_i + \Phi_i y_{i,t-1} + u_{i,t} \tag{2}$$

$$u_{i,t} = \gamma_i f_t + \varepsilon_{it} \tag{3}$$

where f_t denotes unobservable common effects of individual country, ε_{it} indicates individual specific error. The equation could be rewritten as follows:

$$\Delta y_{i,t} = a_i + \beta_i y_{i,t-1} + \gamma_i f_t + \varepsilon_{it} \tag{4}$$

The null hypothesis asserts the presence of a unit root.

This study first applies the panel autoregressive distributed lag (ARDL) method developed by Pesaran et al. (1999) to examine relationships between aggregate FDI flows and institutional quality over the period of 1996 – 2017. As stated by Liu et al. (2019) the ARDL is a dynamic model and can be classified as an Error Correction Model. In this context, the method offers three advantages over other static models and restricted dynamic models as argued by Eberhardt

and Presbitero (2015). First, it enables us to distinguish between short-term and long-term behaviour. In addition, we can evaluate the error correction term, which reveals the speed of the economy's long-run equilibrium adjustment. Finally, the statistical significance of the error correction term allows us to test for cointegration. The panel ARDL method is also superior regardless of whether the variables are cointegrated at level, I (0), or at first difference, I (1), or have a mixed order of cointegration (I(0) or I(1)), unless they are cointegrated of order 2 (Pesaran et al., 1999; Attiaoui et al., 2017). Furthermore, the ARDL technique is more appropriate to apply to such a dataset in which the cross section (N) is less than the period (T). As clarified by Pesaran et al. (1999), using the traditional methods such as fixed effect, instrumental variables, and GMM may lead to erroneous conclusions in the case of a larger time dimension (T) than (N). Similarly, Roodman (2009) points out that the GMM method is prone to produce spurious results for situation with small N and large T. The panel ARDL approach is therefore better than others for this research. Notably, by including lags of endogenous and exogenous variables, this technique eliminates the possible endogeneity problem and generates consistent and efficient results. (Samargandi et al., 2015; Attiaoui et al., 2017; and Asteriou et al., 2021). However, this technique's validity, consistency, and efficiency are contingent on two requirements. First, the coefficient in the error correction term must be between 0 and –2, which shows convergence in the long run (Asteriou et al., 2021; and Okumus et al., 2021). A second important requirement is that the residuals of the error correction model are serially uncorrelated (Samargandi et al., 2015). As a requirement of the panel ARDL method, we will apply some preliminary tests before proceeding with the ARDL-PMG technique.

There are three estimators commonly applied for such panel datasets; the mean group (MG) introduced by the work of Pesaran and Smith (1995) the pooled mean group (PMG) developed by Pesaran et al. (1999), and dynamic fixed effects (DFE). In contrast to the MG, which utilises the average coefficient value, the PMG estimator employs both pooling and averaging (see Pesaran et al., 1999). The assumption of the MG estimator is that the short run and long run coefficients are heterogeneous across individuals, while the PMG estimator allows the short run coefficients, intercepts, and error variance to differ but constrains the long run coefficients to be homogenous for each country. As stated by Samargandi et al. (2015), the short-run assumption of heterogeneity in both PMG and MG estimators might be justified by local norms and regulations, making the approaches more appropriate against DFE. However, the homogenous assumption of PMG in the long run makes the estimator superior to the MG. We anticipate long-term homogeneity for our sample countries due to their similarities in terms of liberal trade policy. According to Pesaran et al. (1999), any shocks or economic crises

affect the whole group in a similar way due to liberal trade or arbitrage circumstances. Hence, PMG appears to be the more appropriate model to use in the research. Furthermore, it is also argued by Asteriou et al. (2021) that MG is consistent for the panel including a larger number of N, which is another reason why PMG was chosen for our study as the cross-section (N) is 20 and 16 for the two groups. In terms of long run homogeneity, the approach of dynamic fixed effect (DFE) has comparable features to the PMG estimator. However, the technique also assumes that the adjustment speed coefficient and the short run coefficient are homogenous across countries. Moreover, this strategy is also more likely to suffer from simultaneity bias in small cases (Asteriou et al., 2021). Similarly, the MG estimator is more vulnerable to outliers when cross-section dimensions are small (Samargandi et al., 2015).

We use the Hausman test to determine our selection among the MG, DFE, and PMG models, despite the fact that the PMG model offers more benefits. The null hypothesis suggests that there is no significant difference between PMG and MG or PMG and DFE. If the null hypothesis is rejected, we will proceed with PMG in this analysis. Alternatively, if the null hypothesis is not rejected due to the p-value ($p > 0.05$), we will have to select between the MG or DFE.

For the ARDL-PMG analysis of the link between institutional quality and FDI flows, we use the following equation:

$$\Delta y_{it} = a_i + \theta_i (y_{i,\,t-1} - \gamma_i d_{i,\,t-1} - \lambda_i x_{i,\,t-1}) + \sum_{j=1}^{p-1} \Phi_{ij} \Delta y_{i,\,t-1} + \sum_{j=1}^{q-1} \Omega_{ij} \Delta d_{i,\,t-1} + \sum_{j=1}^{q-1} \psi_{ij} \Delta x_{i,\,t-1} + \mu_{i\,+} \varepsilon_{it} \tag{5}$$

where i and t refer to country and time respectively, y is the ratio of FDI to GDP, d represents institutional quality, x stands for control variables: domestic investment (% GDP), trade openness, inflation, real GDP, tariff. The symbols of Φ, Ω, ψ, denote the short run coefficients of the lagged FDI, institutional quality, and other control variables, respectively. The long run coefficients of institutional quality and other control variables are represented by γ and λ notations. θ is error correction coefficient, indicating the speed of adjustment towards the long run equilibrium. μ is used as a proxy for group effects. Finally, ε is the error term with zero mean and constant variance.

