

Can the Current Aid to Latin America Contribute to Economic Growth and Poverty Alleviation?

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ABSTRACT

This paper analyzes whether the foreign aid recently provided for Latin America and the Caribbean (LAC) is efficiently distributed or not. Despite the substantial progress attained in LAC, economic growth and poverty reduction in countries of this region lag behind countries in other regions, especially East Asia. Moreover, recent studies indicate that when donor countries allocate aid, they increasingly select countries which can use aid effectively for economic growth and poverty reduction. For this reason, we suspect that foreign aid for LAC has been less effective in promoting growth and reducing poverty mainly because it was allocated to countries in LAC inefficiently

For this study, we consider both recipient countries' development needs and donor countries' economic interests in allocating foreign aid at the same time. We analyzed relevant data from 22 Development Assistance Committee (DAC) member countries and 32 LAC countries during 2005-2009. In addition, we also considered Korea's distribution of foreign aid for comparison with aid allocations by other DAC member countries.

The results show that foreign aid allocations by Korea and other DAC member states for countries in LAC should be improved substantially so that countries in LAC can use the foreign aid effectively for economic

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growth and poverty reduction.

Key Words: foreign aid, poverty reduction, growth, aid allocations, aid selectivity, Latin America

INTRODUCTION

Ever since the countries in Latin America and the Caribbean (LAC) fell into the debt crisis in the 1980s, social scientists, especially economists, sociologists and historians, have favored comparing the economic and social development of the countries in Latin America and East Asia, particularly the newly industrializing Asian states (Birdsall and Jasperson 1997). Such comparative studies focused on their difference in the sources of growth. Some examples are: “big push”, aid, infrastructure, trade, finance, technology, human development (Cardoso and Helwedge 1992), governance, and institutions (Rodrik et al. 2004).

Social scientists have learned that the source of economic and social development is not just one or two, but several, and the more important is the synergy among those factors of growth. It requires not only the physical factors such as investment and savings, but also human development and governance. Another popular finding has been that these factors are difficult to be obtained or accumulated by the domestic effort alone, but need to be facilitated by foreign aid. Both regions have tried to attract as much aid and make an effective use of it for their economic and social development.

A logical conclusion of such studies is that if there was any difference in the growth performance between the two regions, it may be attributable, to a great extent, to the effectiveness of aid. Growth performance of the countries in Latin America indeed lagged behind East Asian countries in the 1980s and 1990s (Jasperson 1997). Even after the long restructuring period, LAC countries still lag behind in the 2000s (Table 1) Countries in LAC may not have utilized the aid resources as effectively as those in East Asia. Such a hypothesis requires verification: Has the foreign aid to Latin America been utilized effectively to contribute to the economic and social development of Latin America? However, a prerequisite to the answer to this question is whether the foreign aid has been allocated efficiently to countries in Latin America? The reason is that 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.

This paper tries to answer this question.

Table 1. GDP Growth Rates of East Asia and Latin America

Countries	2005	2006	2007	2008	2009	2010
East Asia	6.59	7.02	7.42	4.39	0.81	7.87
Latin America	4.94	5.92	5.54	4.08	-1.55	3.11

Source: World Bank Data, Indicators (<http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>).

This paper is constructed as follows. First, it makes a review of the literature on aid allocations, in particular an optimum aid allocation theory, and examines how the recent aid allocations by DAC member countries on a worldwide basis fare against the theory. Second, the authors report on the findings of some empirical studies of the aid allocations by DAC members to LAC recipient countries in recent years and compare it with the aid allocations by the government of Korea to LAC countries. In this way, the authors try to assess the effectiveness of aid allocations to LAC, in particular by DAC members and Korea. Finally, the paper makes concluding remarks and policy recommendations.

REVIEW OF LITERATURE

An Optimal Aid Allocation

To assess adequacy of the current aid allocation for countries in Latin America objectively, we need a criterion against which we can evaluate the aid allocation to Latin America. Since the purpose of assessing aid allocations is to make aid effective, aid effectiveness can serve as a reasonable guide. In other word, aid allocations that make aid effective would be adequate allocations. Then, we also have to define what aid effectiveness is. Since effectiveness is a degree of achieving the objective, aid effectiveness can be measured by the degree of attaining the objective of aid. However, the objective of aid has evolved over time ever since aid started right after the World War II.

In the new Millennium era, it is commonly accepted that the objective of aid is poverty alleviation. Ever since the heads of states convened at the United Nations (UN) Meeting in 2000 to agree on the Millennium Declaration and the Millennium Development Goals (MDGs), attainment of these MDGs has served as the objective of aid. Therefore, an adequate

aid allocation means allocating aid to developing countries in such a way that aid can contribute to the poverty alleviation or the achievement of MDGs in the most effective manner. In this sense, an efficient aid allocation is a first step for attaining aid effectiveness. The fragile relation between aid and economic growth or poverty reduction found in the literature may also be due greatly to the sub-optimal allocation of aid (Easterly 2004; Easterly and Pfütze 2008).

Collier and Dollar (2002) successfully attempted to establish an optimum aid allocation model or a poverty-efficient aid allocation model. Since an efficient aid allocation model is an allocation that gives aid resources to those countries that can use them in the most effective manner, they built their model on the basis of the latest aid effectiveness studies. These studies indicate that aid is effective in promoting growth and consequently alleviating poverty only when the policies and institutions of the recipient countries are sound (World Bank 1998; Burnside and Dollar 2000).

