Master's Thesis of International Studies

Assessing the Impact of ODA on the Tax Effort of Developing Countries

공적개발원조(ODA)가 개발도상국 조세노력에 미치는 영향

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Graduate School of International Studies
Seoul National University
International Cooperation Major

Soyoung Mark Yoon

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Taekyoon Kim

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Soyoung Mark Yoon

Confirming the Master's Thesis written by
Soyoung Mark Yoon
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Chair Chong-Sup Kim

Vice Chair Jae Bin Ahn

Examiner Taekyoon Kim

Abstract

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Soyoung Mark Yoon

International Cooperation Major

Graduate School of International Studies

Seoul National University

As donor countries providing Official Development Aid (ODA) increasingly experience 'donor fatigue,' the focus of development has shifted to tax. As tax is the main resource of the state, enhancing tax effort has been the focus of interest among scholars in order to understand the diverse tax structures among countries so that developing countries can set forth and have the capacity to carry out development agendas with less reliance on Official Development Aid.

In recognizing the importance of 'tax effort' in the role it plays in state-building, this study seeks to analyze the impact of ODA on the tax effort of developing countries. Using Benedek et al. (2012)'s paper as a benchmark, this study explores the dynamics of ODA by conducting panel analysis on 126 countries over the years 1980-2019. By adding new governance variables, results show that

increasing the quality of governance does enhance tax effort, but only in the case when controlling for corruption. With its interaction with ODA, *rule of law* rather has a positive impact on tax effort. As was found by previous literature, total ODA is proven to have a negative impact on tax effort. Both ODA loans and grants proved to be statistically significant and also negative in its impact on tax effort. However, an important finding of this study is that ODA given to the Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA) region have a positive impact on tax effort compared to other regions.

Keywords: Tax Effort, Official Development Aid, Governance, Developing Countries, State-building, Panel Analysis

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Abbreviations

GDP	**Gross Domestic Product**
IMF	**International Monetary Fund**
MENA	**Middle East & North Africa**
ODA	**Official Development Aid**
OECD	**Organization for Economic Cooperation and Development**
SGDs	**Sustainable Development Goals**
SSA	**Sub-Saharan Africa**
UN	**United Nations**
USD	**United States Dollar**
VAT	**Value Added Tax**

I. Introduction

Ever since developed countries began providing Official Development Assistance (ODA) to developing countries, ODA has been the subject of much scrutiny with regards to its effectiveness in aiding countries to industrialize and in inducing development. However, when observing even just the surface level of the outcome of growth, we find that countries that received a greater amount of ODA relative to the share of GDP did *not* experience greater growth—here, measured as the growth rate of GDP per capita. As can be seen in table 1[1], except for Cape Verde and Tonga, which rank in the top tier of countries that had both high levels of GDP per capita growth and high levels of ODA inflow, all other countries in the list did not experience high growth levels in GDP per capita despite having received greater amounts of ODA relative to their respective GDP. Even today, scholars do not have a consensus on whether the impact of ODA is positive or negative to the development of recipient countries.

This explains the natural increase in emphasizing the need for ownership and sustainability of recipient countries in development. The Paris Declaration on Aid Effectiveness in 2005 placed emphasis on five key principles for aid[2], among which emphasis was placed on ensuring that partner countries have ownership in the process of implementing national development agendas, as well as strengthening financial management capacities, such as enhanced domestic resource mobilization (OECD 2005). The United Nations Sustainable Development Goals (UN SGDs)

[1] Data covers 126 countries over the years 1980-2019. Data on GDP per capita is from the World Bank Development Indicators. Data on ODA is from the OECD.

[2] The five principles of the Paris Declaration are: Ownership, Alignment, Harmonization, Managing for Results and Mutual Accountability

officially started in 2016 with a 15-year plan to meet 17 universal goals. Among them, Goal 17 places the emphasis on "Strengthen[ing] the means of implementation and revitaliz[ing] the Global Perspective for Sustainable Development" (United Nations Statistics Division). Specific target indicators include strengthening domestic resource mobilization, which acknowledges the importance of enhancing state capacity so that the state can mobilize the resources needed for increased public demand as the economy develops (Gaspar et al. 2016).

Table 1. Average ODA Total and GDP per capita Growth of Developing Countries (1980-2019)

Rank	Country Name	Total ODA (% of GDP)	GDP per capita Growth (%)	Rank
1	Kiribati	26.18	99.82	111
2	Liberia	15.95	99.83	110
3	Solomon Islands	15.82	100.14	105
4	São Tomé and Principe	15.38	100.00	106
5	Cape Verde	15.16	103.45	21
6	Vanuatu	14.66	100.42	100
7	Mozambique	13.53	102.61	38
8	Tonga	11.95	103.26	24
9	Samoa	11.18	101.89	61
10	Eritrea	10.81	102.17	49
11	Burundi	10.05	99.58	116
12	Rwanda	9.60	102.48	40
13	Guinea-Bissau	8.41	100.87	85
14	Central African Republic	7.99	99.58	115
15	Zambia	7.82	100.44	99

※ Total Number of Countries: 126

In fact, scholars have recently given greater attention to tax and *tax effort*—defined as the tax-to-GDP ratio—of developing countries, though discourse on tax reform and tax development with regards to developing countries started early on

(Schumpeter 1918; Mosley et al. 1987). The approach to understanding and analyzing tax has been quite diverse among scholars. From analyzing the internal workings of the political economic system embedded in each country (Di John 2006; Mkandawire 2010; Wu et al. 2010; Bird 2015; Gaspar et al. 2016) to focusing on external factors such as conflict and external vulnerability (Morrissey et al. 2016; Boogaard et al. 2018), many scholars have been actively engaging and taking initiative in understanding tax in relation to development and developing countries (Bräutigam 2004; Ouattara 2006; Benedek et al. 2012; Prichard et al. 2012; Gnangnon and Brun 2019).

While specific factors may hinder a country's ability to enhance tax mobilization—such as reliance on natural resources—one area scholars have collided in opinion is that of ODA and tax. Many argue that ODA has been detrimental for developing countries in designing sophisticated tax administrative capacities or creating a political atmosphere of compliance, which is crucial for tax mobilization (Bräutigam 2008; Benedek et al. 2012). Yet others have found that ODA *does* positively impact tax mobilization, albeit a much smaller impact and when specific conditions apply (Yohou et al. 2016).

It is therefore crucial to continue to evaluate and expand the understanding of how ODA influences a country's effort to mobilize taxes. By finding new insights to the way tax structures evolve and how ODA directly/indirectly affects a country's ability to tax, countries will be able to better design ODA policies and tax reform in order to achieve sustainable development. Having emphasized the importance of continuous research in this area, this study contributes to literature by analyzing the impact of ODA on the tax effort of developing countries while controlling for governance and taking into consideration regional differences.

This study is organized as follows: Chapter 2 discusses previous literature

around the impact of ODA in enhancing revenue mobilization in various countries. Chapter 3 describes the research design of this study, where the Fixed Effects model is used to analyze, evaluate and understand the impact of ODA on tax effort. ODA is broken down by sectors, and governance variables as well as regional differences are taken into account. Chapter 4 discusses the findings of the analysis and Chapter 5 concludes the study with implications for ODA policy and limitations of research.

II. Literature Review

1. Different Approaches to Tax and Development

Traditionally, tax literature focused only on the economic aspects of tax (Besley & Persson 2013). After all, the concept of tax belongs to the realm of fiscal policy as well as a state's administrative capability to generate revenue. However, scholars have increasingly opened to the consideration of political factors and conditions in the development of tax systems (Gaspar et al. 2016). Levi (1988), who provides the theoretical infrastructure for understanding the formulation of tax systems, argues that taxes are by nature forcefully extracted by 'predatory' rulers. She emphasizes that achieving quasi-voluntary compliance is crucial in minimizing transaction costs as well as in dealing with the issue of 'free-riding'. Creating an atmosphere of quasi-voluntary compliance and taking into consideration structural political factors has become an important contribution to tax literature.

Besley and Persson (2013) also argue, traditional approaches to tax and development have focused on the interaction between tax and economics. Considering that the government is the main actor in not only collecting taxes but also in reinvesting such revenue for public services, Besley and Persson introduce their own approach that includes the consideration of political institutions.

Along with Besley & Persson (2013), the approach to research on tax has evolved and taken a variety of forms. Some scholars have tried focusing on the different types of taxes, whether it be VAT, corporate taxes, or personal income taxes (Lee & Gordon 2005). Others have focused on the state and its role in 'making' tax effort. Research on the state looked into the political institutions of countries and the quality of governance and how it affects tax performance (Bird et al. 2008; Yohou

and Goujon 2017). Still others have focused on the structural factors of tax revenue, such as colonial factors (Makandawire 2010), vulnerabilities in the form of natural disasters, conflict, and other external shocks (Morrissey et al. 2016; Boogaard et al. 2018). It is important to note that while scholars have taken such diverse approaches in understanding tax mobilization, not much research has been done on the impact of ODA on tax mobilization.

2. Conflicting Views on ODA and Tax

In general, the impact of ODA on tax effort has been evaluated by scholars as negative. As explained by Bräutigam and Moore, long term dependence on foreign aid causes detrimental effects on the administrative capability of countries to mobilize revenue. Because ODA mostly comes in the form of 'unearned' revenue, such 'free' money diminishes the need for bargaining with taxpayers while also reducing the incentive to advance tax mobilizing capabilities (Bräutigam 2008).

Despite the argument that ODA negatively affects tax effort, some scholars have produced contradicting results, stating that ODA could potentially positively affect the tax mobilization efforts of countries, depending on the specific conditions set in their respective research. Ouattara (2006) analyzed a large sample of aid recipients over the years 1980-2000 and utilized both the Fixed Effects and Random Effects Models to find that the 'positive-ness' or 'negative-ness' of aid depends on the type of government expenditure—aid has a negative impact on non-developmental government expenditure and a positive impact on developmental government expenditure—and thus could be positive in nature. Gnangnon (2020) analyzed 102 developing countries over the years 1980-2015 to find that development aid does in fact enhance tax reform in developing countries, even

though the positive effect is lesser in degree for developing countries.

