

**IS THE CURRENT AID TO LATIN AMERICA AND THE CARIBBEAN  
EFFECTIVE TO REDUCE INCOME INEQUALITY?**

By  
**SHIN, Jihye**

**THESIS**

Submitted to  
KDI School of Public Policy and Management  
In Partial Fulfillment of the Requirements  
For the Degree of  
**MASTER OF DEVELOPMENT POLICY**

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Committee in charge:

Professor Kye-Woo LEE, Supervisor



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**ABSTRACT**

**IS THE CURRENT AID TO LATIN AMERICA AND THE CARIBBEAN EFFECTIVE TO  
REDUCE INCOME INEQUALITY?**

– INCLUSION OF INEQUALITY IN THE ALLOCATION AND TARGETING OF FOREIGN AID –

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## **ACKNOWLEDGEMENTS**

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## **I. INTRODUCTION**

The purpose of this paper is to examine whether foreign aid to countries in Latin America and the Caribbean (LAC) can contribute to address inequality, which is the most serious economic and social issue of the region. In particular, this paper focuses on the current aid allocation practice by OECD/ DAC members and analyzes whether it is conducive to reduction in income inequality.

### **1.1 Inequality in relations with poverty reduction and economic growth**

Apart from social and political concerns it causes, the increase in inequality raises economic problems as well - it tends to drag down economic growth and cause economic inefficiency as lower income groups are not able to realize their human capital potential fully (OECD, 2015). Accordingly, international society has declared to put efforts to overcome inequalities. Among the 2030 Sustainable Development Goals established by the United Nations is reduced inequalities<sup>1</sup>, and World Bank also has declared boosting shared prosperity by fostering the income growth of the bottom 40% for every country as one of its twin goals<sup>2</sup>.

Inequality is closely related with poverty and economic growth, the other two main goals of development, and the three elements interact and affect one another both directly and indirectly. Small changes in income distribution can have a larger impact on the level of poverty (White and Anderson, 2001). Also, a change in relative poverty affects the growth elasticity of absolute poverty; given the same amount of growth, more people will be lifted off poverty under more equality in income (Ostry and Berg, 2011; Ostry et al., 2014). On the other hand, income distribution affects economic growth as well. Unlike the common perception that there is a trade-off between growth and income distribution, more income equality fosters growth, while unequal distribution of income hinders it (OECD, 2015).

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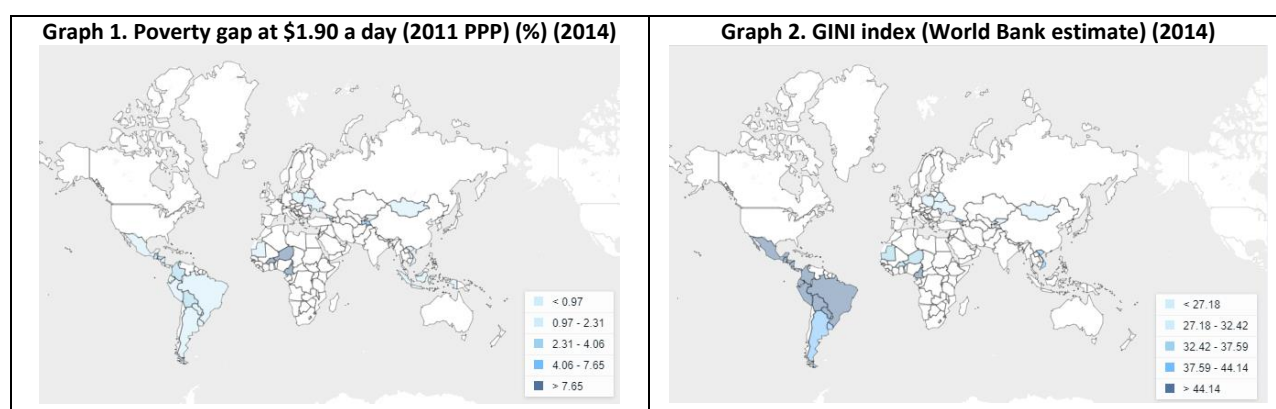
<sup>1</sup> <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>

<sup>2</sup> <http://www.worldbank.org/en/about/what-we-do>

Considering this dynamic and triangular relationship between poverty, inequality and growth, development strategies should be based on income growth and income inequality so that ultimately they can result in poverty reduction (Bourguignon, 2004).

## 1.2 Foreign aid and income inequality in Latin America and the Caribbean

Latin America and the Caribbean, the region of interest in this paper, has distinct economic characteristics compared to other regions of the developing world. While relatively less people suffer from absolute poverty, income inequality remains high (World Bank, 2014). (Not included in References at the end).



Source: World Bank Data, Indicators  
(<https://data.worldbank.org/indicator/SI.POV.GAPS?view=map>)

Source: World Bank Data, Indicators  
(<https://data.worldbank.org/indicator/SI.POV.GINI?view=map>)

Whereas inequality itself is a serious economic and social issue of the region, due to its nature explained above, it may be accountable for low economic growth rate as well.