Collier and Dollar (2002) conclude that more aid should be allocated to countries with higher rates of poverty and sounder development policies and institutions since aid is effective in promoting economic growth and alleviating poverty in those nations only. The development policies and institutions include not only the market-based economic policies and institutions, but also the political policies and institutions including civil and political rights and participation (Collier and Dollar 2004). In addition, they indicated that more aid should be allocated to countries with a larger population since they would have a greater number of poorer people. Moreover, more aid should be allocated to those countries where poverty reduction elasticity of economic growth is greater since they would reduce a greater number of poorer people with a given economic growth rate.

On the basis of this poverty-efficient aid allocation model, Collier and Dollar (2002) estimated the actual allocations of DAC members' aid to find that there is a vast gap between the two, and the actual aid allocation practice of DAC members was substantially inefficient. According to the poverty-efficient or optimum aid allocation model, about 19 million people in developing countries could be lifted from poverty annually. However, the actual number was only about 9 million people per year.

Current Aid Allocation Practice of DAC Members

Even before the Collier and Dollar (2002) study on the optimal aid allocation model, there were several studies of the actual aid allocations in the real world. However, these studies suffered from a weak theoretical

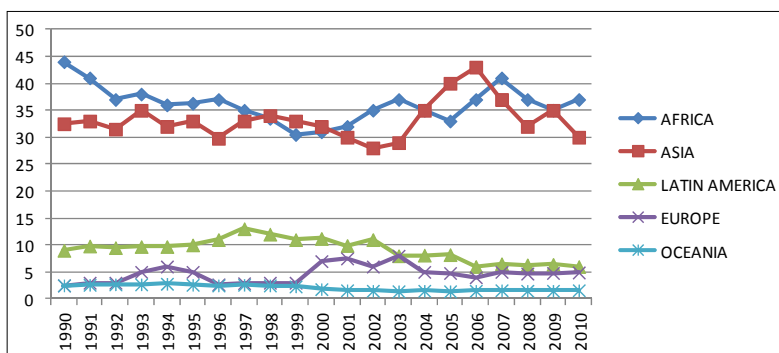
basis or model. They focused on the analysis of the actual aid allocation data on the basis of the simple assumption that as long as donors actively took into account of the recipient-country needs, the allocations would be effective for growth. They did not assess the importance of the factors that make aid effective for economic growth and poverty reductions, nor did they look into the link between growth and poverty reductions. Accordingly, they concentrated on whether donors considered recipient countries' per capita income level, human development needs, population size, policies, and institutions. They found that the multilateral aid by international organizations met the recipient-country needs better than the bilateral aid of the DAC members (Maizels and Nissanke 1984). They also found some contradictory results (e.g. Trumbull and Wall 1994; Wall 1995; Bandyopadhyay and Wall 2007). On the one hand, they found that DAC members took into account the recipient-country needs only partially. On the other hand, they found that donors actively considered recipient-country needs.

The main reason for such contradictory findings is that the estimation models adopted for the empirical studies considered recipient-country needs only and did not take into account the donor-country interests. Consequently, the estimated coefficients are biased and have a low level of reliability. Actually, several studies reveal that donors consider not only the recipient-countries' development needs, but also actively take into account donors' political and strategic objectives (Alesina and Dollar 2000; Alesina and Weder 2002). For example, donors allocate aid in accordance with the voting behavior of the recipient countries in line with the donors at U.N. meetings and the colonial relations with the recipients, or the corrupted governments continue receiving large aid.

To overcome the weaknesses of the estimation models based on recipient-country needs only, a series of studies have tried to take into account not only the recipient-country needs, but also donor-country interests. As a result, they find that donors have been increasingly selective in allocating aid to recipient-countries. That is, since the end of the Cold War, DAC members have provided a greater amount of aid to those developing countries with a higher level of poverty, policy, and institutions (Dollar and Levin 2004; Berthelemy and Tichit 2004; Berthelemy 2006; Sundburg and Gelb 2006; Claessens et al. 2007). Ever since the Berlin wall was collapsed in 1989, especially since the end of 1990s, the bilateral aid by DAC donors have allocated aid, focusing on developing countries' economic needs and sound policies and institutions, and neglecting relatively their debts, population size, and colonial relations (Claessens et al. 2007).

These studies all conclude that donors are increasingly selective in aid allocations, reducing their emphasis on strategic and political criteria. They ascribe these donors' selective aid allocation practices to the end of the Cold War and rapid globalization. This aid allocation practice since the Cold War is consistent with the optimum or poverty-efficient aid allocation model. With the given amount of aid along this practice of aid allocations, a greater number of poor people can be lifted from poverty.

A natural question arising from this selective aid allocation practice is whether the same practice is taking place in Latin America and the Caribbean or not. Or should the recent upswing in economic growth rates and down swing in poverty ratios in some Latin American countries like Brazil, Chile, Panama, and Peru be attributed to the selective aid allocation practice? To answer these questions, we need to examine the aid allocation practices in Latin America and the Caribbean.



Source: OECD/DAC online database.

