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ORIGINAL ARTICLE

Revisiting the nexus between development aid, institutions, and growth: A global evidence

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Abstract

Objective: This study mainly focuses on the relationship between development aid and growth as well as examines the role of the institutional development levels of countries in this relationship and makes economic inferences.

Methods: The analysis is conducted for 64 countries receiving official development assistance in the 2000–2020 period. To provide robust estimates in these studies, the Driscoll and Kraay estimator is used after fixed and random effects models.

Results: In almost all of the estimated models, a significant relationship between official development assistance per capita and growth is found. Moreover, the models with institutional factors and interaction terms also support the results. According to the robust estimation results, official development assistance per capita positively affects growth.

Conclusion: The results for all countries do not mean that good policies and strong institutions are unnecessary. In contrast, they show that the priority is the sum of aid per capita.

KEYWORDS
development aid, growth, institutions, Official Development Assistance, panel data analysis

Not every society in our world has equal economic opportunities. While some societies have been able to produce more income, more human development, and more welfare in the historical process, others have not benefited from most of these opportunities—except for some elite minorities (DFID 2010). One of the measures to be taken before global inequality causes global problems is to provide chances for societies that are disadvantaged in terms of income, human development, and welfare to reach these opportunities. According to the main argument on this topic, disadvantaged societies can also move into an advantageous position by entering a certain growth and development process, with financial opportunities and technical support to be provided (Neumayer 2003; Dabla-Norris et al. 2015). One of the most

important opportunities to enable disadvantaged societies in terms of income, human development, and welfare has been development aid in the last 70 years (Casey, Glennerster, and Miguel 2012).

The "development aid" phenomenon, which came to the fore with the Marshall Plan for the reconstruction of Europe after World War II, continued by expanding its scope through multilateral institutions, especially the World Bank (International Development Assistance—IDA) and the OECD (Development Assistance Committee—DAC). In particular, IDA, which started its operations in 1960 and has brought together many donor and recipient countries, has played an important role in development aid provision within a more complex planning framework compared to the Marshall Plan (Tarp 2006; Kharas 2007).

In its simplest form, "development aid" is a type of grant or loan provided to impoverished countries by a government or multilateral organization for development purposes (Lewis 2003; Reddy and Minoiu 2006; Tarp 2006). According to the definition of official development assistance (ODA) by the OECD, both direct grants and concessional loans with a grant component of more than 25 percent fall within the scope of development assistance. Additionally, food aid, emergency aid, technical assistance, and construction project support are included in this scope (Dalgaard and Hansen 2001; Morrissey 2001; Tarp 2006; Kharas 2007; Tang and Bundhoo 2017; Adhikari 2019). According to World Bank data, these aids, which were only $4.2 billion in 1960, increased to $194.1 billion in 2020 (see Graphics A1 in the Online Appendix). These amounts indicate the importance of development aid.

Essentially, the development aid-growth literature is like a battlefield where theoretical and empirical perspectives collide. The relationship between aid and growth is an area where different results may emerge depending on many parameters such as different periods, data sets, samples, conditions, and forms of aid. The aim of our study is to look at the topic from the perspective of the 21st century. Until the 1980s, the possibility of various financial flows to impoverished countries had been very limited. Globalization and liberalization have now eliminated this constraint among impoverished countries. The main objective of this study is to reveal the effects of development aids on growth in the 2000s in a framework related to institutional factors. According to the analyses conducted for 64 countries receiving development aid in the 2000–2020 period, per capita official development aid positively affects the per capita gross domestic product (GDP). Robust estimation results confirmed similar findings. An important contribution of the study to the literature is to examine the relationship between aid and growth from a 21st-century perspective. Furthermore, one of the contributions of the study to the literature is to examine the role of institutions in examining the relationship between these two variables. A comprehensive analysis was carried out in the study due to the large number of control variables used, in line with the literature, and the inclusion of several institutional structure indicators in the model. With these unique aspects, it is believed that the study will make a significant contribution to the literature.

This article consists of five sections. The second section following the introduction is devoted to a discussion and summary of the literature. In the third section, the data set and the empirical model are included and also includes the scope of the study, the model pattern to be used, and information about the variables. In the fourth section, the methodology is included. In the fifth section, which is titled Results, predictions about the models and interpretations of these predictions are given. The sixth section summarizes and interprets estimations reported in the fifth section by using the robust estimation method.

LITERATURE REVIEW

Many studies in the literature have examined the relationship between development aid and economic growth. Among these studies, some argue that development aids are beneficial (aid optimism) as well as some oppose the spirit of this aid (aid pessimism). Aid optimists argue that aids eliminate the savings gap in impoverished countries, creates a source of human and physical investments, increases the country's foreign exchange capacity for capital goods and technology imports, and forces countries into institutional development. In this way, the opportunities of countries for development and growth in the long run will also increase. The most important outputs of this situation are poverty reduction and increase in welfare

(Svensson 1999; Morrissey 2001; Radelet, Clemens, and Bhavnani 2005; Askarov and Doucouliagos 2015). Aid pessimists also emphasize that contrary to the views above, aid goes to consumption rather than investment, deteriorates the relative price structure, reduces productivity and foreign competitiveness, and in societies where there are no strong institutions and corruption, governments waste this aid by making extremely risky investments. The growth of bureaucracy instead of institutional development, the perpetuation of corrupt governments, and the further enrichment of the elites are the negative consequences of development aid, according to aid pessimists (Boone 1994, 1996; Burnside and Dollar 2000; Alesina and Weder 2002; Radelet, Clemens, and Bhavnani 2005; Tekin 2012). The strongest argument in this regard is that African countries have been the largest recipients of development aid for decades, but they have shown very poor economic performance during this period. The most important reasons for this situation are considered to be corrupt governments, corruption, and waste in these countries (Burnside and Dollar 2004b; Gomanee, Girma, and Morrissey 2005; Asongu and Nwachukwu 2017). Moreover, continuous foreign aid makes countries dependent on aid (Dash 2021).