The shortcoming of the typical panel ARDL approach is that the method may be misleading in the presence of cross-sectional dependence (Chudik and Pesaran, 2013). Because of that reason, this research applies the CS-ARDL approach which overcomes the problem of cross-sectional dependence by augmenting the panel ARDL regressions with lagged dependent variable and lagged cross-section averages into the model. It has been suggested that the introduction of lagged

cross-section averages largely addresses the endogeneity issue (see Pesaran et al., 1999; Okumus et al., 2021). The CS-ARDL model is also an ARDL version of the Dynamic Common Correlated Estimator, making it applicable whenever the variables included in the regressions have a mixed order of cointegration (at level or at first difference), unless they are cointegrated of order 2. This study employs the CS-ARDL as a robustness check based on the following equation because of its advantages.

$$\Delta y_{it} = a_i + \theta_i(y_{i,\,t-1} - \gamma_i d_{i,\,t-1} - \lambda_i x_{i,\,t-1} + \theta_i^{-1} n_i \overline{y}_t + \theta_i^{-1} \vartheta_i \overline{\gamma}_t + \theta_i^{-1} \varphi_i \overline{x}_t + \sum_{j=1}^{p-1} \Phi_{ij}$$
$$\Delta y_{i,\,t-1} + \sum_{j=1}^{q-1} \Omega_{ij}\ \Delta d_{i,\,t-1} + \sum_{j=1}^{q-1} \psi_{ij}\ \Delta x_{i,\,t-1} + \sum_{j=0}^{p-1} \omega_{ik} \Delta \overline{y}_{t-1} + \sum_{j=0}^{p-1} \kappa_{ik} \Delta \overline{d}_{t-1} + \quad (6)$$
$$+ \sum_{j=0}^{p-1} \varrho_{ik} \Delta \overline{x}_{t-1} + \mu_i\ + \varepsilon_{it}$$

where $\overline{y}_t$, $\overline{d}_t$ and $\overline{x}_t$ refer to the cross-section average of y_{it}, d_{it} and x_{it} (FDI inflows, institutional quality and control variables, respectively.

4. Results and Discussion

Prior to displaying the findings obtained from the ARDL-PMG model, we present the outcomes of preliminary examinations, particularly the Pesaran's cross-sectional dependence (CD) test and unit root tests.

4.1. Preliminary Tests

Table 4 reports the results of the Pesarans' CD test for the models of two group countries separately. The p-values of the two models are less than 0.05, allowing us to reject the null hypothesis of no cross-sectional dependence. The presence of cross-sectional dependence shows that an economic crisis or shock that appears in a country affects the other sample countries.

T a b l e 4

Pesaran's Cross-sectional Dependence Test

Models	Pesaran statistics with p-values	Average value of off-diagonal elements
FDI^L = f(ins, inf, domes, trade, gdp, tariff)	6.053 (0.000)	0.243
FDI^H = f(ins, inf, domes, trade, gdp, tariff)	2.294 (0.021)	0.234

Source: Author's calculation.

This study employs the CADF unit root tests to check the stationary of the models. Table 5 indicates the results of the CADS unit root test for both groups. It is observed that domestic investment, trade openness, inflation, and tariffs are stationary at level, I (0), while FDI, institutional quality and GDP have unit roots. However, those two variables turn out to be stationary at their first difference, I(1), in model 1. In model 2, all variables are stationary at their first difference forms except for FDI, inflation and GDP.

For a robust check of the unit root analysis, we have also applied the CIPS test reported in Table 6. The results indicate that FDI flows, domestic investment, trade openness, inflation, and tariffs are stationary at level, I (0), while institutional quality and GDP have unit roots. However, those two variables turn out to be stationary at their first difference, I(1), in model 1. In model 2, all variables are stationary at levels except for domestic investment and trade openness, which do not have a unit root at the first difference.

4.2. Results of ARDL-PMG Method

The findings estimated by the panel ARDL-PMG indicate the relationship of institutional quality with FDI flows, domestic investment, trade openness, inflation, GDP and tariffs for the two groups of OECD members. As previously described, the Hausman test is applied to choose the most appropriate method among PMG, MG, and DFE. The null hypothesis is in favour of the PMG, while the alternative hypothesis suggests that either the MG or the DFE are consistent. We are not able to reject the null hypothesis because the p-value is greater than 0.10, as can be seen at the bottom of Tables 6 and 7, thus we proceeded with the analysis with the PMG model.

Table 7 demonstrates that institutional quality has a positive and significant effect on FDI flows in the long run for the group of countries with lower institutional quality scores. In other words, an increase of one unit in institutional quality is associated with an increase of 0.298% in FDI flows to those economies in the specification 1. Institutional quality continues to exert a significant role in determining FDI inflows in regressions 2 and 3 in the long term. In the short run, however, the coefficient of institutional quality is shown to be insignificant in all regressions. The effect of institutional quality may not be observed in the short run, since the reaction of foreign investors to the enhancement of institutions may take a longer time. Thus, in the short run, it is likely that there will be no relationship between institutional quality and FDI flows. The findings are in line with those obtained by Ren et al. (2012).

Table 5

CADF Panel Unit Root Test Results

Variables	Countries with weaker ins. quality				Countries with stronger ins. quality			
	I(0) level		I(1) first-difference		I(0) level		I(1) first-difference	
	Constant	*Constant and trend*	*Constant*	*Constant and trend*	*Constant*	*Constant and trend*	*Constant*	*Constant and trend*
FDI	0.883	2.214	–4.393***	–4.096***	–2.904**	–2.213**	–	–
Inst_quality	0.883	2.214	–4.393***	–4.096***	–1.326	–0.306	–4.858***	–1.582***
Domestic_inv	–4.827***	–4.281***	–	–	2.044	3.032	–4.696***	–2.569***
Trade_openness	–2.786***	–2.360***	–	–	–0.077	–1.613	–4.068***	–2.124**
Inflation	–4.499***	–3.717***	–	–	–5.159***	–4.426***	–	–
GDP	–1.262	–0.495	–5.552***	–2.776***	–1.627*	–0.282	–7.580***	–5.947***
Tariff	–3.213***	–3.013***	–	–	–1.152	–0.698	–8.386***	–8.414***

Note: t statistics are reported in parentheses. *, **, *** stand for the level of significance of 1%, 5% and 10%, respectively. Null hypothesis: there is no unit root test.