Figure 1. Regional Shares of Total Net ODA (unit: %)

The need for analyzing aid allocations in Latin America and the Caribbean is increasingly intensified by the recent trend of the total aid amount allocated to Latin America and the Caribbean. This region is one of the lowest aid-allocated regions among recipient countries in the world. Since 1997, especially 2002, official development assistance (ODA) allocated to Latin America and the Caribbean region has gradually declined. It now stands at only 7 percent of world ODA flows. Since the millennium, most donor countries have reduced their ODA allocations to the region. Therefore, further intensified is the need for allocating the ever getting smaller pie of the global aid more efficiently among the countries in Latin America and the Caribbean and using it more effectively. Hence,

the need for making an empirical analysis of DAC donors' aid allocations to Latin America becomes also more important and urgent.

The government of Korea had not been a member of DAC until 2010. However, Korea has been offering aid to LAC countries as a non-DAC member. The aid allocations by the government of Korea may shed some lights on the non-DAC members' aid allocations to LAC countries. Therefore, this paper also analyzes Korea's aid allocations to LAC countries for a comparison with the DAC donors' aid allocations and makes recommendations for future aid allocations to LAC recipients.

AID ALLOCATIONS TO LATIN AMERICA AND THE CARIBBEAN

Estimation Model

The GLS (Generalized Least Squared) model with heteroskedasticity is used to analyze the aid allocation of 22 DAC countries and Korea to the 32 LAC countries during 5 years from 2005 to 2009.

$$\Lambda_{ijt} = a_0 + b_i + c_t + d_j + fX_{ijt} + e_{ijt} \quad (1)$$

Λ_{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 in this model is a total bilateral ODA amount from a donor to a recipient during the sample period. ODA per capita is not used because the total number of population is included as one of independent variables. When there is no bilateral ODA in a certain year, the observation is excluded in the analysis in order to eliminate the biases of the estimations.

All possible fixed effects are controlled by including the recipient country dummy variable, the year dummy variable, and the donor country dummy variable in the model. Independent variables which show recipient countries' economic, human, and institutional needs are GDP per capita, infant

mortality rate, civil and political rights, government effectiveness, and total population. GDP per capita variable explains recipient countries' economic needs. If the practice of aid allocation is ideal and optimal, negative coefficients can be expected, meaning more aid to poorer countries. A more proper variable may be poverty rates. However, time series poverty rate data defined consistently across countries and over time are scarce, and poverty rates and the GDP per capita data on a world-wide basis had a high correlation in 2005. Therefore, GDP per capita is a good proxy of the poverty rate. Then, infant mortality rate and population explain the recipients' physical needs, and civil and political rights and government effectiveness reveal their political and economic policies and institutions, respectively. Positive coefficients are expected from these four variables if the aid allocation is optimal from the recipient's poverty reduction point of view. This means that more bilateral aid goes to countries with higher infant mortality rates and populations, and to countries with higher civil and political rights and government effectiveness. The variables representing recipient-needs will test whether DAC donors provide aid to countries in LAC in a selective manner, as the main stream literature claims for all aid recipient countries in the late 1990s and through 2003.

Independent variables, which explain donor countries' interests, are also added in this paper. These variables are export to the donor, import from the donor, and FDI from the donor. If donors consider the economic relations with recipient countries when selecting aid recipients, the coefficients of these three variables will show positive signs. These variables will test whether DAC donors provide aid for LAC recipients' benefit only, or for the DAC donors' interests as well.

The relation between the bilateral ODA amount and independent variables with monetary value could have a quadratic function, in addition to the linear relation as assumed in most past studies. Therefore, squared values of GDP per capita, infant mortality rate, population, export to the donor, import from the donor, and FDI from the donor are added as independent variables. All squared variables are expected to have a positive coefficient sign if the allocation practices are optimal from the recipients' needs or donors' interests view point. However, from the donor's point of view, the squared population variable is likely to have a negative sign. A donor is expected to increase the aid amount as the population size of recipient countries increases. However beyond a certain population size, it would increase aid at a decreasing rate or decrease aid to cover as many recipients as possible.

This estimation model is different from the past studies in the literature.

First, this estimation model controls country specific or time specific effects. Some studies consider recipient country specific effects, such as the colonial relations with recipients or recipient countries' voting behavior at the UN (Alesina and Dollar 2000; Alesina and Weder 1999). However, they do not consider other effects. Moreover, they do not control donor countries' specific effects.

Second, this model considers recipient countries' political and economic institutions and policies. Some past studies only consider economic policies and institutions, but not political policies and institutions (Dollar and Levin 2006; Claessens et al. 2007). Other studies consider both political and economic policies and institutions. However, instead of indices representing the development of economic policies and institutions, they used the degree of economic development itself, such as enrollment rates, infant mortality rates, total FDI received from all countries (Berthelemy and Tichit 2004).

Third, this model considers that the relationship between aid and independent variables can be not only linear, but also quadratic by including the squared value of some independent variables as independent variables. This will enrich the depth of analysis (Bandyopadhyay and Wall 2007).

Fourth, to obtain unbiased estimates, this model does not include the observations when the recipient countries' aid is zero (Berthelemy and Tichit 2004; Dollar and Levin 2006; Claessens et al. 2007).