Studies dealing with this issue can basically be divided into three groups. The first-generation studies examined the topic within the framework of the linear relationship between physical capital investments and growth, starting from the Harrod–Domar model and the twin deficit model of Chenery and Strout, which was developed on the basis of the Harrod–Domar model. Accordingly, insufficient savings in impoverished countries will be compensated for development aid and used to finance new investments. However, the results showed that savings did not increase as much as benefits (Arndt, Jones, and Tarp 2010). The second-generation studies focused on the conditional effects of aid. The mainstay of these studies is the "Assessing Aid: What Works, What Doesn't, and Why" report published by the World Bank (1998). In this report, it is revealed that development aids increase economic growth and reduces poverty in countries with "good" economic policies and "strong" institutional structures. On the other hand, at the same time, the connection between aid and growth in the 2000s brought along discussions on the future of aid and aid policies (Hermes and Lensink 2001, 1). In support of the report, Svensson (1999) first revealed that the impact of aid on growth is related to political and civil liberties in recipient countries, while Burnside and Dollar (2000) stated that foreign aid will affect growth positively only under the presence of good fiscal, monetary, and commercial policies. In later studies, too much emphasis was placed on "strong" institutions and "good" policies, especially freedom, democracy, financial liberalization, financial development, openness, regulation, and structural transformation (Kosack 2003; Burnside and Dollar 2004a; Burnside and Dollar 2004b; Ang 2010; Aboubacar, Xu, and Ousseini 2015; Tang and Bundhoo 2017; Sethi et al. 2019; Jena and Sethi 2020; Dash 2021).

On the other hand, the third-generation studies argue that aid is insufficient, do not find an effect between aid and growth, or claim that there will be no comprehensive effect. Doucouliagos and Paldam (2011) evaluated 1217 estimation results from 106 studies and stated that aids are insufficient for growth. Tekin (2012) reported that there is no causality between aid and growth for the 27 least developed countries in Africa. In the study conducted by Fatima (2014) for Pakistan, a significant relationship between aid and growth could not be established. Corruption, financial imprudence, and weak institutions were seen as the reasons for this situation. Dreher and Langlotz (2020) reached a similar conclusion for 97 countries. Mosley (1987), while accepting the positive microeconomic effects of aid, stated that it is difficult to determine macroeconomic (holistic) effects. In the literature, this situation has revealed another debate as the "micro–macro paradox." In another co-authored study, Mosley, Hudson, and Horrell (1990) found no significant relationship between aid and growth due to spending on nonproductive areas in the public sector (Hudson 2004). Reddy and Minoiu (2006) also showed that types of aid can have different effects on growth. Maruta, Banerjee, and Cavoli (2020) similarly showed that types of aid can have different effects on growth in different countries. Accordingly, in their study, aid for education for South American countries, health for Asian countries, and agriculture for African countries are more effective. Dreher et al. (2021) also revealed that the aid provided by China, the United States, and the OECD-DAC had a positive effect on economic growth in the recipient countries, while any evidence of the effect of the aid provided by the World Bank on economic growth could not be found.

DATA SET AND EMPIRICAL MODEL

The "Assessing Aid: What Works, What Doesn't, and Why" report published by the World Bank in 1998 stated that development aid increases economic growth and reduces poverty in countries with "good" economic policies and "strong" institutional structures.[1] Therefore, the main objective of the study is to analyze the impact of development aid on growth for the period 2000–2020, taking into account the interaction with institutional factors. In this framework, 64 countries were analyzed. Information on 64 countries is included in Online Appendix Table A1. The models in Equation (1) were used to determine the relationships between the variables.

$$g_{it} = \beta_0 + \beta_1 aidpc_{it} + \beta_2 \sum ins_{it} + \beta_3 \sum cont_{it} + \beta_4 \sum aidpc_{it} * ins_{it} + \varepsilon_{it}. \quad (1)$$