Considering the importance of inequality issues in the region and the goals of international aid, it is reasonable to conclude that the donors should target their ODA to reduce income inequality when they distribute official development assistance (ODA) to the LAC countries. Moreover, Latin America is one of the regions that receive the lowest amount of aid in the world, and the amount has been even decreasing in recent years. With limited resources, more effective and efficient “allocation” is desired, since “an effective use of aid requires in the first place that aid should be allocated to the countries that can use it effectively for social and economic development (Lee, 2012)”.



Therefore, research questions of this paper are stated as follows:

*1. Do the donors take into account the most serious economic and social issue, inequality, when they allocate aid to the LAC countries?*

*2. Is the current allocation of aid conducive to alleviate income inequality?*

This paper analyzes the current aid allocation practice and examine whether the aid is efficiently distributed to Latin American and the Caribbean countries to reduce poverty and income inequality. Relevant data will be analyzed from 31 donors – 30 DAC countries and China – and 32 LAC recipients, during 7 years from 2010 to 2016, using the Generalized Least Squared (GLS) model with heteroscedasticity. Based on the framework used in the study of Lee et al. (2012), both recipient countries' needs and donor countries' interests will be considered in the allocation of bilateral aid.

As a follow-up study of Lee et al. (2012), which used data from 2005 to 2009, this paper examines whether the aid allocation practice in the LAC has been improved in the latest period. This research adds to the literature that addresses the relationship of foreign aid and income inequality, which has not been fully explored yet. Furthermore, it may serve as a reference for donors when they attempt to include inequality factors in the allocation of their ODA and aim to improve income distribution in the recipient countries.

The rest of this paper is structured as follows: Section II reviews literature on impact of aid on income inequality and current aid allocation practice of donors; Section III describes the estimation model, methodology and data; in Section IV are presented and analyzed the empirical findings; and finally Section V contains conclusion and policy implications.

## **II. LITERATURE REVIEW**

### **2.1 Impact of Aid on Income Inequality**

Despite its significant role in development, surprisingly less attention has been paid to the relationship of aid and income inequality. In addition, there is no consensus on impact of aid on income inequality among the limited number of studies.

#### *Positive relationship: Aid worsens income distribution*

According to Layton and Nielson (2009), which examined the ODA and its impact on Gini Coefficient in 82 countries from 1975 to 2005, the relationship between foreign aid and inequality is shown as zero and weakly positive. Later research by Bjørnskov (2010) and Herzer and Nunnenkamp (2012) also support the positive relationship between aid and income inequality. Bjørnskov (2010) tested 88 countries over the period of 1960-2000, and found that foreign aid has an inequality increasing effect, bringing more benefits to the elite groups and upper class than to lower income groups. In particular, this tendency is stronger in relatively more democratic countries than autocratic ones. On the other hand, after investigating 21 countries from 1970 to 1995, Herzer and Nunnenkamp (2012) suggested that aid's effect of increasing inequality is attributable to lack of accountability. While recipients have their own structural problems such as corruption and rent-seeking, donors seek their own incentives rather than the recipients' needs.

#### *Negative relationship: Aid improves the distribution of income*

Chong et al. (2009) studied the relationship of aid and income inequality, including the interaction with policy factors. Using the sample of 116 countries from 1971 to 2002, they observed that aid alone does not reduce income inequality, but with some weak evidence it does improve income distribution when combined with democratic institutions. Shafiullah (2011) mainly backs up the result of Chong et al (2009) with the sample of 94 countries from 1989 to 2008, but the impact is ambiguous in South Asia.

More recent studies specifically focusing on Latin America also confirm aid's effect on reducing income inequality. According to Gonzales & Larru (2012), which examined 18 Latin American countries from 1990 to 2008, foreign aid has an egalitarian effect on inequality. Using the similar coverage of data, 20 Latin American countries over the period of 1992-2007, Tezanos et al. (2013) observed that foreign aid contributes to the reduction of income inequality. The impact is larger in case of concessional loans rather than grants. Moreover, aid is found to be more effective in reducing inequality under less corruption.

#### *Mixed or ambiguous relationship*

Fewer research, most of which studied aid at disaggregated levels, have reported that aid and income relationship show mixed relationships. After testing 30 countries from 1995 to 1998, Cuesta, J. et al. (2006) concluded that aid has little influence on income inequality, and the impacts are not always in the same direction and regional differences were reported. In Latin America the effect was the lowest; the lower initial inequality level was, the lower the income redistribution effect was identified. Gouba (2012) suggested that aid with conditionality increases income and wealth inequality, whereas aid without strings attached has the reverse effects. He also disaggregated the two types of aid by sector, but their effects appeared to be similar regardless of the sectors. Saidon et al. (2013) disaggregated ODA into economic, social, production and multi sector aid and examined their impacts on income inequality in 75 countries over the period of 1995-2009. They observed that economic aid contributes income distribution while multi-sector aid worsens it. Social and production sector aid do not appear to have significant impacts on income inequality.

In summary, the impact of foreign aid on income inequality studied in the current literature is controversial without reaching an agreement. This may be attributed to the following three reasons.

First, most of the existing literature examined the impact of aid on inequality only at the whole world level. Accordingly, it overlooked that the impact may differ by different geographic regions.