Fifth, this model is different from other earlier studies, since it includes independent variables representing not only recipients' needs, but also donors' interests. While donors are interested in satisfying recipient's various needs, they may also consider their own interests, such as economic relations with recipient countries as well. Many donors explicitly state in their aid policy documents or legislations that they pursue not only socio-economic development of recipient countries, but also, at the same time, their own interests, i.e., mutual interests (for example, Netherlands, Korea). Thus in this combined model, three more variables and their squared variables are added to find if the donor's economic relations are related to the aid amount for the LAC countries. The newly added independent variables include the amount of recipient's exports to the donor, the amount of recipient's imports from the donor, and the amount of the FDI coming from the donor to the recipient. These donor-interest variables are not contravention with recipient' needs, but do promote recipients' development and welfare as well. Some past studies do not consider these variables representing donor's interests at all (Bandyopadhyay and Wall 2007). Others do include some variables representing donor's interests, but the variables

are incomplete by not considering FDI at all (Dollar and Levin 2006; Claessens et al. 2007), by defining the variables improperly such as all FDI coming from all foreign countries (Berthelemy and Tichit 2004), or by considering only imports coming from the donor, but excluding exports going to the donor (Dollar and Levin 2006).

Sixth, this estimation model is different from some past studies since it analyzes the aid allocation behaviors of not only DAC members as a whole (average) (Bandyopadhyay and Wall 2007), but also by individual member countries. There may be variations in the aid allocation policies and practices among donor countries, and their differences should be assessed and ranked so that international pressures can be exerted on donors to undertake aid policy reforms for poverty reductions.

Finally, this study is different from the past studies since it considers the latest period for which aid allocation policy data are available, i.e., 2005-2009. Past studies consider the period up to 2003, during which the objective of aid did not focus on poverty alleviation. The objectives of aid during the 1990s were either debt reductions or structural adjustments of the debt-ridden economies. Or the objectives were transition of the planned economies of the Eastern and Central Europe to market-oriented economies, and bailing out the countries in Asia and Latin America in the aftermath of the Asian Financial Crisis. Poverty reductions became the center stage of aid mainly after the heads of countries agreed on the Millennium Declaration and Millennium Development Goals in 2000. Therefore, the period through 2003 is too short a time for donor countries to adjust their aid allocation policies and focus on the objectives of attaining the MDGs and poverty alleviation.

Data Sources

Data for most variables with monetary values have been collected from the World Bank database. More information on the data sources is detailed in Annex 1. All monetary values are converted into real terms in 2005 US dollar value. Regarding data for variables with non-monetary values, two different indices are used to represent civil and political rights in recipient countries. They are Freedom House's civil liberty and political rights indices. These indices best describe the citizens' rights in recipient countries. The Freedom House scores a country from 1 to 7 for each category with 1 being the most free and 7 being the most restrictive. In this study, those two indices are summed up as one variable and then reversed, with 14 being the most free and 2 being the most restrictive.

The data for the Government effectiveness is picked from the World Bank's Governance Indicators. The index ranges from -2.5 of the least effective to 2.5 of the most effective. All available data between 2005 and 2009 of 22 DAC countries and 32 LAC countries are included in the dataset of this analysis. The sample statistics are provided in Table 2.

Table 2. Sample Statistics: DAC Members' Aid

Variable	Observation	Mean	Std. Dev.	Min	Max
Real ODA (USD million)	2432	8.490663	33.4957	-236.1198	697.0773
Real GDP per capita (USD'000)	3498	5.344042	3.452945	0.4414716	18.73669
Real GDP per capita squared (USD million)	3498	40.47821	52.27296	0.1948971	351.0635
Infant mortality (out of 1,000)	3520	20.60375	11.90862	4.4	70.8
Infant mortality squared	3520	566.2894	815.9302	19.36	5012.64
Civil liberty & Political rights	3520	11.25625	2.562704	2	14
Government Effectiveness	3520	-0.04216	0.6834037	-1.43387	1.514487
Population (million)	3520	17.53074	36.91452	0.048	193.2466
Population squared (trillion)	3520	1669.622	6467.454	0.002304	37344.25
Real Export to the donor (USD'000)	3399	695083.1	7444797	0.0057406	201E+08
Real Export to the donor Squared (USD million)	3399	5.59E+13	1.36E+15	0.000033	4.03E+16
Real Import from the donor (USD'000)	3499	497518.3	4983725	0.0006538	1.40E+08
Real Import from the donor Squared (USD million)	3499	2.51E+13	6.18E+14	4.27E-07	1.95E+16
Real FDI from the donor (USD million)	1856	111.6621	470.8838	0	7668.303
Real FDI from the donor Squared (USD trillion)	1856	234080.5	2064960	0	5.88E+07

For the analysis of Korean bilateral ODA to the LAC countries, bilateral ODA of Korea International Cooperation Agency (KOICA) is used. KOICA's aid accounted for 36% of Korea's total ODA, 51% of total bilateral ODA, and 74% of Korea's total grant ODA in 2008.

A quick glance at the sample statistics of DAC member countries and KOICA shows that KOICA donates much less aid to the LAC countries than an average DAC country does. While an average DAC country provides about 8.49 million dollars to individual LAC countries a year on average, KOICA offers about 1 million dollars. The recipient countries of KOICA aid are poorer with an average GDP per capita of 4,570 dollars than the recipients of DAC countries with an average GDP per capita of 5,344 dollar. LAC recipient countries export to DAC countries