First of all, i in Equation (1) shows countries (1,…,64), and t shows years (2000,…,2020). GDP per capita (g_{it}) value in the 2000–2020 period is taken as the dependent variable. The independent variables in the model are ODA per capita ($aidpc_{it}$), institutional variables vector ($\sum ins_{it}$), control variable vector ($\sum cont_{it}$), and interaction term ($\sum aidpc_{it} * ins_{it}$). Based on reports in the relevant literature, openness levels expressed as the ratio of foreign trade volume to GDP ($open_{it}$), annual percentage change in consumer prices expressing price stability (inf_{it}), public sector final consumption expenditures (gov_{it}) indicating the weight of the public sector (gov_{it}), domestic investments (inv_{it}), and foreign direct investments (fdi_{it}) are included in the model as control variables. The variables of an institutional structure are the control of corruption index (cor_{it}), political stability and absence of violence/terrorism index (pol_{it}), regulatory quality index (reg_{it}), rule of law index (law_{it}), and voice and accountability index (acc_{it}). The first set of data on control of corruption, political stability and absence of violence/terrorism, regulatory quality, rule of law, and voice and accountability obtained from the World Bank Worldwide Governance Indicators was published in 1996. Each data set takes a value between –2.5 and +2.5, and as the index approaches –2.5, the relevant indicator deteriorates, while the index getting closer to +2.5 indicates that the relevant indicator improves. Of course, since the countries receiving ODA are below a certain level of development, they have negative indicators in terms of institutional factors, as well as economic indicators. Apart from these variables, ε_{it} in the model is the error term. Detailed descriptions and sources of the data can be found in Online Appendix Table A2.

Instead of simply focusing on the relationship between ODA and growth, this study aims to examine the role of the institutional development levels of countries in this relationship and identify economic implications. For this reason, instead of including only institutional variables in the model, ODA data supported with institutional variables were derived and included in the model as an interaction term. Askarov and Doucouliagos (2015), Dreher et al. (2021), and Galiani et al. (2017) also included the interaction term in some studies. This way, the effect of institutional factors is revealed more clearly.

METHODOLOGY

Methods suitable for 64 countries and 21 periods include panel data models.[2] Among panel data models, there are models in which the constant and slope parameters are constant according to units and time, there are models in which the constant and slope parameters are variable according to units and time, and

[1] The relationships between net development assistance and the World Bank Governance indicators of control of corruption, political stability and absence of violence/terrorism, regulatory quality, rule of law and voice and accountability are presented in Graphics A2 in the Online Appendix. Although the report "Assessing Aid: What Works, What Doesn't, and Why" states that development aid increases economic growth and reduces poverty in countries with "good" economic policies and "strong" institutional structures, data for the period 1996–2020 show that the distribution of official development aid is not exactly as described in this report.

[2] The unbalanced panel is due to the lack of some observations. The observations of all countries on institutional factors for the year 2000 were left incomplete because they were not published by the World Bank. Similarly, gov, inv, and open data for 2020 for Burkina Faso, inf for Namibia in 2000 and 2001, inf for Eswatini in 2020, gov for 2020 for Vanuatu, and finally, gov for Angola for 2000 were missing.

there are those in which only one of the constant or slope parameters is variable according to unit or time.

$$Y_{it} = \beta_0 + \sum_{k=1}^{K} \beta_k X_{kit} + u_{it}. \quad (2)$$

Models in the first group are defined as "classical panel data models" or pooled least squares models. In classical panel data models, the constant (β_0) and slope ($\sum_{k=1}^{K} \beta_k$) parameters expressed in Equation (2) are constant according to units and time, and at the same time, all observations are homogeneous. Fixed effects models allow for unit-specific effects, estimating parameters using within-group estimation (Baltagi 2005). Random effects models assume changing effects over time, estimated using the generalized ordinary least squares (OLS) estimator (Greene 2003, 295; Hsiao 2003, 35–37). Depending on conditions, this estimator converges to different estimators like pooled OLS or within-group estimators. These methods address variations in data across units and time, providing insights into complex relationships within data sets.[3]

RESULTS

As discussed in detail in the Introduction section, intellectual debates on the relationship between development assistance and growth still continue. The question of whether the relationship between the two variables is unconditional or conditional is also questioned in the 21st century. To satisfy this curiosity, predictions of the models were made[4] so that the estimation results can be analyzed. Before proceeding to the estimation results, it is necessary to decide which of the fixed effects/random effects estimators will be used. The analysis of variance F test, proposed by Moultan and Randolph in 1989, examines the validity of the classical model (Baltagi 2005, 63). Here, the H_0 hypothesis is "the classical model is valid." If the H_0 hypothesis cannot be rejected according to the calculated F test result, it is decided that the classical model is efficient. When the F statistic results (see Tables 1–3) are analyzed, it is seen that the models do not conform to the classical model. The Hausman test is used when choosing between fixed effects and random effects models (Baltagi, Bresson, and Pirotte 2003; Frondel and Vance 2010). This test is based on the calculation of the H statistic by using the difference between the variance–covariance matrices of the random effects model (generalized least squares estimator) and the fixed effects model (within-group estimator). The Hausman test analyzes whether the H statistic is equal to zero. As a result of the test, it is decided that the random effects model is appropriate if the difference between the parameters is not systematic, and the fixed effects model is suitable if the difference between the parameters is systematic (Baltagi 2005). According to the Hausman test statistic results in Tables 1–3, information on the estimation method of the models is given. Based on these findings, the fixed effects estimator is applicable in all models from Model 2 to Model 8; however, the random effects estimate is only valid in Model 1 in Table 1. All six models in Table 2 were found to have valid fixed effects estimators. The fixed effects estimator is valid in all models employed for Central and South America and Sub-Saharan Africa, as shown in Table 3, which also contains the subgroup analysis. On the other hand, the fixed effects estimator is valid in Model 3, while the random effects estimator is valid in Model 4, which contains interaction terms used for Eastern European and Asian countries.