On the other hand, Thornton (2014) utilized former colony and common religion instrumental variables to find that an increase of one standard deviation of ODA significantly undermines the tax effort of countries. Benedek et al. (2012) analyzed 118 countries from 1980-2009 and disaggregated ODA to loans and grants to find that while ODA in general has a negative impact on tax effort, grants were more likely to have a negative impact than loans.

Despite different outcomes on the positivity or negativity of ODA on tax effort, scholars have not been able to further disaggregate ODA by sectors or assess regional differences in the impact of aid. Scholars have disaggregated tax and analyzed the different types of taxes and how they aid development, but the approach of distinguishing ODA by sector was not taken by many. Also, scholars will occasionally utilize a regional dummy variable in their model (Lee & Gordon 2005; Bird et al. 2008) to specifically control for regional differences, but have yet to observe the specific interaction of ODA on tax by region. This study therefore seeks to analyze the impact of ODA on tax effort by disaggregating ODA by sector and also by incorporating regional interaction terms to understand the different dynamics of ODA, if any, by region.

III. Research Design

1. Research Question & Hypothesis

Given the varying conclusions on the impact of ODA on the tax effort of countries, further analysis of the nature of impact ODA has on the tax effort of countries is needed. Using Benedek et al. (2012)'s model as a baseline, this study aims to answer the following research questions: (1) how does the impact of ODA (total, loans, grants, etc.) on tax effort evolve over the years; (2) how do different sectors of ODA impact tax effort; (3) how does the aspect of ODA's impact on tax effort change when governance indicators are accounted for; and (4) how do regional differences play into ODA's impact on tax effort.

Based on the research questions above, this study proposes the following hypotheses:

Hypothesis 1: Following the findings of Benedek et al. (2012), total ODA will continue to have an overall negative impact on ODA, despite loans having a positive impact and grants having a negative impact.

Hypothesis 2: Given that the purposes of ODA by sector is diverse, sectoral distinctions of ODA will not matter in depicting ODA's impact on tax effort but rather whether such sectoral aid was given as grants or loans. ODA itself may not have a direct impact on tax effort, but the characteristics of ODA (such as having to eventually pay back the sum given as loans) will affect tax effort.

Hypothesis 3: Enhancing governance will not only encourage greater volumes of ODA but also positively impact countries' tax effort. Governance variables are expected to have a positive coefficient.

Hypothesis 4: Taking into account that different regions have diverse

characteristic or factors that play into development as well as the ODA received, this study expects that regions with higher portions of ODA (East Asia and the Pacific, Sub-Saharan Africa regions) will have a greater significant impact of ODA on tax effort compared to other regions.

In answering the research questions above, this study contributes to literature by providing a more in-depth analysis in understanding the dynamic impact of ODA on tax effort—how the impact differs by sector and by region. Such findings will further provide insight for policy makers in providing ODA that will enhance tax effort in developing countries in order to achieve the original intent of ODA—development and growth.

2. Empirical Model

Taking from Benedek et al. (2012), the baseline model they proposed is as follows. In order to measure the impact of ODA on tax revenue, they utilized the measure of tax-to-GDP ratio [$(TAX/GDP)_{it}$] in logs as the dependent variable (i for each country and t for each measure of time in years). The tax ratio was then expressed as a function of ODA type (ODA_GRANTS, ODA_LOANS), including its non-linear effect [$(ODA\_GRANTS)^2$, $(ODA\_LOANS)^2$].

Other control variables were included in the econometric model in order to explain tax effort. GDP per capita was used as an indicator for level of economic development. Share of agriculture, share of industry and trade openness—measured as the sum of exports and imports as a share of GDP—were included as well. A higher GDP per capita is expected to have a positive relationship with tax effort, as higher levels of income or economic development would naturally lead to higher levels of tax collected. Agriculture share is estimated to have a negative relationship,

as many governments show a tendency to avoid taxing the agricultural sector. The opposite is true for industries, and thus a positive relationship is expected for industry share. Trade openness could both be positive or negative, depending on the balance between exports and imports and the levels of taxation on imports and reliance on trade taxes.

This study also includes governance indicator variables— *control of corruption*, *government effectiveness*, *political stability and absence of violence/terrorism*, *regulatory quality*, *rule of law*, and *voice and accountability* — as controls to the model. Improvements in the quality of governance is expected to have a positive impact on tax effort. Governance variables are labeled altogether in the model as GOV_{it}.

Also included in this model are ODA by sector variables and regional interaction variables to check for regional heterogeneity. OECD categorizes ODA into 8 main sectors: s*ocial infrastructure & services*, e*conomic infrastructure & services*, p*roduction sectors*, *multisector*, *program assistance*, *action related to debt*, *humanitarian aid* and *unspecified*. ODA by sector variables are labeled altogether in the model as $SECTOR_{it}$. Regional interaction variables are labeled altogether in the model as INT_{it}.

The empirical model for this study is as follows:

$$\left[\frac{TAX}{GDP}\right]_{it} = \beta_0 + \beta_1 \cdot ODA_{GRANTS_{it}} + \beta_2 \cdot ODA_{LOANS_{it}} + \beta_3 \cdot (ODA_{GRANTS})^2 + \beta_4 \cdot (ODA_{LOANS})^2 + \beta_5 \cdot AGRI_{it} + \beta_6 \cdot INDUS_{it} + \beta_7 \cdot GDPPC_{it} + \beta_8 \cdot OPEN_{it} + \beta_9 \cdot GOV_{it} + \beta_{10} \cdot INT_{it} + \alpha_i \cdot + \mu_t \cdot + \varepsilon_{it}$$

$$\left[\frac{TAX}{GDP}\right]_{it} = \beta_0 + \beta_1 \cdot SECTOR_{it} + \beta_2 \cdot AGRI_{it} + \beta_3 \cdot INDUS_{it} + \beta_4 \cdot GDPPC_{it} + \beta_5 \cdot OPEN_{it} + \beta_6 \cdot GOV_{it} + \beta_7 \cdot INT_{it} + \beta_8 \cdot INT_{it} + \alpha_i \cdot + \mu_t \cdot + \varepsilon_{it}$$

3. Data

3-1. Replication of Benedek et al. (2012)

This study starts by replicating the results from Benedek et al. (2012), which covered 118 countries[3] over the period of 1980-2009. Data on tax revenue was carefully constructed based on IMF country reports and the IMF Government Financial Statistics (GFS) database. ODA data was taken from the Organization for Economic Cooperation and Development (OECD), and data for control variables such as *GDP per capita*, *share of agriculture value added* and *share of industry value added* was taken from the World Development Indicators of the World Bank. Further details on the sources of data can be found in the Appendix.

The replication results of Benedek et al. (2012) can be found in table 2 & 3, where columns (1) and (4) from the paper were replicated. The results show that the dataset used in this study produced almost the exact same results as Benedek et al. (2012)'s paper, except for a difference in coefficients for GDP per capita. The coefficients in the replication differ slightly from that in the original paper. Total ODA has a smaller negative coefficient, a decrease of about -0.0016 than what was reported by Benedek et al. Overall, the significance levels of the coefficients remain the same.

[3] The list of 118 countries in the sample excludes countries that are classified as "High Income" countries

Table 2. Benedek et al. (2012)

	Model 1			Model 2		
	(1)	(2)	(3)	(4)	(5)	(6)
	Fixed Effects	Difference GMM 1/	System GMM 2/	Fixed Effects	Difference GMM 1/	System GMM 2/
Tax, lagged		-0.0589	0.5882***		0.1248	0.6655***
		(0.02804)	(0.0862)		(0.1476)	(0.0672)
Total ODA	-0.0066*	-0.0216*	-0.0117*			
	(0.0039)	(0.0115)	(0.0071)			
Total ODA, squared	0.0001	0.0002*	0.0001			
	(0.0001)	(0.0001)	(0.0001)			
ODA Loans				0.0001	0.0049	0.0142
				(0.0040)	(0.0108)	(0.0176)
ODA Loans, squared				-0.0000	-0.0018*	-0.0011
				(0.0002)	(0.0009)	(0.0010)
ODA Grants				-0.0055*	-0.0203***	-0.0151***
				(0.0032)	(0.0067)	(0.0010)
ODA Grants, squared				0.0000	0.0002***	0.0002**
				(0.0000)	(0.0001)	(0.0001)
Agriculture share in Value-Added	-0.0080***	-0.0028	-0.0173**	-0.0026	-0.0057	-0.0112
	(0.0015)	(0.0153)	(0.0080)	(0.0028)	(0.0084)	(0.0112)
Industry share in Value-Added	0.0003	-0.0134	-0.0256	0.0002	0.0045	-0.0067
	(0.0028)	(0.0161)	(0.0184)	(0.0002)	(0.0097)	(0.0136)
GDP Per Capita (log)	0.3037***	-0.0052	-0.1552	0.3050***	0.0466	-0.1283
	(0.1222)	(0.5752)	(0.1413)	(0.1222)	(0.3592)	(0.1515)
Trade Openness	-0.0020**	-0.0073*	-0.0045	-0.0019**	-0.0053**	-0.0065**
	(0.0009)	(0.0043)	(0.0030)	(0.0009)	(0.0022)	(0.0032)
Constant	-0.6849***			-0.6997***		
	(0.1661)			(0.1662)		
M1 (p value)		0.782	0.028		0.105	0.012
M2 (p value)		0.254	0.793		0.327	0.772
Over-identification		Hansen:	Hansen:		Hansen:	Hansen:
(p value)		0.82	0.71		0.87	0.60
Observations	2589	2363	2376	2589	2363	2376
Number of instruments		54	57		81	84
Number of countries	118	116	117	118	116	117

Note: Dependent variable is total tax revenue to GDP. Control variables include the share of agriculture in value-added, share of industry in value-added, GDP per capita and trade openness. Full set of year dummies in all regressions. Robust standard errors, in parenthesis; ***(**,*) indicate significance at 1(5, 10) percent.

1/ Two step, robust, instruments based on second lags of tax and ODA.

2/ Two step, robust, with instruments based on first lag of differences in tax and ODA in levels equation, and second lags of their levels in the differenced equation.