Second, the former studies did not examine whether the partners of the aid negotiation agreed explicitly on the objective of inequality reduction in the beginning of the aid cycle, i.e. at negotiations. For aid to have any impact on inequality, both partners of aid negotiations should explicitly agree on the objective on inequality reduction and the means of achieving the objective of inequality reduction. However, all previous studies skipped examining this initial negotiation step and directly jumped to the ex-post assessment. If there were no explicit agreement on the objective of inequality reduction at the aid negotiation stage, even if one study found a positive relationship between the aid project and inequality reduction, it would be accidental and there would be no guarantee for the sustainability of aid effectiveness on inequality reduction.

Last, none of the previous studies approached the topic from the allocation side. In order for aid to be effective, the resources should be efficiently allocated in the first place; in other words, aid should be distributed to the countries with more needs and more capabilities to use it to achieve its development goals.

Therefore, a more proper approach of future studies should be first examine if there were an agreement on the objective of reducing inequality through the aid project, and then it would make sense to have an ex-post assessment of the impact of the aid project on inequality reduction. This paper applies this rational framework for assessing aid impact on inequality reduction in LAC.

This study would examine first whether the aid partners have explicitly agreed on the objective of reducing inequality in the recipient countries. This agreement must be reflected in the donor's decision making on aid allocations to different aid recipient countries. Then, using an estimation model it will examine if the inequality issue is considered in the aid allocation step, and based on the regression results assess whether the current aid allocation is conducive to inequality reduction.

## **2.2 Current Aid Allocation Practice of Donors**

By intuition and empirical findings (Alesina and Dollor 2000; Alesina and Weder 2002), it is now widely acknowledged that donors actively take into account their own interests as well as recipient-country development needs when they distribute foreign aid. Historically, the purpose of giving aid has evolved over time – from helping reconstruction of European countries after the World War II to strengthening political and strategic allies during the Cold War to promoting economic growth and eradicating poverty from the new millennium.

Since the end of Cold War in 1989, donors have been increasingly selective in the allocation of bilateral ODA (Lee, 2012). More and more aid has been distributed according to economic and humanitarian needs of recipients, such as income per capita, education level, infant mortality, etc (Dollar and Levin 2004; Berthelemy and Tichit 2004; Sundburg and Gelb 2006; Claessens et al. 2007). In line with the findings of recent research that highlight the importance of institutions in aid effectiveness, such factors as democracy, corruption and sound policies of the recipients are also considered important. In recent years, less emphasis is put on foreign debts, population size and colonial relations (Claessens et al. 2007).

Meanwhile, economic factors have gained more importance over political ones among donors' interests. Nowadays donors tend to relatively neglect diplomatic or strategic motives when they allocate bilateral aid (Lee, 2012). On the other hand, economic incentives, such as trade with recipient countries and foreign direct investment to them, are considered more important than before.

As pointed out by Lee et al. (2012), former studies on aid allocation have limitations in that “they did not assess the importance of the factors that make aid effective for economic growth and poverty reductions, nor did they look into the link between growth and poverty reductions,” not to mention that they failed to pay attention to income inequality, which cannot be separated from the other two. Therefore, this paper attempts to incorporate inequality factor in the estimation model and focus on the link between the other factors and income inequality in the LAC region marked by its high degree of income inequality.

### III. METHODOLOGY AND DATA

#### 3.1 Estimation Model

The empirical model of this paper follows the framework used by Lee et al. (2012). The Generalized Least Squared (GLS) model with heteroscedasticity is used to analyze the aid allocation of 29 DAC countries<sup>3</sup> and China to the 33 LAC countries during 7 years from 2010 to 2016.

The equation for the estimation model is as follows:

$$A_{ijt} = a_0 + b_i + c_t + d_j + fX_{ijt} + e_{ijt}$$

$A_{ijt}$ : bilateral ODA from each donor country (j) to each recipient country (i) over the sample period (t)

$a_0$ : common intercept

$b_i$ : recipient country dummy, specific to each recipient but fixed over the period

$c_t$ : year dummy, common to all countries in the sample but varies over the time

$d_j$ : donor country dummy, specific to each donor but fixed over the period

$X_{ijt}$ : independent variables including all variables explaining recipient countries' needs and donor countries' interests in offering aid to recipients

The dependent variable  $A_{ijt}$  is total bilateral ODA amount from a donor country to a recipient during the sample period. Dummy variables are set for the recipient country, donor country and year to control all possible fixed effects. Independent variable  $X_{ijt}$  includes all the factors that explain recipient countries' needs and donor countries' interests in allocating bilateral ODA.