Table 3. Sample Statistics: KOICA's Aid

Variable	Observation	Mean	Std. Dev.	Min	Max
Real ODA (USD million)	115	1.000527	1.720068	0.004161	10.0867
Real GDP per capita (USD'000)	115	4.570567	2.982933	0.4444343	15.4278
Real GDP per capita squared (USD million)	115	29.7106	40.94186	0.1975218	238.017
Infant mortality (out of 1,000)	115	21.62087	12.08561	4.9	66.6
Infant mortality squared	115	612.2539	839.269	24.01	4435.56
Civil liberty & Political rights	115	11.10435	2.355933	2	14
Government Effectiveness	115	-0.169373	0.6241738	-1.496031	1.344273
Population (million)	115	15.16056	30.10146	0.049173	187.9582
Population squared (trillion)	115	1128.061	4916.936	0.002418	35328.29
Real Export to the donor (USD'000)	115	207591	549503.5	0	3692834
Real Export to the donor Squared (USD million)	115	3.42E+11	1.60E+12	0	1.36E+13
Real Import from the donor (USD'000)	115	524806.3	1224963	0	7039286
Real Import from the donor Squared (USD million)	115	1.76E+12	7.17E+12	0	4.96E+13
Real FDI from the donor (USD million)	115	15.897	42.415	0	221.8
Real FDI from the donor Squared (USD trillion)	115	2036.1	7310.8	0	49212

much more than to Korea, but import from DAC countries much less than from Korea (\$695,038 thousand versus \$207,591 thousand; and \$497,518 thousand versus 524,806 thousand). The same is true with regard to FDI to LAC recipient countries.

ANALYSIS RESULTS

DAC Countries' Aid Allocations to LAC

Before making regression analyses based on the equation (1), a rank correlation coefficient has been estimated. If DAC donors take into account the independent variables that represent LAC recipients' development needs in their aid allocation decisions, the correlation between the rank of LAC countries by these independent variables and that by the amount of aid would be close to one. Then, that aid allocation would be close to the optimum aid allocation model that we have reviewed. Therefore, all 32 LAC recipients are ranked by each of the independent variables (GDP per capita, infant mortality rate, civil liberty/political right index,

government effectiveness index, and population size) on the basis of the average value over the period 2005-2009. The first rank is given to the lowest country in the case of GDP per capita and to the highest country in the case of all other variables, since the country is likely to receive the most aid. These ranks are averaged out with equal weights to come up with one rank for each recipient country. This average rank is compared with the rank of LAC recipient countries on the basis of the ODA amount with the first rank to the country with the largest aid amount. According to the optimal allocation model, the correlation coefficient of the two sets of ranks should be close to one.

In reality, the estimated rank correlation coefficient is 0.29, which is a fairly weak correlation. This means that the aid amount is not so strongly determined by the independent variables that we adopted in our analysis. Dominican Republic is ranked the lowest in terms of the development needs, but its aid amount is ranked only 19th. Likewise, Brazil, Chile, Jamaica, and Costa Rica are ranked 3rd, 5th, 9th, and 10th in their development needs, respectively, but their aid amount is ranked 8th, 17th, 32nd, and 18th, respectively. On the other hand, Bolivia and Colombia are ranked 6th and 7th in development needs, respectively, but their aid amount is ranked 2nd and 1st, respectively. Details of this rank correlation analysis are given in Annex 2.

However, this rank correlation analysis considers the effect of all independent variables at the same time and assumes that all variables have an equal weight in their effect on aid amounts. The aid amount is positively correlated with GDP per capita (0.57), infant mortality (0.47), and population (0.68). However, it is negatively correlated with civil/political rights (-0.65) and government effectiveness (-0.67). The simple average of all ranks of the recipient countries by the independent variables is not a good indication of the development needs of each country. Therefore, for a better frame of analysis, this study uses regression analyses, which consider the effects of each independent variable when others are assumed to be the same.

The overall specification of the estimation model is acceptable. Although the new variables representing donors' interests are added to the variables representing recipients' needs, the Wald chi test statistic, which shows the significance of the simultaneous specification of multiple variables, is high enough with a low p-value. Moreover, the coefficients of the variables representing donors' interests are also statistically significant. The estimation results based on the model including only recipients' needs variables (the recipient-needs model) seem to show that a greater number

Table 4. Regression Results: DAC Members' Aid Allocations: 2005-2009

Variable (Dependent variable: real ODA amount in million US dollars)	Recipient-Needs Only Model (2005-2009)	Recipient-needs and Donor-Interests Combined Model (2005-2009)
Statistics	Coefficient (T-value)	Coefficient (T-value)
Recipient Fixed Effects	Y	Y
Time Dummy	Y	Y
Donor Dummy	Y	Y
Common Intercept	-18.14471 (-0.52)	-101.4658 (-0.98)
Real GDP per capita	0.3413117 (0.99)	1.052692 (1.71)
Real GDP per capita squared	-0.0167639 (-0.9)	-0.0755242* (-2.34)
Infant mortality	0.561781* (2.28)	-0.3425609 (-1.02)
Infant mortality squared	-0.0118631* (-3.09)	0.006029 (1.3)
Civil liberty & Political rights	0.1140988 (0.41)	0.2188335 (0.62)
Government Effectiveness	0.3481671 (0.52)	-1.456383 (-1.36)
Population	0.3008666 (0.83)	1.027014 (1.21)
Population squared	-0.0002943 (-0.25)	-0.0023689 (-0.86)
Real Export to the donor		3.79E-06* (5.45)
Real Export to the donor Squared		-1.15E-13* (-3.89)
Real Import from the donor		7.30E-06* (6.68)
Real Import from the donor Squared		-3.57E-13* (-3.73)
Real FDI from the donor		-0.0056242* (-2.8)
Real FDI from the donor Squared		6.10E-07 (1.28)
No. of Observations	2413	1215
Overall Significance Test	Wald chi2(64) = 2351.57 Prob > chi2 = 0.0000	Wald chi2(66) = 1128.71 Prob > chi2 = 0.0000

*: statistically significant at the 10 percent level.

of variables are statistically significant at the 10 percent level, i.e., infant mortality and its squared variables. On the other hand, the estimation results based on the model including both recipient-needs and donor-interests (the combined model) show only the GDP per capita squared variable is statistically significant. The sign and size of the coefficients estimated by the two models are often different even when they are statistically insignificant. These discrepancies between the estimations by the two models may be due to the misspecification, especially the missing variable effects, of the recipients' needs only model. Therefore, the estimation results of the combined model is less biased and preferred.