Table 3. Author's Replication of Column (1) & (4)

Tax Revenue/GDP (log)	(1)	(4)
Total ODA (% of GDP)	-0.005**	
	(0.05)	
Total ODA, squared	0.000	
	(0.25)	
ODA Loans (% of GDP)		0.010**
		(0.04)
ODA Loans, squared		0.001**
		(0.03)
ODA Grants (% of GDP)		-0.005**
		(0.02)
ODA Grants, squared		0.000
		(0.70)
Agriculture, Value Added (% of GDP)	-0.009***	-0.010***
	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.001	0.001
	(0.27)	(0.29)
GDP per capita	0.000***	0.000***
	(0.01)	(0.01)
Trade Openness (Export+Import)/GDP	-0.002***	-0.002***
	(0.00)	(0.00)
Constant	2.855***	2.860***
	(0.00)	(0.00)
Observations	2535	2535
R-sq	0.048	0.053

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

After being able to replicate similar outcomes, the next process involved expanding the dataset to cover the years 1980-2019, as well as adding additional governance variables, interaction variables of ODA by region, and ODA by sector

variables. Given that many studies on tax revenue commonly cite the issue of having 'holes' in the dataset due to missing data, the same difficulties remained in replicating the exact dataset used by Benedek et al. (2012)—as they used IMF Country Reports and other sources to complete their tax dataset—but also in expanding the dataset to 2019. Since extending the current tax data was difficult, an alternative source of tax revenue from the World Bank was used, as data from the World Bank on tax covered the years 1980 to 2019. The results proved similar to that obtained by Benedek et al. (2012) as well as the replication, allowing for research to be extended to 2019. The comparison of results based on different tax data can be found in table 4.

While the coefficient for ODA does change from negative to positive, the coefficients and significance values of the other variables remain largely the same. The change in coefficient for ODA could be explained by the large decrease in numbers of observations, which signifies that the change in coefficient from negative to positive was most likely a result of 'filled in' tax data that was originally missing from the official tax database.

Nonetheless, while the change in coefficient may mean that tax data from the World Bank is an incompatible substitute for tax data specific to this model, such results do not drastically differ from that found in previous literature. Since the coefficients and significance levels remain largely the same as with the original paper and its replication, this study then proceeds to expand the data with this new model that utilizes tax data from the World Bank.

Table 4. Comparison of Tax Revenue Data (1980-2009)

	Original		Replication		WB Tax Revenue	
Tax Revenue/GDP (log)	(1)	(2)	(1')	(2')	(1'')	(2'')
Total ODA (% of GDP)	-0.0066*		-0.005**		0.007	
	(0.0039)		(0.05)		(0.36)	
Total ODA, squared	0.0001		0.000		-0.001*	
	(0.0001)		(0.25)		(0.07)	
ODA Loans (% of GDP)		0.0001		0.010**		-0.011*
		(0.0040)		(0.04)		(0.09)
ODA Loans, squared		-0.0000**		0.001**		-0.000
		(0.0002)		(0.03)		(0.89)
ODA Grants (% of GDP)		-0.0055*		-0.005**		0.009
		(0.0032)		(0.02)		(0.28)
ODA Grants, squared		0.0000		0.000		-0.001
		(0.0000)		(0.70)		(0.13)
Agriculture, Value Added (% of GDP)	-0.0080***	-0.0026	-0.009***	-0.010***	-0.007***	-0.008***
	(0.0015)	(0.0028)	(0.00)	(0.00)	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.0003	0.0002	0.001	0.001	0.003*	0.004**
	(0.0028)	(0.0002)	(0.27)	(0.29)	(0.07)	(0.05)
GDP per capita	0.3037***	0.3050***	0.000***	0.000***	0.000***	0.000***
	(0.1222)	(0.1222)	(0.01)	(0.01)	(0.00)	(0.00)
Trade Openness (Export+Import)/GDP	-0.0020**	-0.0019**	-0.002***	-0.002***	-0.005***	-0.004***
	(0.0009)	(0.0009)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	-0.6849***	-0.6997***	2.855***	2.860***	2.401***	2.405***
	(0.1661)	(0.1662)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	2589	2589	2535	2535	896	874
R-sq			0.048	0.053	0.158	0.159
terms in parenthesis:	(standard error)		(p-values)		(p-values)	

* p<0.10 ** p<0.05 *** p<0.010

3-2. Summary Statistics

Out of 126 countries in the sample for the period between 1980 and 2019, the average ratio of total tax revenue to GDP is about 15.46%. The average total ODA for the 126 non-high income countries is about 3.83% of GDP, which is further divided into 0.20% and 3.64% of GDP for ODA loans and grants, respectively. We can easily observe that grants constitute a significantly higher share of ODA that is provided to the recipient countries. Agriculture has an average share of 18.61%, while industry has an average share of 25.97%, relative to GDP. Average GDP per capita is about 7646 Dollars, measured in constant 2017 international Dollars. Lastly, trade openness has an average of -9.01%, meaning that countries in the sample import more than they export, relative to GDP. Further details can be found in table 5 below:

Table 5. Descriptive Statistics (1980-2019)

Variables	Observations	Mean	Minimum	Maximum	Std. Dev.
Total Tax Revenue (% of GDP)	2097	15.46	2.00	39.26	5.84
Total ODA (% of GDP)	4571	3.83	-2.22	59.18	5.50
ODA Loans (% of GDP)	4323	0.20	-17.52	25.37	1.16
ODA Grants (% of GDP)	4567	3.64	0.00	67.92	5.39
Agriculture, Value Added (% of GDP)	4372	18.61	0.91	79.04	12.75
Industry, Value Added (% of GDP)	4350	25.97	0.96	87.80	10.79
GDP per capita (constant 2017 international $)	3541	7646.41	420.16	37182.83	6202.04
Trade Openness (% of GDP)	4206	-9.01	-252.57	132.24	17.05

In addition to the default variables used in Benedek et al. (2012), governance indicator variables from the World Bank were added to the model. Measures of governance comprise of six different categories set by the World Bank:

control of corruption, *government effectiveness*, *political stability*, *regulatory quality*, *rule of law*, and *voice and accountability*. Each country is scored between -2.5 and 2.5, with a higher score resulting in higher/stronger governance/institutional quality. Summary statistics for governance indicator variables can be found in table 6 below:

Table 6. Descriptive Statistics, Governance Indicators (1996-2019)

Variables	Observations	Mean	Minimum	Maximum	Std. Dev.
Control of Corruption	2641	-0.46	-1.72	1.65	0.64
Government Effectiveness	2638	-0.45	-2.28	1.34	0.62
Political Stability	2634	-0.37	-2.99	1.42	0.87
Regulatory Quality	2639	-0.42	-2.63	1.54	0.66
Rule of Law	2646	-0.48	-2.32	1.43	0.66
Voice and Accountability	2646	-0.35	-2.23	1.29	0.79

Regional dummy variables were also included in the analysis. Guidelines for regions were taken from the World Bank country classification list, which divided countries into 7 country groups. Countries in the sample were only located in 6[4] of the 7 regions, which are *East Asia and Pacific*, *Europe and Central Asia*, *Latin America and the Caribbean*, *Middle East and North Africa*, *South Asia*, and *Sub-Saharan Africa*. The specific list of countries by region are listed in the Appendix.

Finally, ODA was further decomposed by sectors. While many sub-sectors did exist, this study focused only on the 8 major sectors, which are s*ocial infrastructure & services*, e*conomic infrastructure & services*, p*roduction sectors*, *multisector*, *program assistance*, *action related to debt*, *humanitarian aid* and

[4] All regions except North America were included in the analysis. According to the World Bank, the region 'North America' consists of 3 countries: Bermuda, Canada, United States.

unspecified. Data on ODA sectors was taken from the OECD database. A summary of ODA by sector (as a % of GDP) variables can be found in table 7.

Table 7. Descriptive Statistics, ODA by Sector (2006-2019)

Variables (% of GDP)	Observations	Mean	Minimum	Maximum	Std. Dev.
Social Infrastructure & Services	1824	1.50	0.00	37.14	2.84
Economic Infrastructure & Services	1803	0.46	0.00	29.12	1.37
Production Sectors	1822	0.23	0.00	9.21	0.50
Multisector	1823	0.24	0.00	8.70	0.56
Program Assistance	1353	0.30	0.00	8.74	0.75
Action Related to Debt	936	0.39	0.00	42.25	2.02
Humanitarian Aid	1719	0.35	0.00	18.09	1.22
Unspecified	1799	0.06	0.00	2.32	0.13

3-3. Comparison of Tax Revenue and ODA Trends

In order to understand the trend of ODA in relation to tax, the averages for the time period 1980-2009 are represented in figure 1 & 2. When comparing total ODA to total tax revenue, we find that overall, ODA and tax seems to move in opposite directions. Though ODA levels initially increased in the 1980s, they start to steadily decline around 1994, while tax revenue levels show a steady increase over the years.