Those that show recipients' needs are GDP per capita, Gini coefficient, infant mortality rate, civil and political rights, government effectiveness and total population. GDP per capita and Gini coefficient reflect recipient countries' economic needs. GDP per capita is used as a proxy of poverty rate due to the scarcity of data on time series poverty rate consistently defined across countries. According to the optimal or poverty-efficient aid allocation theory, ideally more aid should be allocated to countries with lower GDP

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<sup>3</sup> Currently, there are 30 members in the OECD DAC, but the European Union is excluded in the research as it is considered as a multilateral donor.

per capita; thus the optimal sign would be negative. Then, it is desirable that countries with higher Gini coefficient receive more bilateral ODA because high inequality hinders poverty reduction and economic growth and aid has effects on reducing income inequality as described earlier in the literature review. Infant mortality rate represent recipients' humanitarian needs; aid amount is expected to increase as the infant mortality rate rises. Political policies and institutions are examined through civil and political rights index, and economic policies and institutions through government effectiveness index. In line with the optimum aid allocation model, total population is included as an independent variable because more population means that there are more people to be lifted off absolute and/or relative poverty. In order to enrich the depth of analysis, squared values of independent variables that have monetary value, i.e. GDP per capita, infant mortality rate, and population, are added to examine quadratic relationships.

Independent variables that reflect donors' interests include export from the recipient to the donor, import from the donor to the recipient and foreign direct investment (FDI) from the donor to the recipient. Under the assumption that donors seek their economic benefits when they allocate aid, the amount of ODA is expected to increase as the volume of trade between the donor and the recipient is bigger. Accordingly, the coefficients of these variables would be positive. As well as the recipients' needs variables with monetary value, squared values of all the variables that explain donors' economic interests are added. Political motives such as recipient countries' voting behavior or former colonial relations are excluded as they are now considered to have minor importance, and thus country specific effects are controlled by the estimation model. To summarize, optimal signs will be negative for GDP per capita and GDP per capita squared, and positive for all the rest of the independent variables.

The most distinctive feature of this study is that it incorporates the income inequality factor to represent recipient countries' needs. When it comes to recipients' needs, the current literature tends to include only poverty-related indicators for the recipient's economic needs. However, taking the significance of inequality in Latin America and the commitment of aid partners to reduce it, it is more reasonable to include inequality index as a variable in the estimation model.

In addition, this model maintains the advantages that the original model (Lee, 2012) had. It controls country – both donors and recipients – and time specific effects. It considers both political and economic institutions and policies of the recipient countries; former studies only consider one of the two or use the degree of economic development itself instead of economic policies. Meanwhile, examination of quadratic relationship of some independent variables enriches the depth of analysis. In order to avoid biased estimates, observations are excluded when the recipient’s aid is zero. Finally, inclusion of donors’ interests enables more accurate analysis.

### **3.2 Data**

Data used in this study have been mostly collected via statistics portal of international organizations. Total ODA amounts, imports/exports and foreign direct investment are from OECD Statistics. GDP per capita, infant mortality rate and population used data from World Bank. For Gini coefficient, data from The Standardized World Income Inequality Database were used. Civil and political rights indicators were collected through Freedom House’s civil liberty and political rights indices in the form of aggregate scores of the two values. Detailed information on the data sources is attached in Annex 1.



#### IV. EMPIRICAL RESULTS

Table 1. Regression Results: DAC Members' Aid Allocations: 2010-2015	
Variable (Dependent variable: real ODA amount in million US dollars)	Recipient-Need and Donor-Interest Combined Model (2010-2015)
Statistics	Coefficient (T-value)
Recipient Fixed Effects	Y
Time Dummy	Y
Donor Dummy	Y
Common Intercept	-16.69818 (-0.09)
Real GDP per capita	-0.010998* (-1.67)
Real GDP per capita squared	6.77E-07** (2.35)
Gini Coefficient	-1.179934 (-0.86)
Infant mortality rate	3.410828 (0.65)
Infant mortality rate squared	-0.007029 (-0.12)
Civil liberty & Political Rights	0.019978 (0.58)
Government effectiveness	3.999452 (0.97)
Population	1.52E-06 (0.37)
Population squared	-8.44E-15 (-0.53)
Real import from the donor	2.97E-06*** (3.63)
Real import from the donor squared	-1.64E-14** (-2.32)
Real export to the donor	1.28E-06* (1.84)
Real export to the donor squared	5.90E-1 (0.11)
Real FDI from the donor	-0.002393 (-1.52)
Real FDI from the donor squared	7.97E-08 (1.07)
No. of Observations	680
Specification Test	Wald chi2(55)=1204.41 Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.  
\*\* statistically significant at the 5 percent level.  
\* statistically significant at the 10 percent level.

#### 4.1 Findings and Analysis

According to the regression analysis, GDP per capita, GDP per capita squared, import from the donor, import from the donor squared, and export to the donor were significant at or under the 10 percent level. Among the variables that reflect recipient countries' development needs, only GDP per capita and GDP per capita squared are statistically significant. The sign for the coefficient of GDP per capita is negative, which is in line with the poverty-efficient aid allocation model. In other words, donors give a greater amount of aid to countries with lower GDP per capita; however, the absolute value of the coefficient is very small. On the other hand, the coefficient of GDP per capita squared is shown as positive with a larger absolute value. Other variables, Gini coefficient, infant mortality rate, civil liberty and political rights and population appear to be in accordance with their respective optimal signs, but do not have statistical significance. Especially, the main interest of this study, Gini coefficient, is statistically insignificant and therefore we can interpret that donors in general do not pay attention to the level of income inequality when allocating their aid to countries in LA.