Among the variables which represent LAC recipients' needs in the combined model, statistically significant at the 10 percent level is only the GDP per capita squared variable. The coefficient of the GDP per capita, infant mortality, and population variables is statistically insignificant. The negative coefficient of GDP per capita squared is consistent with the sign of the optimal or poverty-efficient aid allocation model. This means that as LAC recipients get richer above a certain level of GDP per capita, they receive aid from DAC donors at a decreasing rate. The policy and institutional variables representing the political and economic institutions of LAC countries and effectiveness of LAC governments are both insignificant. We cannot say that DAC donors allocate more aid to LAC countries with poorer per capita income, higher infant mortality, larger population, and stronger political and economic policies and institutions. Therefore, we can conclude that when DAC donors allocate their aid to LAC recipients, they do not consider, on average, the development needs of LAC countries. We cannot observe any selective aid allocations, as referred to in the recent literature. This type of aid allocation performances is inconsistent with the optimal aid allocation model that we have reviewed. It cannot promote growth and reduce poverty effectively. However, when

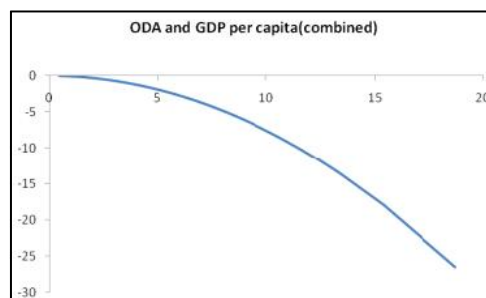


Figure 2. Relationship between Aid and GDP per capita

LAC recipients get richer above a certain level of per capita income (about \$2,000), they receive aid from DAC donors at a decreasing rate, and only this pattern of aid allocations is consistent with the optimal aid allocation model.

Among the variables representing donor-interests, statistically significant at the 10 percent level are exports to the donor, exports to the donor squared, imports from the donor, imports from the donor squared, and FDI from the donor. The only exception is the FDI squared variable. The positive sign of the exports and imports and their squared variables means that DAC donors favor those LAC recipients which export more to the donor and import more from the donor. This type of aid allocations is conducive to economic growth and poverty alleviation in LAC recipients since international trade promotes growth, which would in turn promote poverty alleviation. The negative sign of the FDI variable means that DAC donors decrease their aid to LAC recipients as donors increase their investment in the recipients. This type of aid allocations is not conducive to economic growth and poverty reductions in LAC recipients. Donors perhaps try to protect their interests by offsetting the increasing FDI amount with decreasing aid amount in each country. They may believe that FDI and aid are substitutable for each other. The negative sign of the exports squared and imports squared variables mean that as LAC recipients increase their exports to or imports from their DAC donors beyond a certain level, they get aid from DAC donors at a decreasing rate. This type of aid allocations is protective trade policies and is not conducive to economic growth and poverty alleviation in LAC recipients since international trade promote economic growth. Therefore, we can conclude that when DAC donors provide aid to LAC, they consider not only recipients' growth and poverty alleviation needs, but also donors' own interests. Nevertheless, DAC donors have lost a balance in pursuing this win-win aid allocation behavior by placing more emphasis on their interests and taking protective policies.

In the first graph of Figure 3, aid keeps increasing as export increases, but starts to decrease as exports surpass about 19 billion dollars. In this graph, the export from Mexico to the United States was omitted because it is an outlier. Only the export amounts of 10 observations out of 1,215 are greater than 19 billion dollars. Thus, for most recipient countries, aid keeps increasing as the recipient countries export more to the DAC donor countries. In the case of import, the relationship pattern is similar to that of the export. As the import from DAC donor countries increases, aid rises. Then aid decreases when the import becomes greater than about

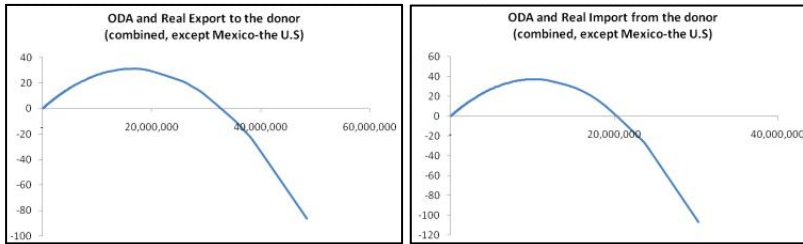


Figure 3. Relationship between Aid and Real Trade with the Donor

12 billion dollars. The import of Mexico from the United States was also omitted in this graph. Only 7 observations, however, have the import amount greater than 12 billion dollars.