First, for the findings, Table 1 shows the relationship between per capita ODA and growth. Here, the relationship between per capita ODA and growth was estimated with eight different models. Model 1 focused only on the relationship between the two variables. Accordingly, it is seen that there was a significant relationship between per capita ODA and growth. However, the R^2 value in the model was quite low. Additionally, unlike the other models in the study, this model was the only model estimated within the framework of the random effects model. Starting from Model 2 control variables were added

[3] For more information on mathematical notation, see Online Appendix A1.

[4] For descriptive statistics and correlation matrix, see Online Appendix Tables A3 and A4, respectively.

TABLE 1 Relationship between per capita official development assistance and economic growth.

g	1	2	3	4	5	6	7	8
c	2624.34	3074.433	3584.465	3291.212	3615.844	3388.305	3286.935	3598.571
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
aidpc	3.5246	3.0397	2.4896	2.8100	2.1771	2.6787	2.6155	2.0884
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)
inf		0.9603	0.7801	0.7722	0.8124	0.7438	0.7846	0.8763
		(0.002)	(0.009)	(0.009)	(0.006)	(0.013)	(0.009)	(0.003)
gov		7.71e−08	7.81e−08	8.04e−08	7.24e−08	7.91e−08	7.65e−08	7.03e−08
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
inv		2.58e−08	2.40e−08	2.40e−08	2.72e−08	2.42e−08	2.59e−08	2.83e−08
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
fdi		1.55e−07	1.48e−07	1.42e−07	1.37e−07	1.44e−07	1.46e−07	1.38e−07
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
open		−18.4162	−19.6773	−18.7122	−18.9292	−18.9532	−19.0044	−19.1430
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
cor			532.5567					235.0849
			(0.001)					(0.237)
pol				196.742				112.5168
				(0.024)				(0.229)
reg					923.0545			991.6819
					(0.000)			(0.000)
law						302.4719		−529.2185
						(0.076)		(0.021)
acc							149.4261	102.707
							(0.317)	(0.530)
Number of observations	1344	1338	1275	1275	1275	1275	1275	1275
R^2	0.0151	0.3657	0.3667	0.3636	0.3825	0.3626	0.3615	0.3856
F statistics	71.34	80.18	66.57	67.59	69.22	67.10	70.77	62.10
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Hausman	1.19	161.47	378.04	116.34	123.66	4316.99	247.24	115.19
	(0.2754)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Cross Dep.	150.889	57.378	54.630	58.324	51.924	60.346	58.437	49.733
	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Heteros.	22.0687 W50	1.9e+06	6.3e+05	8.9e+05	3.9e+05	9.6e+05	1.6e+06	2.4e+05
	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Autocorr.	0.2588	0.3452	0.6067	0.6092	0.627	0.6073	0.6079	0.6317
Models	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Note: Values in parentheses show the probability values of the relevant data. Probability values smaller than 0.01 indicate significance at the level of 1%, those in the range of 0.01–0.05 indicate significance at the level of 5%, and those in the range of 0.05–0.10 indicate significance at the level of 10%.

TABLE 2 Relationship between per capita official development assistance and economic growth (with interaction terms).

g	1	2	3	4	5	6
c	3584.465	3291.212	3615.844	3388.305	3286.935	3598.571
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
aidpc	2.4896	2.8100	2.1771	2.6787	2.6155	2.0884
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.002)
inf	0.7801	0.7722	0.8124	0.7438	0.7846	0.8763
	(0.009)	(0.009)	(0.006)	(0.013)	(0.009)	(0.003)
gov	7.81e−08	8.04e−08	7.24e−08	7.91e−08	7.65e−08	7.03e−08
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
inv	2.40e−08	2.40e−08	2.72e−08	2.42e−08	2.59e−08	2.83e−08
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
fdi	1.48e−07	1.42e−07	1.37e−07	1.44e−07	1.46e−07	1.38e−07
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
open	−19.6773	−18.7122	−18.9292	−18.9532	−19.0044	−19.1430
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
*cor*aidpc*	5.1756					2.2846
	(0.001)					(0.237)
*pol*aidpc*		1.9120				1.0934
		(0.024)				(0.229)
*reg*aidpc*			8.9707			9.6376
			(0.000)			(0.000)
*law*aidpc*				2.9395		−5.1432
				(0.076)		(0.021)
*acc*aidpc*					1.4521	0.9981
					(0.317)	(0.530)
Number of observations	1275	1275	1275	1275	1275	1275
R^2	0.3667	0.3636	0.3825	0.3627	0.3615	0.3856
F statistics	66.57	67.59	69.22	67.10	70.77	62.10
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Hausman	83.66	76.61	71.53	83.98	84.38	73.10
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Cross Dep.	54.630	58.324	51.924	60.346	58.437	49.733
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Heteros.	6.3e+05	8.9e+05	3.9e+05	9.6e+05	1.6e+06	2.4e+05
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Autocorr.	0.6067	0.6092	0.627	0.6073	0.6079	0.6314
Models	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Note: Values in parentheses show the probability values of the relevant data. Probability values smaller than 0.01 indicate significance at the level of 1%, those in the range of 0.01–0.05 indicate significance at the level of 5%, and those in the range of 0.05–0.10 indicate significance at the level of 10%.

TABLE 3 Relationship between per capita official development assistance and economic growth for subgroups.