**Table 2. Aid Allocation by Individual Donor Country**

Variable (Dependent variable: real ODA amount in million US dollars)	Australia	Austria	Belgium	Canada	Czech Republic		
Fixed Effects	Y	Y	Y	Y	Y		
Time Dummy	Y	Y	Y	Y	Y		
Donor Dummy	N	N	N	N	N		
Common Intercept	0 (omitted)		0 (omitted)		0 (omitted)		
Real GDP per capita	-.0087565*** (-12.81)		0 (omitted)		.011468*** (4.81)		
Real GDP per capita squared	3.68e-07*** (12.35)		1.94e-08*** (4.80)		-6.24e-07*** (-5.43)		
Gini Coefficient	2.579308*** (14.84)		0 (omitted)		1.098045** (2.28)		
Infant mortality rate	-4.876016*** (-6.38)		0 (omitted)		3.312998*** (2.77)		
Infant mortality rate squared	.0422701* (1.90)		-.0197263*** (-8.12)		-.0233307 (-1.35)		
Civil liberty & Political Rights	.0920845*** (-4.46)		0 (omitted)		-.0125726 (-1.48)		
Government effectiveness	-8.120841*** (-5.79)		0 (omitted)		2.515659 (0.91)		
Population	4.312e-08 (0.20)	<i>Variables omitted because of collinearity</i>	0 (omitted)	No observations	-.0000162*** (-6.91)		
Population squared	-3.05e-15 (-0.98)		1.92e-16*** (10.22)		3.00e-13*** (10.84)		
Real import from the donor	-6.74e-07 (-0.11)		0 (omitted)		-.000047* (-1.85)		
Real import from the donor squared	-3.32e-14 (-0.01)		0 (omitted)		4.05e-10 (1.31)		
Real export to the donor	.0000134** (2.39)		0 (omitted)		-.0001431** (-2.20)		
Real export to the donor squared	-6.24e-12** (-2.17)		-2.41e-13*** (-14.13)		2.55e-10** (2.45)		
Real FDI from the donor	-.0003773 (-0.14)		0 (omitted)		3.759935** (2.23)		
Real FDI from the donor squared	.0000499*** (4.12)		0 (omitted)		0 (omitted)		
No. of Observations	32				38		43
Specification Test	Wald chi2(25) = 9671.60 Prob > chi2 = 0.0000				Wald chi2(14) = 58494.79 Prob > chi2 = 0.0000		Wald chi2(25) = 32955.02 Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.

\*\* statistically significant at the 5 percent level.

\* statistically significant at the 10 percent level.

Variable (Dependent variable: real ODA amount in million US dollars)	Denmark	Finland	France	Germany	Greece
Fixed Effects	Y	Y	Y	Y	Y
Time Dummy	Y	Y	Y	Y	Y
Donor Dummy	N	N	N	N	N
Common Intercept			-7198.885 (-4.63)	-186.6217 (-0.42)	
Real GDP per capita			.4212456*** (7.21)	-.0012312 (-0.08)	
Real GDP per capita squared	<i>Variables omitted because of collinearity</i>	No observations	-.0000131*** (-5.44)	3.95e-07 (0.58)	<i>Variables omitted because of collinearity</i>
Gini Coefficient			-.7934622 (-0.04)	-2.95-0202 (-1.21)	
Infant mortality rate			-87.41018** (-2.26)	-5.646931 (-0.87)	
Infant mortality rate squared			1.832729*** (3.48)	.1470469* (1.66)	
Civil liberty & Political Rights			-.8367029 (-0.95)***	.1439266* (1.71)	
Government effectiveness			-211.8939*** (-2.84)***	-22.0606 (-1.45)	
Population			.0001749*** (3.32)	-6.72e-06 (-0.69)	
Population squared			-1.09e-12*** (-4.85)	3.51e-13*** (4.34)	
Real import from the donor			.0002116*** (-2.63)	7.25e-06 (0.38)	
Real import from the donor squared			1.33e-10*** (4.61)	-5.21e-12*** (-2.70)	
Real export to the donor			-.0003606*** (-2.63)	.0000167 (0.99)	
Real export to the donor squared			1.16e-10** (2.14)	2.15e-13 (0.07)	
Real FDI from the donor			.0201301 (0.73)	-.0258872 (-1.32)	
Real FDI from the donor squared			.0000287 (0.63)	-.0000112 (-0.67)	
No. of Observations			46	98	
Specification Test	Wald chi2() = Prob > chi2 = 0.0000	Wald chi2() = Prob > chi2 = 0.0000	Wald chi2(26) = 10278.88 Prob > chi2 = 0.0000	Wald chi2(33) = 324.10 Prob > chi2 = 0.0000	Wald chi2() = Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.

\*\* statistically significant at the 5 percent level.

\* statistically significant at the 10 percent level.