DAC Individual Countries' Aid Allocations to LAC

In this part, the analysis based on the combined model is applied to each of the 18 individual DAC countries and Korea. Australia, Austria, Canada, and Portugal were excluded from the analysis due to the lack of data. These countries have only a few observations or no observations for all variables for regression analyses, in particular the FDI variables. The detailed results are summarized in Annex 3.

Again, it has been proved that when individual DAC donors allocate aid to LAC countries, they consider not only LAC recipients' needs, but also DAC donors' own interests as well. Of the 18 individual DAC donors for which data are available, 8 donor countries (Denmark, Finland, France, Germany, Netherlands, New Zealand, Sweden, and the UK) do not have any significant variable out of the six independent variables that represent donors' interests. All the other 10 DAC donors have at least one statistically significant variable out of the six independent variables. This means that DAC donors do consider their own interests when making aid allocation decisions for LAC countries. Therefore, it is proper to estimate the donors' aid allocation policies and performances with a model that includes both recipient-needs and donor-interests variables. If estimation is made with a model based only on LAC recipients' needs, the estimated coefficients will be biased and unreliable.

Most DAC donors do consider LAC recipients' interests. Of the 18 DAC donors for which data are available, only 5 DAC donors (Denmark, Finland, Netherlands, Norway, and Switzerland) do not have any statistically significant variables out of a total of eight independent variables that

represent LAC recipients' needs. All other 13 countries have at least one statistically significant recipients' needs variable, and therefore they do consider LAC recipients' development needs when making aid allocation decisions. Only two countries (Norway and Switzerland) seems to consider only donor-interests when making aid allocation decisions for LAC countries

Three individual DAC countries seem to consider neither recipient-needs, nor donors' economic interests (Denmark, Finland, and Netherlands). Either they have no methodical aid allocation system, or have a system which is based neither donor-interests, nor recipient-needs. They may pursue political, strategic or some other interests.

Table 5. Determinants of Aid Allocations by Country Group

No.	Countries that considered recipient-needs only	Countries that considered donor-interests only	Countries that considered both recipient-needs and donor-interests	Countries that considered neither recipient-needs nor donor-interests
1	France	Norway	Belgium	Denmark
2	Germany	Switzerland	Greece	Finland
3	New Zealand		Ireland	Netherlands
4	Sweden		Italy	
5	United Kingdom		Japan	
6			Luxembourg	
7			Spain	
8			United States	

The aid allocation performances of DAC donors in LAC can be assessed and ranked on the basis of the number of statistically significant coefficients out of a total number of all independent variables. For this purpose, all independent variables in the combined model are divided into two groups: a recipient-needs variable group and a donor-interest variable group. Then the coefficient of each recipient-needs variable is scored equally 12.5% (100% for all 8 recipient-needs variables) if it is statistically significant and its sign is consistent with the optimal aid allocation model and aid objectives. Likewise, the coefficient of each donor-interests variable is scored equally 16.7% (100% for all 6 donor-interest variables) if it is statistically significant and its sign is consistent with the donor's interest and at the same time conducive to recipients' economic growth and poverty reduction (Annex 3).

For example, Luxembourg's aid allocation performance is assessed as 37.5% in the recipient-need variable group and 16.7% in the donor-interest

variable group. In the recipient-needs variable group, it has 5 significant variables (GDP per capita, GDP per capita squared, government effectiveness, population, population squared; among 8 recipient need variables) with a potential score of 62.5%. However, it actually receives a score of 37.5%, since only three coefficients (GDP per capita, government effectiveness, and population squared) out of 6 recipient-needs variables have the sign consistent with the optimal aid allocation model. In the 6 donor-interest variables group, only one variable (real imports from the donor) is statistically significant and consistent with the optimal sign and aid objectives. Thus it receives 16.7% in the donor-interest variable group. Table 6 provides a summary of the scores for individual DAC countries and Korea (KOICA).

Among 18 individual DAC donor-countries analyzed by this scoring methodology, 5 countries (Denmark, Finland, Netherlands, Norway, and Switzerland) receive zero% in the recipient-need variables group. This may be interpreted as no consideration of recipient-needs when allocating aid resources to LAC. Other 13 countries have at least one or more coefficients significant and optimal. Belgium, Luxemburg, New Zealand, and Spain receive the highest score of 37.5% in the recipient-needs variables group. The rest have 12.5% or 25% with one or two significant and optimal coefficients.

In the case of the donor-interest variables group, 8 donor-countries do not have any significant and optimal coefficient, while other 10 donors have at least one. Those 8 countries are Denmark, Finland, France, Germany, Netherlands, New Zealand, Sweden, and the UK. These countries are indifferent to their economic interest when allocating bilateral aid to the LAC countries. On the other hand, Spain has the highest score of 50%, and Belgium gets the second highest score of 33.3%. All other countries have just 16.7% with one significant and optimal coefficient.

About half the total DAC member countries have relatively high scores in both groups. These countries can be regarded as well-balanced countries, pursuing both recipients' needs and donors' interests at the same time. Belgium has 37.5% in the recipient-needs variables group and 33.3% in the donor-interest variable group, and Spain gets 25% and 50% in each category. Although they both have high scores in both groups, Belgium is more recipient-need-centric, and Spain is more donor-interest-centric. New Zealand also has a high score of 25% in the recipient- need variable group, but its donor-interest variable group score is zero. It is very recipient-need-centric.