Source: Author's calculation.

Table 6

CIPS Panel Unit Root Test Results

Variables	Countries with weaker ins. quaity (Model 1)				Countries with stronger ins. quality (Model 2)			
	I(0) level		I(1) first-difference		I(0) level		I(1) first-difference	
	Constant	*Constant and trend*	*Constant*	*Constant and trend*	*Constant*	*Constant and trend*	*Constant*	*Constant and trend*
FDI	–3.891***	–3.989***	–	–	–3.876***	–4.105***	–	–
Inst_quality	–2.184	–2.336	–4.405***	–4.535***	–2.507***	–3.012***	–	–
Domestic_inv	–2.284**	–2.462**	–	–	–1.756	–1.945	–4.392***	–4.383***
Trade_openness	–2.979***	–2.997***	–	–	–1.676	–1.723	–3.427***	–3.461***
Inflation	–2.756***	–3.140***	–	–	–3.948***	–4.380***	–	–
GDP	–1.837	–2.63	–4.444***	–4.524***	–3.151***	–3.513***	–	–
Tariff	–3.905***	–3.872***	–	–	–3.531***	–4.126***	–	–

Note: t statistics are reported in parentheses. *, **, *** stand for the level of significance of 1%, 5% and 10%, respectively. Null hypothesis: there is no unit root test.

Source: Author's calculation.

T a b l e 7

Results of Overall Index with Panel ARDL-PMG for Weaker Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Log_Inst_quality (EF)	0.298*** (4.25)		
Inst_quality (WGI)		0.0551** (2.52)	
Inst_quality (ICGR)			0.361** (2.19)
Domestic_inv (% GDP)	0.0065*** (4.88)	0.00252 (1.33)	0.00119 (1.54)
Trade_openness (% GDP)	0.00363** 2.14	0.00249*** (4.56)	0.00678* (1.73)
Inflation	–0.00225* (–1.77)	–0.00323 (–1.37)	–0.00601** (–2.13)
Log_GDP	0.0005024** (2.48)	0.000217*** (3.50)	0.000501*** (2.61)
Tariffs	–0.151 (–1.45)	–0.0402** (–2.24)	–0.0277 (–1.35)
Short run results			
ECT	–0.779*** (0.000)	–0.691*** (–7.33)	–0.831*** (–8.92)
Log_Inst_quality (EF)	–0.0191 (–0.65)		
Institutions (WGI)		0.879 (0.75)	
Institution (ICGR)			0.319 (1.19)
Domestic_inv (% GDP)	0.0695 (1.03)	–0.00198 (–0.03)	0.0541 (0.82)
Trade_openness (% GDP)	0.0401* (1.73)	0.0272* (1.74)	0.0195 (1.26)
Inflation	0.0373 (1.01)	–0.0675 (–1.04)	–0.00912 (–1.15)
Log_GDP	0.000426*** (3.41)	0.000773 (1.11)	0.000282*** (3.04)
Tariffs	0.0642 (0.41)	0.00233 (0.11)	–0.0229 (–1.17)
Constant	0.782*** (3.20)	3.257*** (6.48)	1.0938*** (3.88)
Hausman chi^2 P-value in bracket	5.54 (0.236)	8.41 (0.209)	1.22 (0.942)
Number of Observations	311	311	311

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

The coefficient of domestic investment is positive and significant in regression 1 (Table 7) in the long run, which indicates that an increase in domestic investment attracts more FDI inflows to this group of countries.

However, it turns out to be insignificant in columns 2 and 3. Therefore, its role in attracting FDI is weak. Our finding is supported by the study of Buchanan et al.

(2012). The relationship between domestic investment and FDI inflows is far from conclusive in the literature. The presence of local companies which are able to provide the requisite quality of intermediate goods to existing multinational enterprises (MNEs) may encourage more foreign investment into the host nations. On the other hand, the presence of local firms operating effectively with advanced technology may discourage international investors from entering the host country due to the difficulty of competing with them in the same industry. Hence, the net effect of domestic investment on the flow of foreign direct investment is contingent on whether the positive or negative effects dominates. Trade openness is another control variable that has a positive and significant effect on FDI flows in the long run. The variable is an important factor for foreign affiliates producing tradable goods and services or those requiring access to the international market to import intermediate goods. In this framework, more trade liberalisation is associated with more FDI flows to the host economy in the long run. This result is corroborated by the statistically significant and negative coefficient of the tariffs variable in the long run. Higher tariffs seem to get in the way of free trade; hence, they impede FDI flows to the host nation. The finding is consistent with the study by Ali et al. (2010). Inflation also has a negative effect in the long run, indicating that an increase in price level discourages FDI flows to the host countries. GDP shows a positive and significant effect on FDI flows in both the short and long run. This is due to the fact that a larger market size corresponds to a greater demand for goods and services in the host economy, which in turn boosts more FDI flows. However, the role of GDP in attracting FDI flows depends on the type of FDI, as argued by Asideu (2002) and Ali et al. (2010). They claim that GDP is an important determinant for market-seeking FDI while it is not an important factor for resource-seeking FDI. Finally, the error correction term (ECT) is expected to be negative, between 0 and –2. The values of ECT range from –0.691 to –0.831 as anticipated, which indicates that the model converges towards the long run relationship.

Table 8 presents the results of an examination of the relationship between FDI and institutional quality for the countries with stronger institutional quality. In contrast to the prior estimations, the coefficient of institutional quality has no significant effect on FDI either in the short or long terms. It is probable that the insignificance of the effect is due to the countries' better institutional quality over the period (1996 – 2017), which has restrained the variation in the total institutional index. It is also likely that different subcomponents of the overall institutional score have distinct effects on FDI flows. In other words, some components constituting the overall index of institutional quality may be more important than others. Furthermore, it is likely that some dimensions of institutions stimulate.