Variable (Dependent variable: real ODA amount in million US dollars)	Hungary	Iceland	Ireland	Italy	Japan
Fixed Effects	Y	Y	Y	Y	Y
Time Dummy	Y	Y	Y	Y	Y
Donor Dummy	N	N	N	N	N
Common Intercept			0	-163.2504 (-4.36)	5891.091 (2.16e-06)
Real GDP per capita			0	.0002456 (0.13)	-.340014*** (2.34e-10)
Real GDP per capita squared			-3.38e-09 (-0.42)	-1.47e-08 (-0.16)	.0000464*** (1.35e-14)
Gini Coefficient			0	1.8018149*** (5.34)	-31.06285*** (4.03e-08)
Infant mortality rate			0	1.231864 (1.00)	-427.0295*** (1.51e-07)
Infant mortality rate squared			.000414 (0.60)	-.0461004*** (-2.98)	4.754846*** (1.62e-09)
Civil liberty & Political Rights			-.0005796 (-0.96)	-.0528938*** (-9.84)	-24.47578*** (1.77e-08)
Government effectiveness			0	1.784014 (1.77)	-215.5665*** (1.26e-07)
Population			0	1.87e-06 (1.57)	.0001*** (4.17e-14)
Population squared			8.77e-16*** (4.22)	3.04e-15 (0.25)	-2.28e-12*** (6.56e-22)
Real import from the donor			0	2.47e-06 (0.95)	-.0000263*** (9.83e-14)
Real import from the donor squared			-7.69e-13*** (-3.76)	6.94e-3 (0.43)	-1.44e-11*** (4.51e-20)
Real export to the donor			3.37e-06 (0.76)	8.39e-07 (0.436)	.0000647*** (1.28e-14)
Real export to the donor squared			-6.80e-11*** (-3.19)	-7.65e-13 (-0.81)	0
Real FDI from the donor			0	.0001737 (0.10)	0
Real FDI from the donor squared			-.0000701*** (-4.07)	-.0000149*** (-3.87)	0
No. of Observations			32	46	29
Specification Test			Wald chi2(15) = 37721.57 Prob > chi2 = 0.0000	Wald chi2(29) = 4295.21 Prob > chi2 = 0.0000	Wald chi2(13) = 1.48e+21 Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.

\*\* statistically significant at the 5 percent level.

\* statistically significant at the 10 percent level.

Variable (Dependent variable: real ODA amount in million US dollars)	Korea	Luxembourg	Netherlands	New Zealand	Norway
Fixed Effects	Y	Y	Y	Y	Y
Time Dummy	Y	Y	Y	Y	Y
Donor Dummy	N	N	N	N	N
Common Intercept	0		3390.074 (4.8e+09)		
Real GDP per capita	-.0075228 (-1.23)		.0967153*** (2.7e+09)		
Real GDP per capita squared	-2.51e-06*** (-3.48)		-1.10e-06*** (-6.6e+08)		
Gini Coefficient	-2.523107*** (-3.14)		-22.65585*** (-2.1e+09)		
Infant mortality rate	71.87273*** (10.10)		-111.1984*** (-3.9e+09)		
Infant mortality rate squared	-.9263614*** (-13.10)		.9049521*** (3.88e-10)		
Civil liberty & Political Rights	.1526788*** (7.54)		-.7959003*** (3.90e-10)		
Government effectiveness	33.13596*** (6.64)		100.8513*** (3.77e-08)		
Population	-.0000116*** (-7.42)		.0000176*** (9.67e-15)		
Population squared	1.02e-13*** (7.95)	No observations	0	<i>Variables omitted because of collinearity</i>	No observations
Real import from the donor	.0000575*** (12.30)		0		
Real import from the donor squared	-9.85e-12*** (-9.16)		0		
Real export to the donor	-.0000448*** (-15.57)		0		
Real export to the donor squared	5.22e-12*** (9.72)		0		
Real FDI from the donor	-.2828921*** (-7.88)		0		
Real FDI from the donor squared	.0003804*** (6.77)		0		
No. of Observations	35		21		
Specification Test	Wald chi2(27) = 17560.53 Prob > chi2 = 0.0000		Wald chi2(10) = 1.01e+20 Prob > chi2 = 0.0000		

\*\*\* statistically significant at the 1 percent level.

\*\* statistically significant at the 5 percent level.

\* statistically significant at the 10 percent level.

Variable (Dependent variable: real ODA amount in million US dollars)	Poland	Portugal	Slovak Republic	Slovenia	Spain
Fixed Effects	Y	Y	Y	Y	Y
Time Dummy	Y	Y	Y	Y	Y
Donor Dummy	N	N	N	N	N
Common Intercept					-3773.33 (-1.5e+08)
Real GDP per capita					.0579571 (3.3e+07)
Real GDP per capita squared					-2.18e-06 (-3.4e+07)
Gini Coefficient					50.94421 (1.8e+08)
Infant mortality rate					86.90757 (1.6e+08)
Infant mortality rate squared					-.9336372 (-1.6e+08)
Civil liberty & Political Rights					-.2327796 (-4.1e+07)
Government effectiveness					1.185539 (1.5e+06)
Population	<i>Variables omitted because of collinearity</i>	No observations	<i>Variables omitted because of collinearity</i>	<i>Variables omitted because of collinearity</i>	-0.000142 (-5.9e+07)
Population squared					1.26e-13 (5.9e+07)
Real import from the donor					1.58e-06 (3.0e+06)
Real import from the donor squared					0
Real export to the donor					0
Real export to the donor squared					0
Real FDI from the donor					0
Real FDI from the donor squared					0
No. of Observations					27
Specification Test					Wald chi2(12) = 1.30e+18 Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.  
\*\* statistically significant at the 5 percent level.  
\* statistically significant at the 10 percent level.