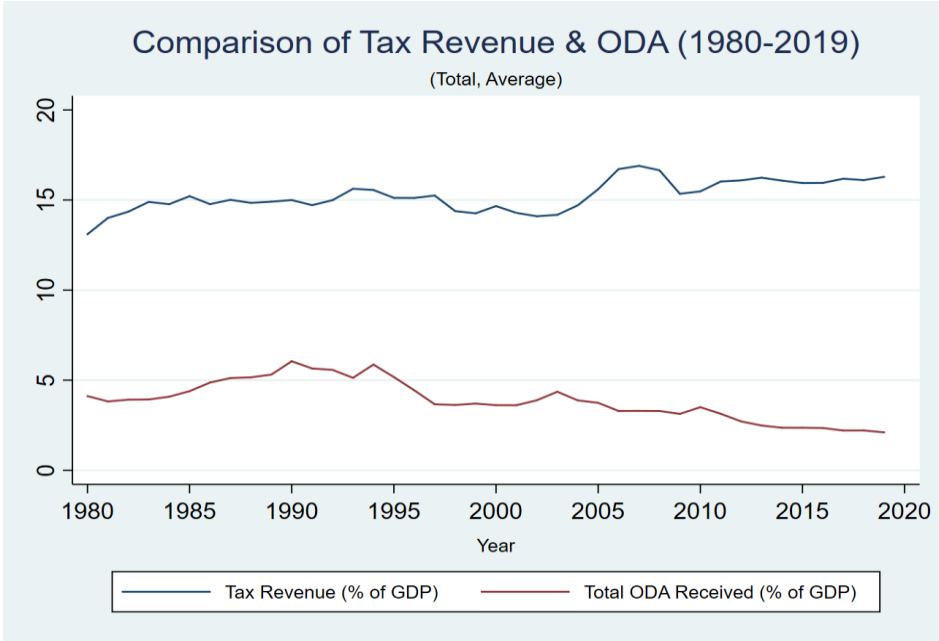

Figure 1. Comparison of Tax Revenue & ODA

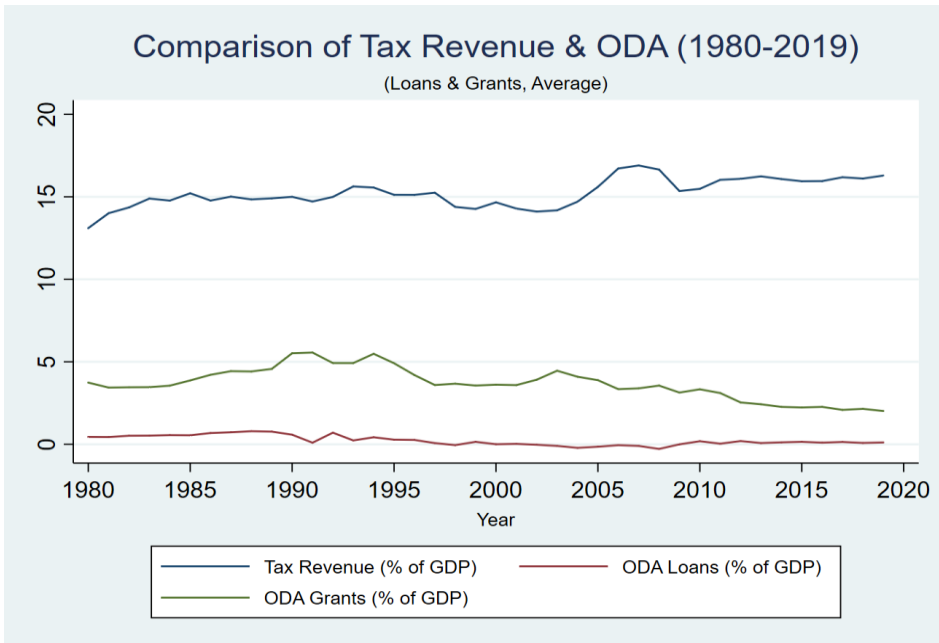

Figure 2. Comparison of Tax Revenue & Loans/Grants

When ODA is broken down into its two main components of grants and loans, we can observe that while the trend in loans does not fluctuate significantly and remains mostly the same, the changes in grants also are inversely proportional to that of tax revenue, as was the case with total ODA. Just from observing the overall trend between ODA and tax revenue, the findings of Benedek et al. (2012) are supported in that total ODA, and especially grants, has a negative impact on tax revenue.

IV. Results

1. Regression Analysis with Governance Indicators

Once the replication was successfully done, governance indicators were added to the model to achieve two purposes. The first is to observe a relatively more 'pure' effect of ODA on tax effort, given that previous literature frequently cite governance issues as a fundamental barrier to accurate evaluation of tax effort. By controlling for governance variables, a more accurate evaluation of the relationship between ODA and tax effort is expected. The second purpose is to simultaneously include governance interaction variables in order to determine if specific governance factors influence the relationship between ODA and tax effort. Such findings could prove useful in allowing policy makers to targeting specific governance factors that influence and enhance tax effort. Since data for governance variables start from 1996, the analysis covers the time period from 1996-2019.

When governance control variables and their corresponding interaction variables were added individually, we find that *political stability* and *regulatory quality* have a significant impact on tax effort, as well as significant interaction with ODA (table 8, column 4 & 5). However, when all governance indicators are combined in the analysis we find that *rule of law* in interaction with ODA has a significant impact. Noting that ODA itself loses significance, we find that only ODA given in relation with *rule of law* has a significant impact on the tax effort of countries. Though the interaction of ODA and *control of corruption* did not turn out significant, the control variable for *control of corruption* is found to be significant which aligns with previous literature that argue for enhanced levels of governance in order to enhance tax effort.

We also find that compared to the original research done by Benedek et al. (2012)—which found that total ODA had a negative impact, loans were largely insignificant and grants had a negative impact on tax effort—loans show a negative and significant effect on tax effort, regardless of whether governance indicators are accounted for or not (table 8, column 9 & 16).

For other control variables, *agriculture value added* remains statistically significant as was the case with the baseline model, while maintaining a negative coefficient. This falls in line with previous literature that found that countries will tend to avoid taxing the agricultural sector and instead provide subsidies, which goes against efforts to tax (Gaspar et al. 2016; Yohou et al. 2016). In contrast, a higher increase in *industry value added* will mostly lead to an increase in tax. *GDP per capita* also proved positive and statistically significant, indicating that an increase in either the economy or individual income levels leads to greater collection in taxes relative to GDP. While *trade openness* could be either positive or negative, our study finds that *trade openness* is negative in its impact on tax effort of developing countries.

Another interesting find is that before governance indicators are included in the analysis, the size of impact of grants versus loans is similar (-0.012 versus -0.015). However, with the inclusion of governance variables, the ratio of impact of grants versus loans on tax effort changes, where loans(-0.022) has twice the greater impact than that of grants(-0.009).

Table 8. Net ODA Grants/Loans & Tax Revenue, with Governance Indicators (1996-2019)

Tax Revenue/GDP (log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
ODA Total (% of GDP)	-0.011**	-0.014**	-0.012**	-0.013**	-0.015***	-0.008	-0.010*	-0.007								
	(0.02)	(0.01)	(0.04)	(0.02)	(0.01)	(0.15)	(0.07)	(0.27)								
ODA Total, squared	-0.000	-0.000	0.000	-0.000	0.000	-0.000	-0.000	0.000								
	(0.35)	(0.82)	(0.60)	(0.45)	(0.26)	(0.63)	(0.40)	(0.78)								
ODA Loans (% of GDP)									-0.015**	-0.030***	-0.024***	-0.031***	-0.024***	-0.025***	-0.030***	-0.022**
									(0.03)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
ODA Loans, squared									0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001
									(0.34)	(0.62)	(0.58)	(0.42)	(0.58)	(0.78)	(0.66)	(0.61)
ODA Grants (% of GDP)									-0.012*	-0.014*	-0.011	-0.017**	-0.013*	-0.013*	-0.013*	-0.009
									(0.07)	(0.06)	(0.14)	(0.02)	(0.09)	(0.09)	(0.08)	(0.25)
ODA Grants, squared									-0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
									(0.62)	(0.83)	(0.49)	(0.82)	(0.54)	(0.42)	(1.00)	(0.37)
Agriculture, Value Added (% of GDP)	-0.009***	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***	-0.010***	-0.012***	-0.012***	-0.013***	-0.013***	-0.013***	-0.012***	-0.013***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.003**	0.003**	0.003**	0.003**	0.004**	0.003**	0.003**	0.003*	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003**	0.003*
	(0.04)	(0.03)	(0.03)	(0.04)	(0.02)	(0.02)	(0.04)	(0.05)	(0.03)	(0.03)	(0.04)	(0.05)	(0.03)	(0.03)	(0.04)	(0.07)
GDP per capita	0.000***	0.000**	0.000***	0.000***	0.000***	0.000***	0.000**	0.000***	0.000***	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**
	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.04)	(0.01)	(0.03)	(0.01)	(0.03)	(0.04)	(0.01)
Trade Openness (Export+Import)/GDP	-0.005***	-0.004***	-0.005***	-0.004***	-0.005***	-0.004***	-0.004***	-0.004***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Control of Corruption		0.029						0.097***		0.017						0.093**
		(0.24)						(0.01)		(0.50)						(0.01)
Government Effectiveness			-0.029					-0.041			-0.040					-0.045
			(0.26)					(0.28)			(0.13)					(0.25)
Political Stability				-0.024*				-0.005				-0.029**				-0.005
				(0.09)				(0.77)				(0.04)				(0.76)
Regulatory Quality					-0.043*			-0.035					-0.047*			-0.031
					(0.07)			(0.29)					(0.05)			(0.35)
Rule of Law						-0.025		-0.037						-0.032		-0.048
						(0.33)		(0.36)						(0.24)		(0.28)
Voice & Accountability							-0.011	-0.000							-0.017	0.005
							(0.64)	(1.00)							(0.47)	(0.87)
ODA*Control of Corruption		0.008**						-0.011		0.011**						-0.013
		(0.04)						(0.17)		(0.01)						(0.17)
ODA*Government Effectiveness			0.012***					0.011			0.015***					0.009
			(0.00)					(0.27)			(0.00)					(0.44)
ODA*Political Stability				0.005**				-0.006				0.007**				-0.008
				(0.05)				(0.16)				(0.02)				(0.11)
ODA*Regulatory Quality					0.012***			-0.002					0.015***			-0.006
					(0.01)			(0.78)					(0.01)			(0.51)
ODA*Rule of Law						0.013***		0.021**						0.016***		0.036***
						(0.00)		(0.01)						(0.00)		(0.00)
ODA*Voice & Accountability							0.010***	0.001							0.010**	-0.003
							(0.01)	(0.87)							(0.02)	(0.69)
Constant	2.626***	2.693***	2.670***	2.683***	2.670***	2.672***	2.683***	2.687***	2.623***	2.691***	2.671***	2.693***	2.670***	2.678***	2.692***	2.688***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1613	1267	1266	1268	1266	1268	1268	1266	1570	1237	1236	1238	1236	1238	1238	1236
R-sq	0.174	0.176	0.176	0.174	0.175	0.180	0.175	0.189	0.158	0.174	0.176	0.173	0.174	0.179	0.172	0.189

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

2. Regression Analysis by ODA Sector

Having found that ODA has a significant impact on tax effort as found in column (1) of table 8, ODA is then broken down into sectors to determine if the

significant impact of ODA is due to one or more specific sectors. As shown in table 9, individual sectors are included independently (columns 2-9), after which the final model in column (10) controls for all sectors. When added individually, we find that *social infrastructure(-0.012**)*, *production sectors(-0.039**)*, *program assistance(-0.033**)* and *humanitarian assistance(-0.043***)* have a significant impact on the tax effort of countries. However, when all the sectors are combined and controlled, only *humanitarian assistance(-0.042***)* remains significant.