FDI into the host economy while others may not have a significant effect on it. Lastly, the relationship between institutional quality and FDI flows may not be monotonic. More clearly, beyond a certain threshold, FDI inflows may increase by smaller and smaller extents or may even decrease. We will take into consideration all the possibilities in the following sections.

T a b l e 8

Results of Overall Index with Panel ARDL-PMG for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Log_Inst_quality (EF)	–0.232 (0.59)		
Institutions (WGI)		0.6821 (0.56)	
Institution (ICGR)			0.143 (1.53)
Domestic_inv (% GDP)	0.00645** (2.33)	0.0165 (1.12)	0.02112*** (8.80)
Trade_openness (% GDP)	0.00131** (2.12)	0.00901*** (2.65)	0.00568*** (3.24)
Inflation	0.000666 (–0.11)	0.0377 (1.39)	–0.0110* (–1.88)
Log_GDP	0.000606*** (3.83)	0.000328* (1.73)	0.000150 (0.84)
Tariff	–0.0176 (–1.06)	–0.0441 (–1.41)	–0.0219** (–2.49)
Short run results			
ECT	–0.743*** (–10.02)	–0.659*** (–7.12)	–0.875*** (–9.63)
Inst_quality	–0.675 (–0.66)		
Institutions (WGI)		0.0395 (0.02)	
Institution (ICGR)			1.289 (1.19)
Domestic_inv (% GDP)	–0.00691 (–0.07)	–0.0128 (–1.37)	–0.0896 (–0.72)
Trade_openness (% GDP)	0.00257 (0.17)	0.0126 (0.32)	0.0385 (0.87)
Inflation	–0.0758 (–0.34)	–0.0751 (–0.38)	0.131 (1.61)
Log_GDP	–0.000724 (0.490)	0.000943 (0.78)	–0.000496 (–0.78)
Tariff	–0.147 (–0.46)	–0.316 (–1.06)	–0.189*** (–3.30)
Constant	2.839*** (5.03)	2.052*** (4.11)	2.39*** (3.75)
Hausman chi^2 P-value in bracket	3.22 (0.665)	1.82 (0.873)	4.97 (0.419)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

As noted earlier, we analyse the influence of different dimensions of institutional quality on FDI flows separately in this section. This study employs the three most widely used components of institutions in the literature (namely, property rights, corruption, and democratic accountability).

T a b l e 9

Results of Components with Panel ARDL-PMG for Weaker Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Property rights	0.0129** (2.09)		
Corruption		0.0109*** (4.18)	
Democratic_accountability			0.00858* (1.66)
Domestic_inv (% GDP)	0.00249 (1.19)	0.00401 (0.56)	0.00178 (0.83)
Trade_openness (% GDP)	0.00324 (1.07)	0.00104*** (6.77)	0.00315 (1.00)
Inflation	–0.00701** (–2.43)	–0.00599*** (–4.80)	–0.00565* (–1.92)
Log_GDP	0.000406*** (2.60)	0.000561*** (3.18)	0.000413** (2.23)
Short run results			
ECT	–0.858*** (–9.39)	–0.838*** (–8.03)	–0.825*** (–8.57)
Property rights	–0.00742 (–0.02)		
Corruption		0.201 (1.01)	
Democratic_accountability			–0.563 (–1.38)
Domestic_inv (% GDP)	0.0845 (0.94)	0.0807 (1.23)	0.0142 (0.33)
Trade_openness (% GDP)	0.0334* (1.76)	0.0191 (1.42)	0.0123 (0.73)
Inflation	–0.0335 (–0.71)	–0.0458 (–0.66)	–0.0633 (–0.62)
Log_GDP	0.000323*** (3.95)	0.000201** (2.33)	0.000406*** (4.19)
Constant	1.041*** (3.57)	0.909*** (3.39)	0.926*** (3.54)
Hausman chi^2 P-value in bracket	3.98 (0.408)	6.98 (0.137)	7.00 (0.136)
Number of Observations	311	311	311

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

Table 9 indicates their effects on FDI flows for the group with weaker institutions. As demonstrated, all three aspects have a positive and significant effect on FDI flows in the long run. That is to say, stronger enforcement of rights, lower

corruption levels (a higher score of corruption reflects lower levels of corruption), and more democratic accountability encourage more FDI flows to the host countries. However, property rights tend to have a greater impact on FDI than the other aspects. As for control variables, they continue to have similar signs to the preceding regression results.

T a b l e 10

Results of Components with Panel ARDL-PMG for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Property rights	0.0798*** (3.39)		
Corruption		0.00165 (0.38)	
Democratic_accountability			–0.0402 (–0.33)
Domestic_inv (% GDP)	0.0220 (1.26)	0.0112*** (2.68)	0.00994 (0.51)
Trade_openness (% GDP)	0.0104*** (3.01)	0.00107 (1.16)	0.0176*** (3.65)
Inflation	–0.125*** (–3.56)	–0.0157* (–1.74)	–0.0898** (–2.39)
Log_GDP	0.000445** (2.33)	0.000445*** (2.82)	0.000383** (2.24)
Short run results			
ECT	–0.625*** (–6.89)	–0.838*** (–8.03)	–0.655*** (–6.92)
Property rights	–0.0844 (–0.95)		
Corruption		0.0126 (0.10)	
Democratic_accountability			–0.786 (–1.36)
Domestic_inv (% GDP)	0.0329 (0.34)	0.156 (1.57)	0.0563 (0.50)
Trade_openness (% GDP)	0.00127 (0.03)	0.00914 (0.24)	0.0563 (0.73)
Inflation	–0.0722 (–0.46)	–0.0389 (–0.26)	–0.0929 (–0.54)
Log_GDP	0.000138 (0.83)	–0.000756 (–0.73)	–0.000113 (–0.85)
Constant	2.267*** (3.38)	1.615*** (3.20)	3.107*** (5.03)
Hausman chi^2 P-value in bracket	1.98 (0.740)	4.09 (0.394)	2.40 (0.663)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

Table 10 displays the results for the nations with better institutions. As can be seen, neither corruption nor democratic accountability have a significant impact on FDI flows to these nations.