	Sub-Saharan Africa		East Europe and Asia		Central and South America	
g	1	2	3	4	5	6
c	1363.462	1585.201	3872.113	2043.126	3447.925	4524.394
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
aidpc	5.6950	5.9394	−0.7125	4.9719	−2.1320	−7.2236
	(0.000)	(0.000)	(0.443)	(0.013)	(0.338)	(0.011)
inf	−0.073	−0.1624	6.9783	9.7754	25.6017	24.0334
	(0.733)	(0.446)	(0.000)	(0.000)	(0.000)	(0.000)
gov	9.88e−08	9.85e−08	4.63e−08	4.67e−08	−1.73e−07	−1.74e−07
	(0.000)	(0.000)	(0.012)	(0.009)	(0.000)	(0.000)
inv	9.08e-09	6.34e−09	1.44e−08	1.67e−08	2.22e−07	2.07e−07
	(0.307)	(0.473)	(0.085)	(0.041)	(0.000)	(0.000)
fdi	5.80e−09	7.82e−09	1.41e−07	1.58e−07	−5.76e−08	−2.41e−08
	(0.858)	(0.810)	(0.000)	(0.000)	(0.539)	(0.795)
open	−7.6421	−6.0201	−19.1619	−13.3417	−41.5883	−37.2238
	(0.003)	(0.023)	(0.000)	(0.001)	(0.000)	(0.000)
cor	−242.4164		−427.8703		263.8009	
	(0.260)		(0.320)		(0.582)	
pol	72.3103		197.6454		−961.0247	
	(0.473)		(0.213)		(0.006)	
reg	126.7807		1743.483		594.4024	
	(0.572)		(0.000)		(0.245)	
law	−614.7453		982.4961		−1976.387	
	(0.019)		(0.032)		(0.000)	
acc	129.6902		−484.6793		2013.571	
	(0.000)		(0.113)		(0.001)	
*cor*aidpc*		−7.3131		5.6918		9.4359
		(0.003)		(0.031)		(0.091)
*pol*aidpc*		0.6244		1.4548		−0.8995
		(0.662)		(0.291)		(0.879)
*reg*aidpc*		0.2783		3.3851		1.0761
		(0.922)		(0.001)		(0.890)
*law*aidpc*		5.8157		−6.6270		−21.195
		(0.101)		(0.038)		(0.008)
*acc*aidpc*		−0.9255		2.1294		21.0873
		(0.677)		(0.374)		(0.002)
Number of observations	516	516	380	380	260	260
R^2	0.2597	0.2567	0.5879	0.5256	0.672	0.6556
F statistics	86.77	96.92	28.49	36.07	43.96	40.84
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

(Continues)

TABLE 3 (Continued)

	Sub-Saharan Africa		East Europe and Asia		Central and South America	
g	1	2	3	4	5	6
Hausman	84.03	73.68	14.04	5.57	189.48	2381.45
	(0.000)	(0.000)	(0.0808)	(0.6957)	(0.000)	(0.000)
Cross Dep.	16.966	19.761	11.803	51.211	0.735	1.445
	(0.000)	(0.000)	(0.000)	(0.000)	(0.4626)	(0.1485)
Heteros.	2.6e+05	1.5e+05	2875.52	12.8659 W50	6080.72	23237.47
	(0.000)	(0.000)	(0.000)	(0.0000)	(0.000)	(0.000)
Autocorr.	0.7979	0.829	0.6597	0.6974	0.7528	0.6509
Models	Fixed effects	Fixed effects	Fixed effects	Random effects	Fixed effects	Fixed effects

Note: Values in parentheses show the probability values of the relevant data. Probability values smaller than 0.01 indicate significance at the level of 1%, those in the range of 0.01–0.05 indicate significance at the level of 5%, and those in the range of 0.05–0.10 indicate significance at the level of 10%.

to per capita ODA, and from Model 3 onward the individual effects of institutional factors were also included.

In models from Model 2 to Model 8, it is seen that the consumer price index, public sector final consumption expenditures, domestic investments, and foreign direct investments had a positive and significant effect on growth. The impact of public sector final consumption expenditures, domestic investments, and foreign direct investments on growth remained very weak in these models. It is also seen that openness affected growth negatively and significantly. The explanatory power of the model increased with the control variables included in the model.

It should be noted that although the institutional factors included in the models from Model 3 onward did not cause a substantial change in the basic outcomes, the effect of per capita ODA on growth decreased, albeit slightly. The control of corruption, political stability, the absence of violence/terrorism, and regulatory quality indices were significant at the 1 percent, 5 percent, and 1 percent levels, respectively, while the rule of law index was significant at the 10 percent level. These indices also had a positive effect on growth. The voice and accountability index was found to be insignificant here. In Model 8, where all institutional factors were included, the relationship between growth and institutional factors other than regulatory quality and rule of law was insignificant. Here, again, the sign of the rule of law index was reversed.

Within the framework of the results presented in Table 1, the effects of per capita ODA on growth were positive and significant in all models. Accordingly, when per capita development assistance increased by $1, per capita also increased by approximately $2.08–3.52. In general, although institutional factors had partially positive effects on growth, it cannot be argued that per capita ODA increased the effectiveness of growth.