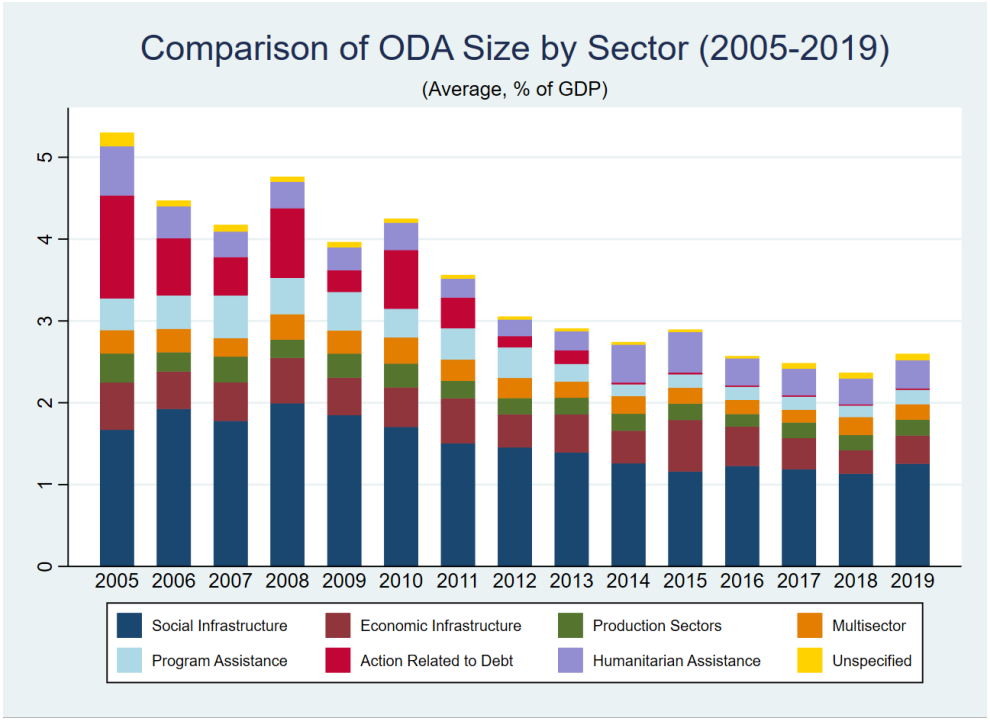

Figure 3. Comparison of ODA Sector Size

When looking at the overall distribution of ODA by sector (figure 3), we find that ODA given for *social infrastructure* is the greatest in size. *Social infrastructure* and *economic infrastructure* account for more than 50% of ODA.

Though *humanitarian assistance* does not cover a significant portion of ODA compared to other sectors, it nonetheless has been consistent in size over the years. The impact of humanitarian assistance ODA on tax effort therefore is not negligible.

Table 9. Net ODA Grants/Loans & Tax Revenue, with ODA by Sectors (2006-2019)

Tax Revenue/GDP (log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Agriculture, Value Added (% of GDP)	-0.009*** (0.00)	-0.005** (0.04)	-0.005** (0.03)	-0.005** (0.03)	-0.005** (0.03)	-0.006* (0.05)	-0.001 (0.66)	-0.008*** (0.00)	-0.006** (0.02)	-0.005 (0.15)
Industry, Value Added (% of GDP)	0.003** (0.04)	0.005*** (0.00)	0.005*** (0.00)	0.005*** (0.00)	0.005*** (0.00)	0.004* (0.07)	0.003 (0.17)	0.003** (0.05)	0.005*** (0.01)	0.000 (0.92)
GDP per capita	0.000*** (0.00)	-0.000 (0.62)	-0.000 (0.75)	-0.000 (0.67)	-0.000 (0.71)	0.000 (0.95)	0.000 (0.59)	-0.000* (0.07)	-0.000 (0.64)	-0.000 (0.20)
Trade Openness (Export+Import)/GDP	-0.005*** (0.00)	-0.005*** (0.00)	-0.005*** (0.00)	-0.005*** (0.00)	-0.005*** (0.00)	-0.005*** (0.00)	-0.007*** (0.00)	-0.005*** (0.00)	-0.005*** (0.00)	-0.008*** (0.00)
Total ODA (% of GDP)	-0.011** (0.02)									
Total ODA, squared	-0.000 (0.35)									
Social Infrastructure (% of GDP)		-0.012** (0.01)								-0.002 (0.75)
Economic Infrastructure (% of GDP)			-0.002 (0.60)							0.002 (0.86)
Production Sectors (% of GDP)				-0.039** (0.03)						-0.016 (0.59)
Multisector (% of GDP)					-0.021 (0.23)					-0.003 (0.95)
Program Assistance (% of GDP)						-0.033** (0.01)				-0.017 (0.29)
Action Related to Debt (% of GDP)							-0.003 (0.47)			0.000 (0.96)
Humanitarian Assistance (% of GDP)								-0.043*** (0.00)		-0.042*** (0.00)
Unspecified (% of GDP)									-0.065 (0.31)	-0.093 (0.27)
Constant	2.626*** (0.00)	2.611*** (0.00)	2.593*** (0.00)	2.608*** (0.00)	2.606*** (0.00)	2.593*** (0.00)	2.502*** (0.00)	2.727*** (0.00)	2.616*** (0.00)	2.712*** (0.00)
Observations	1613	1000	996	1000	1000	762	517	966	993	430
R-sq	0.174	0.067	0.061	0.066	0.062	0.067	0.081	0.084	0.063	0.158

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

3. Regression Analysis of Heterogeneity Across Regions

The next analysis is designed to understand the differing impact of ODA across regions. Using the classification of regions as outlined by the World Bank, countries are divided into 6 regions: *Europe & Central Asia*, *East Asia & Pacific*,

South Asia, *Latin America*, *Middle East & North Africa* and *Sub-Saharan Africa*. The specific list of countries by region can be found in the Appendix. As can be seen in table 10, the analysis for heterogeneity across regions is done for two separate time periods—the original dataset (1980-2009) and extended dataset (1980-2019)—to further explore if there are any significant changes between the two time periods.

Regarding the original dataset (1980-2009), when regional interaction terms are included in the model individually, we find a positive significance for *South Asia(0.015*), Latin America(0.012*)*, *Middle East & North Africa(0.029***)* and *Sub-Saharan Africa(0.007**)* regions. *East Asia & Pacific* region has a negative significant coefficient*(-0.015***)* yet the ODA terms do not turn out significant (table 10, column 3). When all the regional terms are combined together (column 8), none of the regional interaction terms and ODA turn out significant.

However, when analyzing the extended dataset for 1980-2019, not only does ODA turn out significant, but various regions also turn out significant in terms of their interaction with ODA (column 8′). While total ODA turns out to have a negative impact on the tax effort of developing countries, ODA given to *East Asia & Pacific(0.029**)*, *Middle East & North Africa(0.059***)* and *Sub-Saharan Africa(0.035***)* regions have a positive impact on countries' tax effort, leaving only *Middle East & North Africa* region as having an *overall* positive impact of ODA on tax effort*(0.023)*. What this shows is that ODA has a negative impact—be it great or small—on countries tax effort for most of the regions *except* for countries in the Middle East and North African region.

Table 10. Net ODA & Tax Revenue, Heterogeneity Across Regions (1980-2019)

	Original Dataset (1980-2009)								Extended Dataset (1980-2019)							
Tax Revenue/GDP (log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(1)'	(2)'	(3)'	(4)'	(5)'	(6)'	(7)'	(8)'
Total ODA (% of GDP)	-0.005**	-0.005*	-0.002	-0.006**	-0.006**	-0.006***	-0.009***	-0.001	-0.011**	-0.008*	-0.011**	-0.011**	-0.005	-0.017***	-0.022***	-0.036***
	(0.05)	(0.06)	(0.35)	(0.02)	(0.01)	(0.01)	(0.00)	(0.95)	(0.02)	(0.10)	(0.04)	(0.03)	(0.37)	(0.00)	(0.00)	(0.00)
Total ODA, squared	0.000	0.000	0.000*	0.000	0.000	0.000	0.000	0.000***	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.25)	(0.30)	(0.06)	(0.17)	(0.12)	(0.11)	(0.35)	(0.01)	(0.35)	(0.15)	(0.18)	(0.63)	(0.12)	(0.80)	(0.90)	(0.49)
Agriculture, Value Added (% of GDP)	-0.009***	-0.009***	-0.009***	-0.010***	-0.010***	-0.009***	-0.009***	-0.010***	-0.009***	-0.009***	-0.009***	-0.009***	-0.010***	-0.009***	-0.009***	-0.009***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003**	0.003**	0.003**	0.002*	0.003**	0.003**	0.002	0.002*
	(0.27)	(0.26)	(0.42)	(0.28)	(0.34)	(0.30)	(0.28)	(0.49)	(0.04)	(0.04)	(0.05)	(0.07)	(0.04)	(0.02)	(0.12)	(0.08)
GDP per capita	0.000***	0.000**	0.000***	0.000**	0.000***	0.000**	0.000**	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Trade Openness (Export+Import)/GDP	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ODA*Europe & Central Asia		-0.012						-0.015		-0.051***						-0.025
		(0.41)						(0.50)		(0.00)						(0.16)
ODA*East Asia & Pacific			-0.015***					-0.019			0.009					0.029**
			(0.00)					(0.31)			(0.22)					(0.02)
ODA*South Asia				0.015*				0.010				-0.013**				0.013
				(0.10)				(0.63)				(0.02)				(0.29)
ODA*Latin America					0.012*			0.007					-0.026***			0.002
					(0.06)			(0.73)					(0.00)			(0.86)
ODA*Middle East & North Africa						0.029***		0.023						0.040***		0.059***
						(0.00)		(0.24)						(0.00)		(0.00)
ODA*Sub-Saharan Africa							0.007**	-0.005							0.019***	0.035***
							(0.01)	(0.79)							(0.00)	(0.00)
Constant	2.855***	2.854***	2.868***	2.858***	2.860***	2.859***	2.856***	2.876***	2.626***	2.635***	2.625***	2.632***	2.626***	2.602***	2.657***	2.644***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	2535	2535	2535	2535	2535	2535	2535	2535	1613	1613	1613	1613	1613	1613	1613	1613
R-sq	0.048	0.048	0.058	0.049	0.049	0.052	0.050	0.064	0.174	0.181	0.175	0.177	0.182	0.185	0.181	0.206

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

4. Comprehensive Analysis of Tax Revenue & ODA

The final model of analysis includes governance factors, ODA sector variables, and regional interaction variables. Since previous models of analysis show that among the governance interaction variables with ODA only *rule of law* had a significant impact, the interaction term for *rule of law* is included in the model. Regional interaction variables are also included in the model for analysis. Table 11 shows the analysis of total ODA, which is then divided into loans and grants. Table 12 shows the analysis of ODA used for *humanitarian assistance*, which is the only ODA sector that has a significant impact on tax effort.