Nevertheless, the coefficient of property rights is positive and statistically significant, indicating that property rights play an important role in attracting more FDI to the host economies. These results are consistent with the study of Masron and Abdullah (2010) and Ali et al. (2010) who contend that institutional quality whose measurement is directly related to property rights aspects is strongly associated with more FDI flows compared to other components.

Moreover, they assert that inadequately protected property rights result in two types of risks foreign investors may face, namely direct hazard and indirect hazard. The direct hazard refers to the potential for a host country's government to act opportunistically and seize some of the advantages from FDI or perhaps nationalise them. Indirect hazard can be described as follows: if they have better access to the political process, local competitors or partners might persuade the government to favour domestic investors over foreign investors. These two potential risks apply to all types of foreign investments in all industries.

Finally, it is worth noting that in countries with stronger institutions, the effects of property rights on FDI inflows are larger than in those with weaker institutions. Given that property rights are the only significant component of institutional quality in the stronger group, its coefficient may be greater than that of the other group.

4.2.1. Is the Relationship between Institutional Quality and FDI Inflows Linear?

While institutional quality plays a significant role in attracting FDI flows to nations with weaker institutional quality levels, it has no significant effect on countries with higher institutional quality levels.

The insignificant effect causes us to question the link between institutions and FDI for the stronger group. Is the relationship really linear and monotonic? Do institutional improvements display diminishing returns with respect to encouraging foreign entrepreneurs to invest in the host nation? To address the questions, we used the square of the institutional variable as a regressor, which is common practise applied by many works in the literature (e.g., Eberhardt and Presbitero, 2015; Samargandi et al., 2015).

The results are detailed in Table 11. In each regression, three distinct institutional quality data sets are utilised separately. In all columns, the coefficients of institutional quality are positive and statistically significant (FE, WGI, and ICRG), but their square coefficients are negative, indicating that the relationship between institutions and FDI flows is inverted U-shaped for the countries included in the stronger group.

T a b l e 11

Results of the Analysis of the Linearity (PMG) for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Inst_quality (EF)	0.1611** (2.31)		
Square of (EF)	–0.0011** (–2.27)		
Inst_quality (WGI)		0.3211** (2.12)	
Square of (WGI)		–0.2419** (–1.87)	
Inst_quality (ICGR)			0.3187*** (3.48)
Square of (ICGR)			–0.1895* (–1.66)
Domestic_inv (% GDP)	0.0057* (1.72)	0.0609 (1.03)	0.0221*** (3.42)
Trade_openness (% GDP)	0.00156*** (2.34)	0.00743** (2.15)	0.0042* (0.91)
Inflation	–0.006121* (–1.15)	–0.0174** (–1.98)	–0.00289** (2.23)
Log_GDP	0.0006*** (2.83)	0.0002* (1.68)	0.0005* (1.64)
Tariff	–0.0202* (–1.74)	–0.0239 (–1.60)	–0.0215** (–2.13)
Short run results			
ECT	–0.6056*** (–9.83)	–0.6132*** (–8.56)	–0.6341*** (–8.63)
Inst_quality (EF)	0.191 (1.18)		
Square of (EF)	–0.00142 (–1.10)		
Institutions (WGI)		0.609 (0.77)	
Square of (WGI)		–0.0317 (–0.75)	
Institution (ICGR)			0.1248 (1.03)
Square of (ICGR)			–0.0351 (–0.93)
Domestic_inv (% GDP)	0.00536 (0.73)	–0.0339 (–0.74)	–0.0561 (1.14)
Trade_openness (% GDP)	0.00324 (0.52)	0.03965 (0.37)	0.0352 (0.25)
Inflation	–0.0569 (–0.81)	–0.0118** (–2.34)	–0.0281 (–0.81)
Log_GDP	0.0005 (1.44)	0.0007 (1.11)	0.0006 (1.27)
Tariff	–0.0351 (–1.19)	–0.00543 (–1.33)	–0.0066 (–0.91)
Constant	1.681*** (6.63)	1.0513*** (9.60)	1.0635*** (8.57)
Hausman chi^2 P-value in bracket	2.75 (0.599)	1.60 (0.661)	1.22 (0.942)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

For instance, based on the third regression, the threshold value is 0.84, showing that countries with a ICRG value of 0.84 no longer attract FDI due to their institutional quality.[5] For countries that have surpassed the threshold value, any additional improvement in institutional quality discourages FDI inflow. The finding of the negative effect of institutional quality on FDI inflows is consistent with those studied by Baklouti and Boujelbene (2014), Ezeoha and Cattaneo (2012), Busse and Groizard (2008) and Wei (2000). The negative impact can be accounted for by the following points: Excessive regulations have the potential to impede the inflow of capital in the form of FDI since numerous government regulations can create difficulties for businesses in terms of initiation and closure (Busse and Groizard, 2008). This is due to the burdensome bureaucratic procedures that entrepreneurs are required to follow, consuming their time and resources. As a result, this discourages incoming foreign investments or limits the expansion of existing foreign subsidiaries. Similarly, elevated levels of corruption (poor institutional quality) can be perceived as an opportunity to bypass rules and regulations (Begibayeva and Plekhanov, 2015). This allows foreign companies to save time and circumvent government regulations, thereby attracting further investments. It is crucial to mention that the mean value of the institutional quality (WGI) is lower than the threshold, indicating that institutional quality matters for attracting FDI. Nonetheless, as the quality of institutions improves, FDI inflows will increase by smaller and smaller extents up to the threshold. The other regressions also confirm this outcome. As for control variables, their sign remains the same as in earlier regression analysis.