Finally, as seen in Table 2, the impact of per capita ODA on growth was reinterpreted using interaction terms. The two variables were estimated with six different models. In all models, it is seen that there was a positive and significant relationship between per capita ODA and growth. Moreover, in all six models, the consumer price index, public sector final consumption expenditures, domestic investments, and foreign direct investments had a positive and significant effect on growth. However, this positive effect remained very weak, especially for public sector final consumption expenditures, domestic investments, and foreign direct investments. It is striking that openness affected growth in a negative and significant manner, as in all previous models.

It should also be noted that the interaction terms included in the models did not cause a considerable change in the basic result. The variables of *cor*aidpc*, *pol*aidpc*, *reg*aidpc*, and *law*aidpc* had a significant and positive effect on growth at the levels of 1 percent, 5 percent, 1 percent, and 10 percent, respectively. The

*acc*aidpc* index was found to be insignificant. In Model 6, where all interaction terms were included, the relationship between growth and interaction terms other than *reg*aidpc* and *law*aid* became insignificant. Here again, the sign of *law*aid* was reversed. As seen here, although the predictions of the models shown in Table 1 with interaction terms were reinterpreted, there was no significant change in the results. Per capita, ODA affected growth positively and significantly. Although institutional development had effects on growth, it had no tangible effect on the relationship between growth and per capita ODA. As stated in Table 1 before, per capita ODA affected growth positively and significantly in Models 1 and 2, where institutional factors or interaction terms were not included. Unlike the estimation results in Table 2, when the amount of per capita ODA increased by $1 in the models with interaction terms, per capita GDP increased in the range of approximately $2.08–2.81.

As seen in all estimation results, when the per capita amount of development assistance provided by high-income countries to less high-income countries increases, growth effects are observed for aid-recipient countries. However, it cannot be said that this is a situation that depends on institutional factors.

The results for all countries are analyzed in Tables 1 and 2, the effects of development aid on growth may also vary depending on the subgroups into which a country is split. Three subgroups were created in this framework in order to highlight heterogeneity. There are 26 Sub-Saharan African nations in the first group. Nineteen nations from Asia and Eastern Europe make up the second group. The last group includes 13 Central and South American countries. The results of the subgroups are presented in Table 3. There are six models in total in Table 3. Models 1 and 2 show the estimation results for Sub-Saharan Africa, Models 3 and 4 for Eastern Europe and Asia, and Models 5 and 6 for Central and South America. While the random effects estimator is valid only in Model 4, the fixed effects estimator is valid in all other models. Model 1, Model 3, and Model 5 include institutional factors as well as control variables. The other models include interaction terms instead of institutional factors.

Results for 26 Sub-Saharan African nations are shown in Models 1 and 2. Accordingly, in both models, ODA per capita increases the per capita income level by approximately $5.69–5.93. Regarding control variables, consumer price index, domestic investment, and foreign direct investment have no significant effect on growth. On the other hand, although the public sector's final consumption expenditures are significant, their effect on growth is quite weak. On the other hand, openness has a negative and significant effect on growth. Among the institutional factors in Model 1, control of corruption, political stability and absence of violence/terrorism and regulatory quality indices are insignificant. Rule of law and voice and accountability indices were found to be significant at the 5 percent and 1 percent levels, respectively. The voice and accountability index is an institutional variable that positively affects growth in Sub-Saharan African countries. In Model 2, which also includes interaction terms, only the *cor*aidpc* variable is significant at the 1 percent level, while *pol*aidpc*, *reg*aidpc*, *law*aidpc*, and *acc*aidpc* variables are insignificant. However, the sign of *cor*aidpc* is negative and has a negative impact on growth.

Models 3 and 4 present the results for 19 Eastern European and Asian countries. While the variable of ODA per capita is insignificant in Model 3, it is significant in Model 4. Accordingly, in Model 4, ODA per capita increases the per capita income level by approximately $4.97. Regarding the control variables, all control variables are statistically significant. While the consumer price index has a positive effect on growth in Eastern European and Asian countries, public sector final consumption expenditures, domestic investment, and foreign direct investment have a significant effect on growth, but this effect is rather weak. On the other hand, openness has a negative and significant effect on growth. Among the institutional factors in Model 3, control of corruption, political stability and absence of violence/terrorism, and voice and accountability indices are insignificant. On the other hand, regulatory quality and rule of law indices are found to be significant at 1 percent and 5 percent levels, respectively. Regulatory quality and rule of law indices are institutional variables that positively affect growth in Eastern European and Asian countries. In Model 4, which also includes interaction terms, *pol*aidpc* and *acc*aidpc* variables are statistically insignificant. Among other variables, *cor*aidpc* and *reg*aidpc* affect growth positively while the *law*aidpc* index affects growth negatively.