As can be found in table 11, control variables for *agriculture value added*, *industry value added*, *GDP per capita* and *trade openness* show the same results as those found in previous literature—agriculture has a negative impact, industry has a positive impact, higher GDP per capita leads to greater tax effort, and though trade openness could be both positive or negative, trade openness in this model turns out negative. The governance variable *rule of law* as well as its interaction term with ODA are included in the model, and only its interaction with ODA has a positive impact on tax effort. This shows that ODA given to countries with enhanced rule of law will yield a greater tax effort.

ODA does not turn out significant except for when individual regional interaction terms for *Middle East & North Africa* and *Sub-Saharan Africa* are added to the model, as shown in columns (6) and (7). Though the individual regional interaction terms for *Europe & Central Asia*, *East Asia & Pacific*, *South Asia* and *Latin America* turn out to significant affect tax effort, the overall effect of total ODA is indeterminate. The final model that combines all regional interaction terms leaves only ODA given to the Europe and Central Asia region as having a significant impact

on ODA—and a much more negative impact compared to other regions.

When ODA is disaggregated into loans and grants, we find overall the same results as that with total ODA—loans and grants are largely insignificant for the comprehensive model (column 16), the positivity or negativity of coefficients for *agriculture value added*, *industry value added*, *GDP per capita* and *trade openness* remain largely the same, and the interaction term for ODA and the governance variable *rule of law* remains positive and significant. While ODA given to the *Europe and Central Asia* region remains negative and significant, we also find that ODA given to the *South Asia* region is negative, though to a lesser degree of significance.

In table 12, the same comprehensive analysis was done specifically for ODA given as *humanitarian assistance*. Unlike total ODA, grants or loans, *humanitarian assistance* turns out significant, though maintaining a negative coefficient in its impact on tax effort. The results for control variables remain largely the same, except that *GDP per capita* turns out negative. Another finding that differs from table 10 is that for *humanitarian assistance*, ODA given to *East Asia & Pacific*, *South Asia* and *Latin America* regions have a greater negative impact on tax effort than ODA given to other regions. The negative impact is greatest for the *South Asia* region.

For both table 11 and 12, the models that contain all regional interaction terms show that Europe, Asia, and Latin America regions have a greater negative impact on tax effort when coupled with ODA, whereas individually, the Middle East and North Africa and Sub-Saharan Africa regions actually have a greater positive impact of ODA on tax effort than other regions.

Table 11. Net ODA Grants/Loans & Tax Revenue, Full Model I (2006-2019)

Tax Revenue/GDP (log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
ODA Total (% of GDP)	-0.008	-0.005	-0.009	-0.004	-0.005	-0.011*	-0.023***	-0.011								
	(0.15)	(0.37)	(0.12)	(0.49)	(0.38)	(0.07)	(0.00)	(0.40)								
ODA Total, squared	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000								
	(0.63)	(0.37)	(0.72)	(0.47)	(0.54)	(0.83)	(0.76)	(0.87)								
ODA Loans (% of GDP)									-0.025***	-0.024***	-0.022***	-0.022***	-0.024***	-0.027***	-0.037***	-0.022
									(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.13)
ODA Loans, squared									0.000	0.000	0.000	0.000	0.000	0.001	-0.000	-0.000
									(0.78)	(0.77)	(0.91)	(0.95)	(0.78)	(0.68)	(0.71)	(0.74)
ODA Grants (% of GDP)									-0.013*	-0.008	-0.010	-0.009	-0.010	-0.015**	-0.026***	-0.008
									(0.09)	(0.26)	(0.18)	(0.24)	(0.17)	(0.04)	(0.00)	(0.62)
ODA Grants, squared									0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000
									(0.42)	(0.76)	(0.40)	(0.48)	(0.27)	(0.36)	(0.29)	(0.53)
Agriculture, Value Added (% of GDP)	-0.012***	-0.012***	-0.012***	-0.012***	-0.013***	-0.012***	-0.013***	-0.012***	-0.013***	-0.012***	-0.012***	-0.012***	-0.013***	-0.012***	-0.013***	-0.012***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.003**	0.004**	0.003**	0.003**	0.003**	0.004**	0.003*	0.003**	0.003**	0.004**	0.003**	0.003**	0.003**	0.004**	0.003*	0.003**
	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.01)	(0.07)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)	(0.02)	(0.08)	(0.03)
GDP per capita	0.000***	0.000**	0.000**	0.000**	0.000***	0.000***	0.000*	0.000*	0.000**	0.000*	0.000**	0.000**	0.000**	0.000**	0.000	0.000
	(0.01)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.06)	(0.09)	(0.03)	(0.07)	(0.03)	(0.03)	(0.03)	(0.02)	(0.12)	(0.16)
Trade Openness (Export+Import/GDP)	-0.004***	-0.005***	-0.005***	-0.004***	-0.005***	-0.005***	-0.004***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ODA*Rule of Law	0.013***	0.013***	0.015***	0.015***	0.013***	0.012***	0.015***	0.017***	0.016***	0.016***	0.018***	0.018***	0.018***	0.015***	0.019***	0.021***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Rule of Law	-0.025	-0.040	-0.024	-0.033	-0.023	-0.022	-0.031	-0.043	-0.032	-0.044	-0.029	-0.038	-0.031	-0.028	-0.038	-0.047*
	(0.33)	(0.13)	(0.36)	(0.21)	(0.38)	(0.40)	(0.23)	(0.11)	(0.24)	(0.11)	(0.29)	(0.16)	(0.25)	(0.30)	(0.17)	(0.09)
ODA*Europe & Central Asia		-0.047***						-0.043**		-0.044***						-0.045**
		(0.00)						(0.02)		(0.01)						(0.02)
ODA*East Asia & Pacific			-0.015*					-0.011			-0.016*					-0.018
			(0.09)					(0.43)			(0.09)					(0.27)
ODA*South Asia				-0.026***				-0.024				-0.028**				-0.032*
				(0.01)				(0.13)				(0.02)				(0.08)
ODA*Latin America					-0.013*			-0.009					-0.019**			-0.016
					(0.07)			(0.51)					(0.01)			(0.24)
ODA*Middle East & North Africa						0.027*		0.025						0.028*		0.020
						(0.09)		(0.22)						(0.08)		(0.34)
ODA*Sub-Saharan Africa							0.027***	0.016							0.027***	0.012
							(0.00)	(0.17)							(0.00)	(0.30)
Constant	2.672***	2.670***	2.678***	2.672***	2.672***	2.657***	2.717***	2.690***	2.678***	2.677***	2.679***	2.677***	2.680***	2.663***	2.719***	2.688***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1268	1268	1268	1268	1268	1268	1268	1268	1238	1238	1238	1238	1238	1238	1238	1238
R-sq	0.180	0.186	0.182	0.185	0.182	0.182	0.196	0.204	0.179	0.184	0.181	0.183	0.184	0.181	0.195	0.203

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

Table 12. Humanitarian Assistance ODA & Tax Revenue, Full Model II (2006-2019)

Tax Revenue/GDP (log)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Humanitarian Assistance (% of GDP)	-0.043***	-0.043***	-0.043***	-0.042***	-0.043***	-0.043***	-0.041***	-0.039***	-0.020**	-0.020**	-0.020**	-0.017*	-0.023**	-0.019*	-0.022**	-0.022**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.05)	(0.05)	(0.04)	(0.08)	(0.03)	(0.06)	(0.04)	(0.04)
Agriculture, Value Added (% of GDP)	-0.008***	-0.008***	-0.008***	-0.007***	-0.008***	-0.008***	-0.007***	-0.006***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.007***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Industry, Value Added (% of GDP)	0.003**	0.003**	0.003*	0.003*	0.003*	0.003**	0.004**	0.003*	0.003**	0.003**	0.003*	0.003*	0.003*	0.003*	0.004**	0.003*
	(0.05)	(0.05)	(0.06)	(0.05)	(0.06)	(0.05)	(0.03)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)	(0.07)
GDP per capita	-0.000*	-0.000*	-0.000*	-0.000**	-0.000**	-0.000*	-0.000*	-0.000***	-0.000	-0.000	-0.000*	-0.000**	-0.000*	-0.000*	-0.000	-0.000**
	(0.07)	(0.08)	(0.05)	(0.02)	(0.04)	(0.07)	(0.07)	(0.01)	(0.11)	(0.11)	(0.09)	(0.04)	(0.08)	(0.10)	(0.11)	(0.01)
Trade Openness (Export+Import)/GDP	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ODA*Rule of Law									0.014***	0.014***	0.014***	0.015***	0.013***	0.015***	0.013***	0.012***
									(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
Rule of Law									-0.065*	-0.065*	-0.064*	-0.067**	-0.058*	-0.065*	-0.061*	-0.053
									(0.05)	(0.05)	(0.05)	(0.04)	(0.08)	(0.05)	(0.07)	(0.12)
ODA*Europe & Central Asia		-0.000						-0.006		-0.000						-0.006
		(0.99)						(0.79)		(0.98)						(0.80)
ODA*East Asia & Pacific			-0.021**					-0.021**			-0.020**					-0.021**
			(0.03)					(0.02)			(0.03)					(0.02)
ODA*South Asia				-0.066***				-0.069***				-0.071***				-0.072***
				(0.00)				(0.00)				(0.00)				(0.00)
ODA*Latin America					-0.036***			-0.036***					-0.026**			-0.027**
					(0.00)			(0.00)					(0.04)			(0.03)
ODA*Middle East & North Africa						-0.005		-0.009						-0.014		-0.016
						(0.85)		(0.71)						(0.57)		(0.52)
ODA*Sub-Saharan Africa							-0.013***	-0.013***							-0.003	-0.005
							(0.00)	(0.00)							(0.53)	(0.36)
Constant	2.727***	2.728***	2.746***	2.747***	2.744***	2.729***	2.719***	2.781***	2.711***	2.711***	2.729***	2.731***	2.724***	2.716***	2.710***	2.772***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	966	966	966	966	966	966	966	966	966	966	966	966	966	966	966	966
R-sq	0.084	0.084	0.089	0.096	0.093	0.084	0.093	0.120	0.103	0.103	0.108	0.117	0.108	0.104	0.104	0.128