5. Robustness

In our robustness tests, we consider cross-sectional dependence, which may cause erroneous results estimated by the panel ARDL-PMG approach, as mentioned in the methodology section. The CS-ARDL approach takes into consideration the cross-sectional dependence and provides more accurate results. Initially, we examine the impact of institutional quality on FDI flows to countries classified as the weaker group. The coefficient of institutional quality (FE) is positive and statistically significant in the long run, as shown in Table 12. This indicates that these nations can attract more FDI since their institutions make it easier for multinational corporations to conduct business there.

[5] To calculate the threshold value, we take the derivate of the equation 6 (for the long-term part, that is, $\Delta y_{it} = \alpha_i + \theta_i (y_{i,\,t\text{-}1} - \gamma_i d_{i,\,t\text{-}1} - \lambda_i x_{i,\,t\text{-}1})$). Based on the calculation: $(\Delta y = \text{ECT}^*(-\beta_1.\text{X} - \beta_2.\text{X}^2)$, when we substitute the values into the equation, $0 = -0.6341.(0.3187 - 2.(-0.1895).\text{X})\ \text{X} = 0.84$. The same calculation method can be applied for other variables.

T a b l e 12

Results of Overall Index with Panel CS-ARDL for Weaker Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Institutional quality (EF)	0.9952** (1.99)		
Institutional quality (WGI)		0.9194*** (2.99)	
Institutional quality (ICGR)			0.4663** (2.14)
Domestic investment	0.1945* (1.71)	0.3874 (0.59)	0.113* (1.76)
Trade openness	0.0491 (1.29)	0.0329 (0.43)	0.0343 (1.12)
Inflation	–0.3115* (–1.85)	–0.0181* (–1.73)	–0.3257 (–0.97)
Log_GDP	0.0002 (0.92)	0.0005 (0.48)	0.0001 (0.43)
Tariff	–0.2254 (–1.00)	–0.3156 (–0.34)	–0.5918 (–0.18)
Short run Results			
FDI_{t-1}	0.3192*** (5.70)	0.3601* (1.71)	0.4415*** (4.74)
Institutional quality (EF)	0.1247 (1.59)		
Institutional quality (WGI)		0.6219 (0.58)	
Institutional quality (ICGR)			0.2665 (0.38)
Domestic investment	0.2372* (1.68)	0.1216*** (3.78)	0.1942 (1.18)
Trade openness	0.0551 (1.31)	0.0601 (1.55)	0.0284 (1.07)
Inflation	–0.4313* (–1.69)	–0.1287 (–0.15)	–0.6254 (–0.94)
Log_GDP	0.0002 (0.87)	0.0009 (0.59)	0.0003 (1.63)
Tariff	–0.3332 (–0.98)	–0.6216 (–0.59)	–0.2553 (–0.41)
ECT	–0.3198*** (–23.53)	–0.3562*** (–6.50)	–0.4417*** (–15.50)
CD P-value in bracket	1.17 (0.243)	1.50 (0.133)	0.48 (0.632)
Number of Observations	311	311	311

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

These results are robust to the inclusion of institutional quality (WGI) and ICRG variables in regressions two and three respectively. In the short run, none of the coefficients of institutional quality exert a significant effect. This means that institutions do not matter in the short run in stimulating more FDI flows to the host economies.

T a b l e 13

Results of Overall Index with Panel CS-ARDL for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Institutional quality (EF)	0.5468 (1.16)		
Institutional quality (WGI)		0.7641 (1.03)	
Institutional quality (ICGR)			–0.2936 (–0.19)
Domestic investment	0.7365* (1.70)	0.1379* (1.69)	0.6312*** (2.72)
Trade openness	0.0581 (0.98)	0.0320 (0.57)	0.0755 (1.01)
Inflation	–0.1748** (–1.96)	–0.2094 (–0.69)	–0.7193* (–1.75)
Log_GDP	0.0003*** (3.80)	0.0003 (1.14)	0.0002 (0.54)
Tariff	–0.1525 (–1.10)	–0.3487** (–2.40)	–0.1253 (–0.96)
Short-run results			
FDI_{t-1}	0.7852** (2.39)	0.9438*** (10.22)	0.4214*** (3.53)
Institutional quality (EF)	1.5034 (1.02)		
Institutional quality (WGI)		–1.8520 (–1.08)	
Institutional quality (ICGR)			0.3417 (0.19)
Domestic investment	1.7025 (1.43)	0.2677 (1.27)	0.8665*** (2.63)
Trade openness	0.1067 (0.46)	0.0664 (0.59)	0.1283 (1.08)
Inflation	–0.1883 (–1.29)	–0.4297 (–0.66)	–0.9072* (–1.66)
Log_GDP	–0.0005 (–0.75)	–0.0005 (–0.92)	–0.0004 (–0.89)
Tariff	–0.2712 (–1.49)	–0.6473** (–2.37)	–0.2687 (–0.89)
ECT	–0.7857*** (–3.15)	–0.9435*** (–21.06)	–0.4216*** (–11.93)
CD P-value in bracket	0.65 (0.516)	1.33 (0.183)	1.36 (0.175)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

The findings regarding the relationship between institutional quality and FDI for countries with higher institutional levels are presented in Table 13. As seen, the results are similar to those estimated by the panel ARDL-PMG method, as none of the coefficients on institutional quality enter the regressions significantly. More specifically, FDI is no longer drawn to these countries by further improvements in the quality of their institutions. Regarding control variables, they always have a significant role in attracting or discouraging FDI flows in the long

term, but they have an insignificant effect in the short term. In conclusion, FDI flows are determined by the control variables only in the long run.