Variable (Dependent variable: real ODA amount in million US dollars)	Sweden	Switzerland	United Kingdom	United States
Fixed Effects	Y	Y	Y	Y
Time Dummy	Y	Y	Y	Y
Donor Dummy	N	N	N	N
Common Intercept	-43.68553 (-0.44)			--349.3808 (-0.42)
Real GDP per capita	.009769 (2.33)		.171731*** (3.8e+08)	-.0095072 (-0.38)
Real GDP per capita squared	-5.87e-07 (-4.84)		-.0000114*** (-3.7e+08)	5.91e-07 (0.61)
Gini Coefficient	4.055106 (1.82)		53.70512*** (1.47e-07)	-12.578 (-2.10)
Infant mortality rate	-2.901911 (-0.44)		0	-28.55485 (-1.84)
Infant mortality rate squared	.1378655 (1.96)		0	.4883156 (2.45)
Civil liberty & Political Rights	.0455413 (0.53)		0	-.0117545 (-0.05)
Government effectiveness	-6.154701 (-0.84)		0	6.588285 (0.22)
Population	-2.36e-06 (-0.48)		0	.0000566 (1.98)
Population squared	-2.025e-14 (-0.53)		0	-6.60e-13 (-1.90)
Real import from the donor	-.000029 (-1.09)		0	-9.66e-07 (-0.30)
Real import from the donor squared	6.39e-11 (0.66)		0	-2.04e-14 (-1.06)
Real export to the donor	.0000478 (1.63)		0	-3.11e-06 (-1.48)
Real export to the donor squared	-1.91e-10 (-1.96)		0	5.00e-14 (7.37)
Real FDI from the donor	-.0086413 (-1.51)		0	.0083362 (1.77)
Real FDI from the donor squared	-.0001122 (-3.24)		0	-2.76e-06 (-6.58)
No. of Observations	32		14	78
Specification Test	Wald chi2(24) = 108760.50 Prob > chi2 = 0.0000		Wald chi2(6) = 1.05e+20 Prob > chi2 = 0.0000	Wald chi2(32) = 2601.28 Prob > chi2 = 0.0000

\*\*\* statistically significant at the 1 percent level.  
\*\* statistically significant at the 5 percent level.  
\* statistically significant at the 10 percent level.

In other words, donors do not give more aid to those countries with higher income inequality and therefore aid does not help reduce inequality in the LA region.

Among the variables that represent donor countries' economic interests, import from the donor, import from the donor squared, and export to the donor have statistical significance at or under 5 percent level. Import from the donor and export to the donor appear to show positive correlations with aid amount, while import from the donor squared shows a slightly negative relationship. The coefficients of foreign direct investment (FDI) and FDI squared do not show statistical significance.

Compared to the earlier study by Lee et al. (2012), which provided the motives of this paper, the donors basically show similar trend analyzed in the former research. In the study, only GDP per capita squared value was statistically significant on the recipients' needs side. On the other hand, those for donors' interests showed positive correlations with aid amount all except FDI squared. The only changes made are that now GDP per capita have statistical significance, while FDI variables do not show significant relationships with the ODA amount.

This paper also attempted to analyze aid allocation practice by the individual bilateral donors. Unfortunately, the majority of the donors were not available for further analysis due to few or no observations, or collinearity issues among the independent variables, which is highly likely resulted from lack of observations as well. These difficulties mainly arise from lack of data on Gini coefficient and FDI. For most of the Caribbean countries Gini coefficients after 2010 were not available. According to the reports submitted to the OECD, many of the DAC donors keep their information on FDI unpublished, either confidential or non-confidential. Those countries that have the regression results are shown as they may be also not robust because of its sample size and lack of data.

Back to the research question brought up in the beginning, we can conclude that the donors do not consider inequality problems of the region when they allocate bilateral ODA to the Latin America and the Caribbean. On the contrary to recent studies that observed aid selectivity, such tendency was not found in



case of aid given to LAC countries. Rather, the DAC donors mainly focus on economic aspects both on the recipients' needs side and donors' interests side.

Regarding the second research question, the answer would be partly yes. It is desirable that poverty level is considered in the aid allocation, as aid is expected to reduce poverty and thus inequality as well. The GDP per capita variable, which is used as a proxy for poverty, has a negative and significant coefficient. This can be interpreted that countries with lower GDP per capita, or higher poverty ratios, generally get a higher level of aid. If aid helps reduce the poverty level, as the literature indicates, aid would also help reduce inequality level. This is an important and welcome difference in the result of Lee et al 2012 study and this study. Donors have shifted from a position of no concern for the poverty level in recipient countries to a position explicitly considering recipients' poverty level in donor' decision making on aid allocation. Still, the fact that other important social issues in the region – and also closely related to the economy – makes aid allocation inefficient and therefore aid less effective. Current aid allocation in relation with trade and FDI factors is conducive to economic growth, but its impact on income inequality is debatable.