p-values in parentheses
* p<0.10 ** p<0.05 *** p<0.010

After considering the many possibilities, variations and combinations of factors that affect ODA and tax effort, and also considering the research questions and hypotheses raised in the beginning of this study, the following findings can be found:

(1) ODA, whether whole, grants or loans, remains largely negative in its impact to tax effort. This is different from the original findings by Benedek et al. (2012) which found no significant negative impact of loans on tax effort.

(2) Of the different ODA sectors, *humanitarian assistance* proved to have a negative and significant impact on the tax effort of countries. This could most likely be explained by the 'grant-like' characteristic of *humanitarian assistance* compared to other sectors such as social infrastructure ODA, which is largely characterized by loans rather than grants.

(3) Enhancing governance does positively impact tax effort, and when in interaction with ODA, only *rule of law* positively affects the tax effort of countries.

(4) Of the various regions, the Middle East and North Africa region and the Sub-Saharan Africa region show a relatively positive impact of ODA on tax effort compared to that of other regions.

V. Conclusion

1. Policy Implications

Based on the findings of this study, this paper contributes to literature by further uncovering a new aspect of ODA's relationship with tax in the development of countries. This study shows that governance indicators or political considerations are an essential aspect of tax effort—in this case, enhanced *rule of law* positively affects tax mobilization. Also, by adding regional interaction variables, this study is able to demonstrate the difference in impact of ODA on tax effort across regions. While ODA in general is shown to have a negative impact on tax effort, the situation is different for only the Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA) regions, which rather showed a positive overall impact of ODA on tax. Further analysis into the mechanisms of how ODA positively impacts tax for the MENA and SSA regions could provide important insight for policy makers to allow ODA to better suit tax systems in countries of other regions. This study also demonstrates that ODA may not always be simply 'bad' for tax. Not only is enhancing governance important, but also considering other factors that may contribute to allowing for ODA to positively impact, rather than hinder tax mobilization.

Another finding from this study shows that humanitarian assistance ODA has a strong negative impact on the tax effort of countries. Keeping in mind that MENA and SSA regions have the highest share of ODA in *humanitarian assistance* compared to other regions (figure 4), it seems that ODA should actually have an *overall negative impact* on tax effort. However, MENA and SSA regions present a unique case where humanitarian assistance aid alone is not the main factor that

affects tax effort. Rather, another observation that can be made is that both MENA and SSA regions also have the highest share of ODA given for program assistance. One possible explanation regarding the positive trend of ODA on tax effort could therefore be explained in various ODA programs that are implemented in these regions. Further research could be conducted to understand the positive dynamics of ODA in these regions in order to help adjust ODA for other regions to positively affect tax effort.

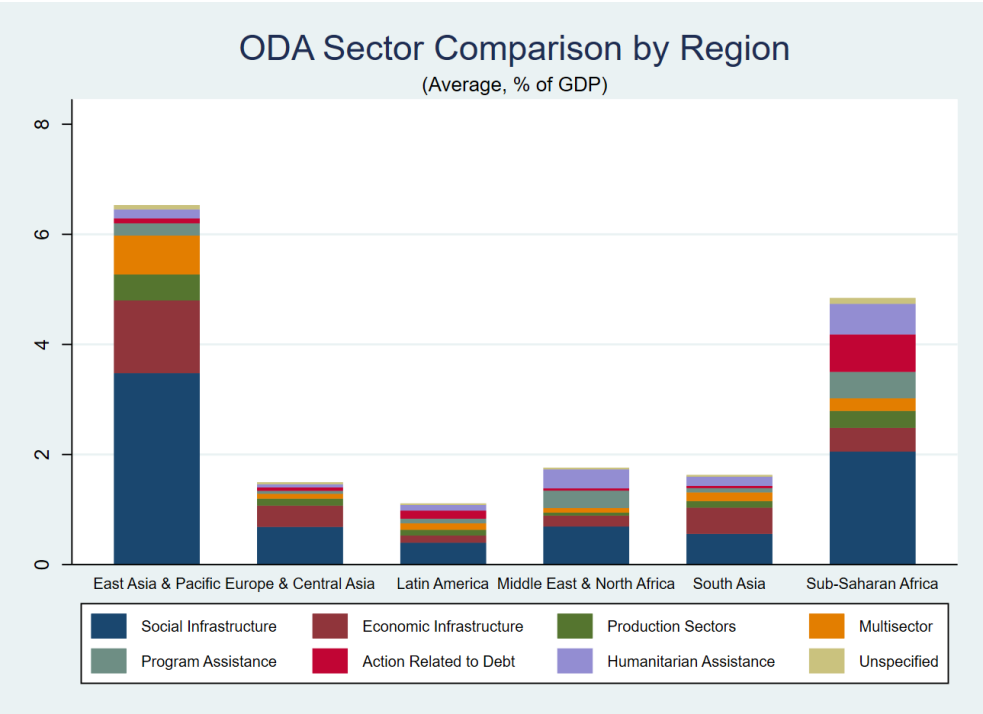

Figure 4. Comparison of ODA Sector by Region

2. Limitations

The first and arguably greatest limitation of this study is that the expansion in tax data from 2009 to 2019 contains 'missing data' especially when it comes to

tax revenue data. While the original paper this study benchmarks compiled data from various IMF country reports to 'fill' missing data in the dataset, this study is not able to utilize the same approach in completing the expanded tax dataset. The low availability on accurate tax data is a common limitation found in tax literature.

Another limitation is that though this study tries to control for all variables that can explain tax effort, there may be other potential omitted variables that more accurately portrays the relationship between ODA and tax effort. The focus of this study is in controlling for governance indicators in addition to traditional control variables utilized by previous tax literature, yet other variables may exist that needed to be controlled to better understand ODA and tax. Scholars have incorporated other control variables such as colonial history, language, religion, etc. Yet this study focuses on the standard models of tax analysis with the inclusion of governance indicators and regional interaction terms. Incorporating other control variables may provide greater insight and new implications for ODA and tax development.

However, given that previous literature on tax effort all faced similar concerns, the empirical model used in this study, despite its clear limitations, cannot be considered lacking significance or importance. The findings in the paper for the period between 1980-2019 can provide useful insight for current and future ODA policies when simultaneously considering the mechanics of tax effort in the development of countries. This study can also be expanded and built upon so that scholars can incorporate new variables to further understand the dynamics of ODA and tax in the roles they play in development.

References

Benedek, Dora, Ernesto Crivelli, Sanjeev Gupta, and Priscilla Muthoora. 2012. "Foreign Aid and Revenue: Still a Crowding Out Effect?" *International Monetary Fund Working Paper*, *WP/12/186*. https://doi.org/10.1628/001522114X679156.

Besley, Timothy, and Torsten Persson. 2013. "Taxation and Development." In *Handbook of Public Economics Vol. 5*, edited by A. J. Auerbach, R. Chetty, M. Feldstein, & E. Saez, 51-110. North Holland.

Besley, Timothy, and Torsten Persson. 2014. "Why do Developing Countries Tax So Little?" *Journal of Economic Perspectives* 28 (4):99-120.

Bird, Richard M. 2015. "Improving Tax Administration in Developing Countries." *Journal of Tax Administration*, 1 (1):23-44.

Bird, Richard M., and Eric M. Zolt. 2005. "Redistribution via Taxation: The Limited Role of the Personal Income Tax in Developing Countries." *UCLA Law Review* 52 (6):1627-1696.

Bird, Richard M., Jorge Martinez-Vazquez, and Benno Torgler. 2008. "Tax Effort in Developing Countries and High Income Countries: The Impact of Corruption, Voice and Accountability." *Economic Analysis & Policy* 38 (1):55-71.

Boogaard, Vanessa V. D., Wilson Prichard, Matthew S. Benson, and Nikola Milicic. 2018. "Tax Revenue Mobilization in Conflict-Affected Developing Countries." *Journal of International Development* 30:345-364. https://doi.org/10.1002/jid.3352.

Bräutigam, Deborah A. 2008. "Introduction: Taxation and State-Building in Developing Countries." In *Taxation and State-building in Developing Countries: Capacity and Consent*, edited by D. A. Bräutigam, O. H. Fjeldstad, & M. Moore, 1-33. Cambridge University Press.

Bräutigam, Deborah A., and Stephen Knack. 2004. "Foreign Aid, Institutions, and Governance in Sub-Saharan Africa." *Economic Development and Cultural Change* 52 (2):255-285.

Di John, Jonathan. 2006. “The Political Economy of Taxation and Tax Reform in Developing Countries.” *WIDER Research Paper No. 2006/74*.

Gaspar, Vitor, Laura Jaramillo, and Philippe Wingender. 2016. “Political Institutions, State Building and Tax Capacity: Crossing the Tipping Point.” *International Monetary Fund Working Paper, WP/16/233*.