T a b l e 14

Results of Components with Panel CS-ARDL for Weaker Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Property rights	0.2865** (2.34)		
Corruption		0.2136** (2.01)	
Democratic accountability			0.2098* (1.73)
Domestic investment	0.0873* (1.65)	0.0982* (1.79)	0.1197 (1.25)
Trade openness	0.0143 (0.69)	0.0095 (1.25)	0.0105 (0.52)
Inflation	–0.1285* (–1.74)	–0.3197** (–2.11)	–0.2358 (–1.65)
Log_GDP	0.0005 (1.43)	0.0002 (1.48)	0.0001** (2.29)
Short run results			
FDI_{t-1}	0.4038*** (6.36)	0.4242*** (6.26)	0.4561*** (5.20)
Property rights	0.1926* (1.79)		
Corruption		0.2302 (0.66)	
Democratic accountability			0.1567 (1.60)
Domestic investment	0.1258 (1.52)	0.1426 (0.79)	0.1282 (1.10)
Trade openness	0.0189 (0.67)	0.0259 (0.58)	0.0302 (0.82)
Inflation	–0.1876* (–1.76)	–0.4085** (–2.10)	–0.2891 (–1.49)
Log_GDP	0.0008 (1.43)	0.0004 (0.15)	0.0007* (1.92)
ECT	–0.4037*** (–22.15)	–0.4242*** (–21.01)	–0.4564*** (–16.58)
CD P-value in bracket	1.60 (0.11)	1.06 (0.290)	0.83 (0.407)
Number of Observations	311	311	311

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

This research also tests the robustness of the results estimated by the method of Panel ARDL-PMG for both the groups of countries. Table 14 shows the estimation results for countries with a weaker level of institutional quality. The regressions encompass property rights, corruption, and democratic accountability separately. As seen in the table, all the variables are significant and positive, indicating that an improvement in any of them promotes FDI flows to those economies. Nevertheless, the positive effect of property rights is greater than the other two aspects. These

findings confirm those estimated by the panel ARDL-PMG method. However, contrary to the Panel ARDL-PMG estimation, property rights exert a positive impact on FDI in the short run, but it is weak (significant at 10% level).

T a b l e 15
Results of Components with Panel CS-ARDL for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Property rights	0.2958** (2.13)		
Corruption		0.2097 (0.54)	
Democratic accountability			0.2743 (0.28)
Domestic investment	0.2174 (1.56)	0.2862* (1.68)	0.3095* (1.84)
Trade openness	0.0107 (0.17)	0.0174 (0.20)	0.0499 (0.56)
Inflation	–0.5513** (–2.18)	–0.6064** (–2.091)	–0.4925** (–2.23)
Log_GDP	0.0001 (1.33)	0.0002 (0.82)	0.0003 (1.18)
Short run results			
FDI_{t-1}	0.5587*** (4.99)	0.5775*** (5.31)	0.5136*** (4.86)
Property rights	0.1325 (0.63)		
Corruption		0.1537 (0.85)	
Democratic accountability			0.1278 (0.85)
Domestic investment	0.3293 (1.54)	0.4607 (1.58)	0.4702* (1.75)
Trade openness	0.0164 (1.16)	0.0194 (1.13)	0.0945 (0.63)
Inflation	–0.7789* (–1.84)	–0.6112** (–2.11)	–0.7753** (–2.10)
Log_GDP	0.0002 (0.44)	0.0003 (0.68)	0.0008 (1.12)
ECT	–0.5598*** (–13.93)	–0.5774*** (–14.51)	–0.5135*** (–14.31)
CD P-value in bracket	0.87 (0.386)	0.89 (0.374)	0.99 (0.323)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

The estimation findings for countries with higher institutional levels are presented in Table 15. As shown, while property rights exert a positive effect on FDI, democratic accountability and corruption do not enter the regressions significantly. These results are comparable to those calculated by the ARDL-PMG panel approach. The majority of control variables exhibit the same pattern as previous estimates.

T a b l e 16

Results of the Analysis of the Linearity (CS-ARDL) for Stronger Group

Dependent Variable (FDI)	**Regression 1**	**Regression 2**	**Regression 3**
Long run results			
Institutional quality (EF)	0.4421** (2.13)		
Square of (EF)	–0.0029** (–1.98)		
Institutional quality (WGI)		0.7631* (1.79)	
Square of (WGI)		–0.5921* (–1.75)	
Institutional quality (ICGR)			0.6435** (2.01)
Square of (ICGR)			–0.3811* (–1.95)
Domestic investment	0.1447 (1.30)	0.1438* (1.82)	0.6737 (1.25)
Trade openness	0.0208* (1.69)	0.0293 (1.09)	0.0662* (1.62)
Inflation	–0.1633 (–1.05)	–0.0337 (–1.28)	–0.8315* (–1.88)
Log_GDP	0.0009 (1.44)	0.0003* (1.82)	0.0005 (0.34)
Tariff	–0.3714 (–1.12)	–0.3924** (–1.99)	–0.1821 (–1.06)
Short run results			
FDI_{t-1}	1.1052*** (13.18)	1.0641*** (9.57)	0.4942*** (9.63)
Institutional quality (EF)	0.0208 (1.18)		
Square of (EF)	–0.0012 (–1.34)		
Institutional quality (WGI)		0.0935 (0.32)	
Square of (WGI)		–0.0993 (–0.18)	
Institutional quality (ICGR)			0.3748 (1.54)
Square of (ICGR)			0.0624 (1.29)
Domestic investment	1.0364 (1.41)	0.2792 (1.36)	0.0724* (1.86)
Trade openness	0.1341 (0.76)	0.0689 (1.12)	0.2184 (1.24)
Inflation	–0.0359 (–1.14)	–0.2642 (–0.72)	–0.9716 (–1.08)
Log_GDP	0.0004 (0.23)	0.0003* (0.71)	0.0004 (1.46)
Tariff	–0.3249 (–1.31)	–0.3924 (–1.29)	–0.2281 (–0.91)
ECT	–0.7258*** (–15.11)	–0.9206*** (–8.56)	–0.4942*** (–8.82)
CD P-value in bracket	1.07 (0.286)	1.17 (0.242)	0.91 (0.362)
Number of Observations	394	394	394

Notes: *t* statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Author's calculation.

Using the CS-ARDL method for the countries included in the stronger group, this study conducts an additional robustness test to determine if the link between institutions and FDI inflows is linear. Table 16 reports the results. As demonstrated, in all regressions, the coefficients of institutional quality (EF, WGI, and ICRG) are positive and statistically significant.