Finally, Models 5 and 6 present the results for 13 Central and South American countries. In Model 5, the ODA per capita variable is insignificant, as in Eastern Europe and Asia, while in Model 6 it is significant. However, in Central and South American countries, ODA per capita decreases per capita income level by approximately $7.22. Regarding the control variables, all control variables are statistically significant except foreign direct investment. The consumer price index has a positive effect on growth in Central and South American countries, while public sector final consumption expenditures have a negative effect and in-country investments have a positive effect on growth as in the case of consumer prices. However, the negative effect of public sector final consumption expenditures and the positive effect of in-country investments are quite limited. On the other hand, as in Sub-Saharan Africa, Eastern Europe, and Asia, openness to internationalization has a negative and significant effect on growth. Among the institutional factors in Model 5, control of corruption and regulatory quality indices are insignificant. In addition, political stability and absence of violence/terrorism, rule of law, and voice and accountability indices are significant at the 1 percent level. Among the significant variables, only voice and accountability have a significant effect on growth, while political stability, the absence of violence/terrorism, and the rule of law have a negative effect. In Model 6, which also includes interaction terms, *pol*aidpc* and *reg*aidpc* variables are statistically insignificant. Among other variables, *cor*aidpc* and *acc*aidpc* affect growth positively, while the *law*aidpc* index affects growth negatively.

According to the general results, ODA per capita positively affects the level of income per capita. However, the results for subgroups of countries reveal some differences compared to the general results. First of all, per capita ODA has a positive impact on per capita income in Sub-Saharan Africa, Eastern Europe, and Asia. Of course, the results show that ODA per capita increases economic growth more in Sub-Saharan Africa. On the other hand, in Central and South American countries, ODA per capita reduces the level of income per capita. This may also indicate that development aid is not used effectively in Central and South American countries. On the other hand, the effect of the voice and accountability index should also be taken into account for these countries.

ROBUSTNESS TESTING

Diagnostic test results are given in Tables 1–3 for all results that were obtained in this study. For all estimated models, the results on cross-section dependence (Cross dep.), heteroskedasticity (Heteros.), and autocorrelation (Autocorr.) tests are included below all estimation results. First, the Pesaran (2004) Cross-section Dependence (CD) test, which performs well at $N > T$, was used to determine cross-section dependence. Levene's (1960) and Brown and Forsythe's (1974) tests were used in the random effects model, whose results are demonstrated in Tables 1 and 3, to determine heteroskedasticity. The modified Wald test was used in all other fixed effects models. Finally, the Baltagi and Wu (1999) Locally Best Invariant (LBI) test was used in all models to determine the presence of autocorrelation. The Baltagi–Wu LBI test results were far from 2 for all estimates and showed the presence of autocorrelation. For the cross-section dependence and heteroskedasticity tests, the H_0 hypotheses were "there is no cross-section dependence" and "there is no heteroskedasticity." All estimation results indicate the presence of heteroskedasticity in the models. There is also cross-section dependence in all models except for the Central and South American countries in Table 3. For these reasons, robust estimation results are needed for all models. The Driscoll–Kraay estimator takes into account all three cases and also ensures the consistency of the covariance matrix estimators, even with the adjusted standard error estimates $N \to \alpha$ (Driscoll and Kraay 1998).

On the other hand, missing data may occasionally be encountered in panel data sets. It was found that some countries' findings in this research had coincidental deficiencies (see footnote 2). In cases of unbalanced panel data, inconsistency, and asymptotic normality may also arise, but heteroscedasticity and autocorrelation issues can also lead to outcomes that are ineffective. This makes the interpretation of the results questionable. The Driscoll–Kraay estimator was used to solve all of these issues in the models that were looked at in Tables 1 through 3, and unbalanced panel data sets were used to produce effective and

reliable estimators. This is mostly because the square of the t moment criteria for each unit in the Driscoll–Kraay estimator may be computed for N's with various T's (Driscoll and Kraay 1998). The Driscoll–Kraay estimator may now provide reliable and effective estimators for models with unbalanced panel data as a result of this modification. In this way, all models were reestimated with Driscoll and Kraay estimators, and robust standard errors were found. The new results obtained with the robust standard errors are given in Online Appendix Tables A5–A7.

Online Appendix Table A5 also shows the robust estimation results of the outcomes presented in Table 1. Here, again, although the inf variable became insignificant, per capita ODA affected growth positively and significantly when Model 1 was excluded. Accordingly, in Table 1, an increase of $1 in per capita ODA would correspond to an increase in per capita GDP by approximately $2.08–3.52. On the other hand, after the robust estimation results, in Online Appendix Table A5, this increase was calculated to be in the range of $2.08–3.03. Finally, Online Appendix Table A6 shows the robust estimation results of the outcomes displayed in Table 2. Despite the fact that the inf variable was insignificant, there was no significant change in the significance values of the other variables. According to the values in Online Appendix Table A6, as in Table 2, an increase of $1 in per capita ODA would correspond to an increase in per capita GDP by $2.08–2.81.

Robust estimation results are also obtained for subcountry groups. Online Appendix Table A7 again shows the robust estimation results of the results in Table 3. According to the results, ODA per capita in Sub-Saharan African countries increases the per capita income level by approximately between $5.69 and $5.93, while the robust estimation results reveal a different result. According to Driscoll and Kraay's robust estimation results, there is no significant effect of ODA per capita on income per capita in Sub-Saharan African countries. In Eastern European, Asian countries, and Central and South American countries, the results are not different from the estimation results in Table 3. Accordingly, Sub-Saharan African countries differ from the overall results in this respect. The positive results for 64 countries are not valid for Sub-Saharan African countries. For Sub-Saharan African countries, the amount of official aid does not have a positive or negative impact on growth. On the other hand, there is a close relationship between Eastern European and Asian countries and the overall results. Both for all countries and for Eastern European and Asian countries, ODA per capita positively affects growth. In fact, according to the overall results (Model 8 in Online Appendix Table A5 and Model 6 in Online Appendix Table A6), ODA per capita increases income per capita by approximately $2.08, while it increases income per capita by approximately $4.97 in Eastern European and Asian countries. Finally, it is concluded that ODA per capita has a negative impact on growth in Central and South American countries. It is possible to argue that this result differs from the overall findings.