## 4.2 Limitations

Despite the importance of the topic and great work base it refers to, this study has its limitations owing to the nature of difficulties in finding resources and the incapability of the researcher.

First, the scarcity of data weakens the reliability of analyses. Though international organizations such as World Bank, OECD and UNECLAC have abundant resources, it is not always easy to access to the whole necessary data. In particular, most of the Caribbean states are small economies and information system is not well developed, which makes data collection much difficult. At the same time, data on foreign direct investment are not reported by the countries in many cases, either confidential or non-confidential. As a result, more detailed individual country analysis was not available.

Second, the time gap is too short with the reference. The study by Lee et al. (2012) examined the period from 2005 to 2009, and this one tests the period right after, from 2010 to 2015. Not enough time has elapsed to observe meaningful changes.

Third, China is excluded from the observation. It would be desirable to include China as a bilateral donor, since it provides large amount of financial flows to all over the world, not only Latin America and the Caribbean. Also it could work as comparison with the DAC countries as a non-DAC donor. However, there is no information available on the aid that the Chinese government officially produces. Furthermore, the majority of the financial outflows from China are in the form of foreign direct investment (FDI), it is not desired to compare on the same standards with other countries' aid flows.

Last, there are limitations in assessing the expected effects of the current aid allocation on income inequality because only the aggregated amount is used in this paper. The impact of aid on inequality may depend on type, sector, conditionality and other modules of the aid as well, so more accurate results can be attained through examining disaggregated aid.

## V. CONCLUSION

Apart from its political or social impacts, inequality is important itself in that it actively and dynamically interact with economic growth and poverty, the two main goals of development. Unlike common expectations that economic growth and equity contradict with each other, more income inequality promotes economic growth and poverty reduction (OECD, 2015).

In particular, Latin America and the Caribbean countries are distinguished from other developing countries with relatively less poverty but still high income inequality. If that is the case, this characteristic of the economy of the region should be considered when donors distribute ODA to countries in LAC. Also, aid given by donor countries should more aim to reduce inequality. These two questions are what this paper attempts to examine.

This study refers to a paper written by Lee et al. (2012), which assessed aid allocation practice by the DAC donors and South Korea in relation with poverty reduction over the period of 2005-2009. Using the Generalized Least Square (GLS) model with heteroscedasticity, this paper analyzes aid allocation of 29 OECD DAC donors and 33 LAC recipients from 2010 to 2015.

Empirical findings confirm the conclusion of the former study – while the donors actively pursue their economic interests, i.e. import from the donor and export to the donor, they only consider GDP per capita out of the variables that include recipients' development needs. When examined by each country, donors, for which data was available, appeared to consider population and import more frequently. Five countries are shown as they are indifferent with the factors examined when they distribute aid to their LAC recipients.

Though considering GDP per capita in aid allocation is conducive to reduce poverty and inequality, other factors such as Gini coefficient, infant mortality rate, political and economic policies and institutions have no statistical significance. This may be attributable for inefficient allocation and ineffectiveness of aid. Therefore, donors should incorporate other dimensions [than economic one] to overcome inequality and

poverty the region is facing with. Meanwhile, the LAC countries should take ownership and improve their political and economic policies and institutions to maximize the effects of aid given to them in reducing income inequality.

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Annex 1. Data Sources

Variable	Unit / Scale	Source	URL
Bilateral ODA	US million dollar (2015 constant)	OECD	<a href="http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en">http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en</a>
GDP per capita	US dolloar (2015 constant)	World Bank	<a href="http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=NY.GDP.PCAP.CD&amp;country=#">http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=NY.GDP.PCAP.CD&amp;country=#</a>
Gini Coefficient	0-100	SWIID	<a href="http://fsolt.org/swiid/swiid_downloads.html">http://fsolt.org/swiid/swiid_downloads.html</a>
Infant mortality rate	Percentage (%)	World Bank	<a href="http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SP.DYN.IMRT.IN&amp;country=#">http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SP.DYN.IMRT.IN&amp;country=#</a>
Civil liberty & Political rights	0-100	Freedom House	<a href="https://freedomhouse.org/sites/default/files/Aggregate%20Category%20and%20Subcategory%20Scores%252c%20FIW2003-FIW2017.xlsx">https://freedomhouse.org/sites/default/files/Aggregate%20Category%20and%20Subcategory%20Scores%252c%20FIW2003-FIW2017.xlsx</a>
Government effectiveness	-2.50~2.50	World Bank	<a href="http://databank.worldbank.org/data/databases/%26nbsp;governance-effectiveness">http://databank.worldbank.org/data/databases/%26nbsp;governance-effectiveness</a>
Population	thousand	World Bank	<a href="http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SP.POP.TOTL&amp;country=">http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SP.POP.TOTL&amp;country=</a>
Import from the donor	US million dollar (2015 constant)	OECD	<a href="http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en">http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en</a>
Export to the donor	US million dollar (2015 constant)	OECD	<a href="http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en">http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en</a>
FDI from the donor	US million dollar (2015 constant)	OECD	<a href="http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en">http://localhost/OECDStat_Metadata/ShowMetadata.ashx?Dataset=TABLE2A&amp;ShowOnWeb=true&amp;Lang=en</a>