However, the square terms are negative and significant, which confirms the inverted U-shaped relationship between institutions and FDI flows.[6] To check if the countries with stronger institutional quality surpass the threshold, we focus on the third regression to calculate the threshold value, in which ICRG is used as a proxy for institutional quality. More clearly, nations with an ICRG score above 0.84 will be unable to attract additional FDI due to the increase in institutional quality. As the mean value of countries in our sample is below the threshold (0.83 < 0.84), improving institutional quality continues to attract foreign investment, albeit at a diminishing rate. Other indicators (FE and WGI) also show the same result. The finding of the inverted U-shaped relationship between institutional quality and FDI inflows is also confirmed by the method of CS-ARDL.

Conclusion

This study empirically explores the effect of institutional quality on FDI inflows in the short and long terms using the Panel ARDL-PMG method during the period 1996 – 2017 for OECD member countries. Even though it is generally agreed that institutions have an important role in attracting FDI, the literature is far from conclusive on this topic.

This study takes into account all potential confounding factors that have been overlooked by previous research, such as using only the overall institution score or a single aspect of institutions, data unavailability, etc. The key findings of this study can be summed up as follows:

Institutional quality is a significant factor in attracting foreign direct investment (FDI) flows in the long term to countries which have lower institutional quality as a group, while it is unclear whether it encourages FDI flows to these countries in the short run. This result indicates that foreign investors can certainly benefit from the improvement of institutions over the long term. As for the individual components of institutional quality, our findings indicate that the various components of institutional quality do not affect FDI flows equally.

[6] For example, the institutional quality (WGI) threshold is 8.3 based on the calculation: ($\Delta y = -0.601*(-0.0163.X - (-0.000973.X^2)$, when we take the derivate of the equation and substitute the values into the equation, we get: X = 0.84.

Although FDI is driven by all three factors (namely property rights, democratic accountability and corruption), property rights have the greatest impact on FDI flows. Regarding countries with better institutional quality as a group, the overall score of institutional quality does not play a significant role in attracting FDI in both long and short terms. In terms of individual components, the only significant determinant of FDI is property rights.

The other contribution of this study to the literature is an evaluation of whether the relationship between institutional quality and FDI flows is linear for the stronger group. Our findings show there is an inverted U-shaped link between institutional quality and FDI inflows in the group characterized by better institutional quality. More clearly, diminishing returns of institutional quality on FDI flows is observed for countries below the threshold. This means that when these countries improve their institutions, they attract less foreign investment than they did before. Institutional quality will no longer attract more FDI flows for countries reaching the threshold. Even for countries that surpass the threshold, further institutional improvements will discourage FDI flows.

These results are robust to the utilisation of data on institutions from various sources, namely Economic Freedom (EF), Worldwide Governance Indicators (WGI) and International Country Risk Guide (ICRG), and the incorporation of control variables used in various research.

The findings of this research suggest some implications for policymakers. On the basis of these findings, policymakers may enhance the inflow of FDI in OECD countries in the weaker group by strengthening the quality of overall institutions over the long term.

Nevertheless, the different components of institutional quality do not affect FDI in the same manner, as previously stated. In this context, greater attention should be paid to enforcing property rights in order to increase FDI flows rather than on other dimensions. Regarding nations in the stronger group, policymakers should concentrate on specific components of institutions to determine which aspect of institutions matters for FDI inflows, as the overall score of institutional quality does not show a significant impact on FDI. When considering the individual dimensions, policymakers should give priority to securing property rights over all other considerations.

Finally, governments should assess their nation’s position in the inverted U-shaped relationship between institutions and FDI to judge the extent to which FDI flows would respond to an incremental improvement in institutional quality. Thus, attempts to increase institutional quality will have a limited impact in improving the effectiveness of FDI flows in nations near the institutional quality threshold.

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A p p e n d i x

T a b l e A

Data Descriptive for the Stronger Group

Variable	Obs	Mean	Std. Dev.	Min	Max
fdi	420	2.3891	4.3424	–3.3395	26.3283
inst_quality(EF)	420	74.2458	4.7255	61.8	83.1
inst_quality(WGI)	420	0.6382	0.4774	–1.1587	1.1062
ins_quality(ICRG)	417	0.8279	0.7427	–1.4629	2.1631
trade_openness	420	91.5277	63.9776	18.349	410.172
domestic_inv	420	23.3644	4.1274	13.7809	39.681
inflation	419	2.2838	2.6644	–5.2051	24.6579
log(GDP)	420	26.8203	1.7358	22.886	30.4642
tariff	417	3.0328	2.0221	0.64	15.02

Source: Author's calculation.

T a b l e B

Data Descriptive for the Weaker Group

Variable	Obs	Mean	Std. Dev.	Min	Max
fdi	336	1.0577	1.5426	–0.9257	11.4155
inst_quality(EF)	336	64.0267	4.6441	49.7	75.2
inst_quality(WGI)	336	–0.7848	0.8931	–3.8781	0.6398
ins_quality(ICRG)	327	–1.0558	0.9764	–4.4694	1.1357
trade_openness	336	88.5689	39.5179	37.4016	183.993
domestic_inv	336	23.6445	4.4939	9.8189	41.5384
inflation	336	5.1546	11.521	–9.6797	143.693
log(GDP)	336	26.2952	1.4116	23.2882	28.6606
tariff	330	2.7426	1.8291	1.02	15.44

Source: Author's calculation.

T a b l e C

The List of Countries

Countries with weaker institutional quality	Countries with stronger institutional quality
Belgium	Australia
Czech Republic	Austria
France	Canada
Greece	Chile
Hungary	Denmark
Israel	Estonia
Italy	Finland
Latvia	Germany
Lithuania	Iceland
Mexico	Ireland
Poland	Japan
Portugal	Korea
Slovakia	Luxembourg
Slovenia	Netherlands
Spain	New Zealand
Turkey	Norway
	Sweden
	Switzerland
	United Kingdom
	Unites States