Gaspar, Vitor, Laura Jaramillo, and Philippe Wingender. 2016. “Tax Capacity and Growth: Is there a Tipping Point?” *International Monetary Fund Working Paper, WP/16/234*.

Gnangnon, Sena K. 2020. “Effect of Development Aid on Tax Reform in Recipient-Countries: Does Trade Openness Matter?” *Journal of International Commerce, Economics and Policy* 11 (1). https://doi.org/10.1142/S1793993320500015.

Gnangnon, Sena K., and Jean-François Brun. 2019. “Tax Reform and Public Revenue Instability in Developing Countries: Does the Volatility of Development Aid Matter?” *Journal of International Development* 31:764-785. https://doi.org/10.1002/jid.3436.

International Monetary Fund. 2021. *Government Financial Statistics Database*.

International Monetary Fund. 2021. *International Financial Statistics Database*.

Kira, Alex R. 2017. “An Evaluation of Governments’ Initiatives in Enhancing Small Taxpayers’ Voluntary Tax Compliance in Developing Countries.” *International Journal of Academic Research in Accounting, Finance and Management Sciences* 7 (1):253-267.

Lee, Young, and Roger H. Gordon. 2005. “Tax Structure and Economic Growth.” *Journal of Public Economics* 89:1027-1043.

Levi, Margaret. 1988. *Of Rule and Revenue*. University of California Press.

Mkandawire, Thandika. 2010. “On Tax Efforts and Colonial Heritage in Africa.” *The Journal of Development Studies* 46 (10):1647-1669. https://doi.org/10.1080/00220388.2010.500660.

Moore, M., & Prichard, W. 2017. “How Can Governments of Low-Income Countries Collect More Tax Revenue?” *ICTD Working Paper 70*.

Moore, Mick, Wilson Prichard, and Odd-Helge Fjeldstad. 2018. *Taxing Africa: Coercion, Reform and Development*. Zed Books Ltd.

Morrissey, Oliver, Christian V. Haldenwang, Armin V. Schiller, Maksym Ivanyna, and Ingo Bordon. 2016. "Tax Revenue Performance and Vulnerability in Developing Countries." *The Journal of Development Studies* 52 (12):1689-1703. https://doi.org/10.1080/00220388.2016.1153071

OECD. 2005. *Paris Declaration on aid effectiveness*. OECD Publishing. http://dx.doi.org/10.1787/9789264098084-en

OECD. 2013. *Tax and development: Aid modalities for strengthening tax systems*. OECD Publishing. http://dx.doi.org/10.1787/9789264177581-en

OECD. 2014. *Measures of tax compliance outcomes: A practical guide*. OECD Publishing. http://dx.doi.org/10.1787/9789264223233-en

OECD. 2016. *Co-operative tax compliance: Building better tax control frameworks*. OECD Publishing. http://dx.doi.org/10.1787/9789264253384-en

OECD. 2021. *OECD Statistics*.

Ouattara, Bazoumana. 2006. "Foreign Aid and Government Fiscal Behavior in Developing Countries: Panel Data Evidence." *Economic Modelling* 23:506-514. https://doi.org/10.1016/j.econmod.2006.02.001.

Prichard, Wilson. 2015. *Taxation, Responsiveness and Accountability in Sub-Saharan Africa*. Cambridge University Press.

Prichard, Wilson, Jean-François Brun, and Oliver Morrissey. 2012. "Donors, Aid and Taxation in Developing Countries: An Overview." *ICTD Working Paper 6*.

Prichard, Wilson, and David K. Leonard. 2010. "Does Reliance on Tax Revenue Build State Capacity in Sub-Saharan Africa?" *International Review of Administrative Sciences* 76 (4):653-675.

Schumpeter, Joseph A. 1918. "Die Krisis des Steuerstaats." *Zeitfragen aus dem Gebiete der Soziologie* 4:3-74, also available as "Chapter 1, The Crisis of the Tax State." 1991. In *The Economics and Sociology of Capitalism*, edited by Richard Swedberg. Princeton: Princeton University Press.

Stewart, Miranda. 2003. "Global Trajectories of Tax Reform: The Discourse of Tax

Reform in Developing and Transition Countries." *Harvard International Law Journal* 44 (1):139-190.

Thornton, John. 2014. "Does Foreign Aid Reduce Tax Revenue? Further Evidence." *Applied Economics* 46 (4):359-373. http://dx.doi.org/10.1080/00036846.2013.829207

United Nations Statistics Division. *SDG Indicators*. UN Department of Economic and Social Affairs. https://unstats.un.org/sdgs/metadata/

World Bank. 2021. *World Development Indicators*.

World Bank. 2021. *Worldwide Governance Indicators*.

Yohou, Hermann D., Michaël Goujon, and Wautabouna Ouattara. 2016. "Heterogeneous Aid Effects on Tax Revenues: Accounting for Government Stability in WAEMU Countries." *Journal of African Economies* 25 (3):468-498. https://doi.org/10.1093/jae/ejw003.

Yohou, Hermann D., and Michaël Goujon. 2017 "Reassessing Tax Effort in Developing Countries: A Proposal of a Vulnerability-Adjusted Tax Effort Index (VATEI)." *Fondation Pour Les Études Et Recherches Sur Le Développement International (Ferdi)*, *Working Paper 186*.

Appendix

Country List by Region (126 total)

Europe & Central Asia (17): Albania, Armenia, Azerbaijan, Belarus, Bosnia & Herzegovina, Bulgaria, Georgia, Kazakhstan, Kyrgyz Republic, Lithuania, North Macedonia, Moldova, Russian Federation, Tajikistan, Turkey, Ukraine, Uzbekistan

East Asia & Pacific (17): Cambodia, China, Fiji, Indonesia, Kiribati, Lao PDR, Malaysia, Mongolia, Myanmar, Papua New Guinea, Philippines, Samoa, Solomon Islands, Thailand, Tonga, Vanuatu, Vietnam

South Asia (7): Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka

Latin America and the Caribbean (29): Antigua and Barbuda, Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Uruguay, Venezuela, RB.

Middle East & North Africa (11): Algeria, Djibouti, Egypt, Arab Rep., I. R. of Iran, Jordan, Lebanon, Libya, Morocco, Syrian Arab Republic, Tunisia, Yemen Rep.

Sub-Saharan Africa (45): Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Dem. Rep. of Congo, Rep. of Congo, Côte d'Ivoire, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, The, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, São Tomé and Principe, Tanzania, Togo, Uganda, Zambia, Zimbabwe

Data Sources:

The same data source from Benedek et al. (2012)'s paper is used for this study. According to Benedek et al. (2012), data on tax revenue was taken from the IMF's Fiscal Affairs Department Database on Revenue Mobilization, IMF's Government Financial Statistics (GFS) database, and various country reports of the IMF in order to construct a thorough dataset that minimized the issues of inaccurate or missing data on tax. Tax revenue is calculated as a percent of GDP. Data on ODA is taken from the OECD database which also provides specific information on ODA loans and grants, all as a share of GDP. Information on *agriculture value added*, *industry value added* and *GDP per capita* (in constant 2000 USD) is taken from the World Development Indicators database of the World Bank, all as a share of GDP. *Trade openness* is calculated as the sum of exports and imports as a ratio of GDP. Data on exports, imports and GDP is taken from IMF's International Financial Statistics (IFS) database.

For the new set of variables added in this study, governance indicators are taken from the Worldwide Governance Indicators database of the World Bank, which contains information on six dimensions of governance: *control of corruption*, *government effectiveness*, *political stability and absence of violence/terrorism*, *regulatory quality*, *rule of law*, and *voice and accountability*. Regional dummy variables are set according to the World Bank Country Classification list for 2021. ODA by sector data is once again taken from the OECD database, which categorizes ODA into 8 different sectors: s*ocial infrastructure & services*, e*conomic infrastructure & services*, p*roduction sectors*, *multisector*, *program assistance*, *action related to debt*, *humanitarian aid* and *unspecified*.

국문 초록

공적개발원조(ODA)가 개발도상국 조세노력에 미치는 영향

공적개발원조(ODA)를 수년째 제공하면서 점점 '피로'를 경험하는 공여국들로 인해 개발의 초점이 점점 개발도상국의 조세노력으로 바뀌고 있다. 세금은 국가의 주요 자원인 만큼 많은 학자들 사이에서 개발도상국이 공적개발원조에 덜 의존하고 자체적으로 개발의제를 제시하고 수행할 수 있는 역량을 갖출 수 있도록 국가의 조세노력을 증진시키는 것에 관심이 집중되고 있다.

본 논문은 국가건설을 위해 '조세노력'이 차지하는 역할의 중요성을 인정하고 ODA가 개발도상국의 조세노력에 미치는 영향을 분석하고자 한다. 베네딕 외(2012)의 논문을 벤치마크로 사용하여, 본 논문은 1980-2009년에 걸쳐 126개국을 대상으로 패널 분석을 실시하여 ODA의 역학 관계를 탐구한다. 새로운 거버넌스 변수를 추가함으로써, 거버넌스가 증진될수록 조세노력도 증가한다는 것을 확인하였다. 다만 거버넌스 항목 중에서 '책무성'만이 유효한 것으로 나타났다. ODA와 상호작용하는 거버넌스 변수 중 '법치'만이 조세노력에 영향을 미치는 것으로 나타났다. 이전 문헌에서 볼 수 있듯이, 공적개발원조는 국가의 조세노력에 부정적인 영향을 미치는 것으로 입증되었다. 공적개발원 증여(grant)나 차관(loan)은 모두 통계적으로 유의미한 것으로 나타났고 조세노력에 미치는 영향도 부정적인 것으로 나타났다. 그러나 지역간

ODA를 분석한 결과 중동과 북아프리카 지역 및 사하라 이남 아프리카 지역에 주는 ODA가 다른 지역에 비해 조세노력에 긍정적인 영향을 미치는 것으로 나타났고 이는 본 논문의 중요한 결과이다.

주제어: 조세노력, 공적개발원조, 거버넌스, 개발도상국, 국가건설, 패널 분석

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