Robust subgroup analyses produced quite diverse findings. The causes of these results must be the primary emphasis. The countries of Sub-Saharan Africa are facing significant challenges. Development aid per capita in these countries does not have a significant impact on growth. This situation is exacerbated by both institutional backwardness and extremely low development aid per capita. For the countries of Central and South America, the situation is much more dire. However, it is also a fact that increases in *cor*aidpc* and *acc*aidpc*, especially for Central and South American countries will have a positive impact on growth. In other words, these countries' progress will be ensured by development aid and encouraging advancements in the control of corruption and voice and accountability. Countries in Sub-Saharan Africa are undergoing a phase where the impact of development aid is neutralized by institutional backwardness. As previously indicated, the primary issue in these countries is that aid is sent to waste rather than productive areas. Eastern European and Asian nations are the most benefited by development aid among subgroups. The advantages of institutional development outweigh the benefits of development aid alone for these countries. Institutional development is an important factor in directing aid to productive areas. Of course, another crucial factor is the quantity of aid per capita.

In conclusion, it is seen to be crucial to explain interaction terms. Interaction terms are used in both Tables 2 and 3 and Online Appendix Tables A6 and A7. The combined effects of the aidpc variable and each institutional factor on economic growth are shown in each of the interaction terms. For instance, a $1 increase in aidpc in Tables 2 and A6 of Model 1 results in an increase in income per capita of

almost $2.48. However, with the progress in control of corruption for countries, the combined effect of *aidpc* (*cor*aidpc*) increases up to $5.17. Insignificant or negative interaction terms exist, on the other hand. Although the relationship between development aid and economic growth cannot be significantly influenced by institutional variables alone, combined impacts within the framework of interaction terms show more positive results. Naturally, the claim that institutional advancements are not important for economic growth is untrue. To be able to make more significant strides in economic growth, it is thought that countries receiving development aid must prioritize institutional advancements in meaningful iterations. When viewed as a subgroup, these are voice and accountability for Central and South American countries and control of corruption for Eastern European and Asian countries and Central and South American countries, respectively. As previously stated, when development aid is combined with voice and accountability improvements in Central and South American countries, the negative effects of development aid are also removed.

CONCLUSION

The report "Assessing Aid: What Works, What Doesn't, and Why" published by the World Bank argues that development aid increases economic growth and reduces poverty in countries with "good" economic policies and "strong" institutional structures. However, when we looked at the data, we showed that the distribution of ODA has not been quite as expressed in this report. According to the analyses conducted for the 2000–2020 period and 64 countries, the impact of per capita ODA on growth was positive and significant in all models. When per capita ODA increased by $1, per capita GDP also increased by approximately $2.08–3.52. Institutional factors themselves had a partially positive effect on growth. However, there was no evidence that per capita ODA increased the effectiveness of growth. Furthermore, when per capita ODA increased by $1 in the models with interaction terms, per capita GDP increased in the range of approximately $2.08–2.81. The robust estimation results could not lead us to a different conclusion compared to the first model results on the direction and degree of the historical relationship between the two variables.

However, different results are obtained for subcountry groups than the results obtained from the whole sample. ODA per capita has a positive effect on income per capita in Sub-Saharan African countries, Eastern European, and Asian countries. The results show that ODA per capita increases economic growth more in Sub-Saharan Africa. On the other hand, in Central and South American countries, ODA per capita decreases the level of income per capita. According to the robust estimation results, the amount of official aid has no positive or negative impact on growth for Sub-Saharan African countries. On the other hand, there is a close relationship between Eastern European and Asian countries and the overall results. ODA per capita has a positive impact on growth both for all countries and for Eastern European and Asian countries. For all countries, ODA per capita increases income per capita by approximately $2.08, while in Eastern Europe and Asia, it increases income per capita by approximately $4.97. Finally, it is concluded that ODA per capita has a negative impact on growth in Central and South American countries.

An important issue is the allocation of development aid. Even if development aid increases in sums, the allocation of these resources to the wrong areas results in dreams of growth being dashed. With the effects of development aid on investments, countries may turn toward a growth process. Nevertheless, in later stages, the immense importance of institutions becomes evident. There may also be the possibility that ineffective public administrations, which are far from transparent, can direct aid to areas that are not economically productive. This way, the waste of resources can cause countries to deviate from their goals. Consequently, the institutional backwardness that exists at the beginning of the development process needs to evolve into strong institutions with development aids. However, for countries at the beginning of their development process, it is still early for donor countries to make a preference for institutional development.

AUTHOR CONTRIBUTIONS

All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by Ömer Faruk Biçen and Mustafa Necati Çoban. The first draft of the manuscript was written by Ömer Faruk Biçen and all authors commented on previous versions of the manuscript. All authors read and approved the final article.

CONFLICT OF INTERESTS STATEMENT

The authors have no relevant financial or nonfinancial interests to disclose.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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