The scores of overall DAC countries are 12.5% in the recipient-need variables group and 33.3% in the donor-interest variables group. DAC

countries consider their economic interests more than LAC recipients' needs. The level of consideration given to LAC countries' needs is low. Especially, GDP per capita and civil and political rights are relatively less considered than other variables. Again, DAC donors' aid allocations to LAC recipients are far from the optimal aid allocation model and are not so conducive to economic growth and poverty alleviation in LAC recipient countries.

Korea's (KOICA's) Aid Allocations to LAC

The analysis of Korea's (KOICA's) aid allocations via the combined model shows results which are somewhat different from those of DAC countries as a whole (Table 7). Among recipient-needs variables, there are a greater number of significant coefficients in the Korea (KOICA) case (2) than in DAC countries as a whole (1): infant mortality rate and infant mortality rate squared. However, the negative sign of the infant mortality is inconsistent with the optimal aid allocation model. The negative sign means that aid decreases as infant mortality increases in LAC recipient countries. To be consistent with the optimal aid allocation model, greater aid should be given as infant mortality increases in LAC countries, since infant mortality is an indicator of poverty and the needs for human resources development. The positive sign of the infant mortality squared variable (about above 60) is consistent with the optimal aid allocation model. Therefore, of the 8 independent variables representing the LAC recipients' needs, Korea's aid allocation satisfies only one criterion, i.e., 12.5%. This score is the same as that of the DAC donors as a whole (Table 6) Among the donor-interest variables, there are a fewer number of significant coefficients in the Korea (KOICA) case (2) than in DAC donors as a whole (5): real export to the donor and real export to the donor squared. Although the positive sign of the real export to the donor is consistent with the optimal aid allocation model, the negative sign of the real export to the donor squared variable is inconsistent with the optimal aid allocation model. This negative sign means that as the real export to Korea increases beyond a certain level, Korea (KOICA) provides aid to the LAC recipients at a decreasing rate. This is inconsistent with the objectives of aid, since more international trade promotes economic growth and poverty reduction of LAC recipients and satisfies the demand of Korea as well. Therefore, of the 6 independent variables representing the Korea's interests, Korea's (KOICA's) aid allocation meets only one criterion, i.e., 16.7%. This score is lower than that of the DAC donors as a whole, which is 33.3% (Table

6). In sum, Korea's (KOICA's) aid allocation to LAC recipients is more or less the same as or inferior to DAC's aid allocations as a whole.

Table 6. DAC Members' and Korea's Aid Allocation Scores: 2005-2009

DAC Members and Korea	Score (%) based on Recipient Needs	Rank	Score (%) based on Donor Interests	Rank
Australia	N.A.	N.A.	N.A.	N.A.
Austria	N.A.	N.A.	N.A.	N.A.
Belgium	37.5	1	33.3	2
Canada	N.A.	N.A.	N.A.	N.A.
Denmark	0	5	0	4
Finland	0	5	0	4
France	25	4	0	4
Germany	25	3	0	4
Greece	12.5	3	16.7	3
Ireland	12.5	3	16.7	3
Italy	12.5	4	16.7	3
Japan	12.5	4	16.7	3
Luxembourg	37.5	3	16.7	3
Netherlands	0	5	0	4
New Zealand	25	2	0	4
Norway	0	5	16.7	3
Portugal	N.A.	N.A.	N.A.	N.A.
Spain	25	2	50	1
Sweden	12.5	4	0	4
Switzerland	0	4	16.7	3
United Kingdom	25	3	0	4
United States	12.5	4	16.7	3
DAC States as a whole	12.5	N.A.	33.3	N.A.
Korea (KOICA)	12.5	N.A.	16.7	N.A.

Table 7. Regression Results: Korea's (KOICA's) Aid Allocations to LAC (2005-2009)

Variable (Dependent variable: real ODA amount in million US dollars)	Recipient-Needs Only Model (2005-2009)	Recipient-Need and Donor-Interest Combined Model (2005-2009)
Statistics	Coefficient (T-value)	Coefficient (T-value)
Recipient Fixed Effects	Y	Y
Time Dummy	Y	Y
Donor Dummy	N	N
Common Intercept	-4.354638 (-1.27)	-2.179216 (-0.56)
Real GDP per capita	-0.0689036 (-0.3)	-0.1732707 (-0.63)
Real GDP per capita squared	-0.0034618 (-0.36)	-0.0021244 (-0.21)
Infant mortality	-0.4183708* (-3.09)	-0.4352773* (-3.17)
Infant mortality squared	0.0032104* (2.33)	0.003753* (2.79)
Civil liberty & Political rights	0.1185443 (0.95)	0.1130293 (0.99)
Government Effectiveness	0.3990592 (0.86)	0.325601 (0.74)
Population	0.6302122* (2.31)	0.4527049 (1.34)
Population squared	-0.0028182* (-2.64)	-0.0008978 (-0.4)
Real Export to the donor		2.26E-06* (2.21)
Real Export to the donor Squared		-3.55E-13* (-2.04)
Real Import from the donor		5.52E-08 (0.1)
Real Import from the donor Squared		-7.80E-14 (-1.36)
Real FDI from the donor		0.0292686 (1.89)
Real FDI from the donor Squared		-0.0000634 (-0.99)
No. of Observations	115	115
Overall Significance Test	Wald chi2(42) = 524.05 Prob > chi2 = 0.0000	Wald chi2(45) = 500.86 Prob > chi2 = 0.0000

*: statistically significant at 10 percent level.

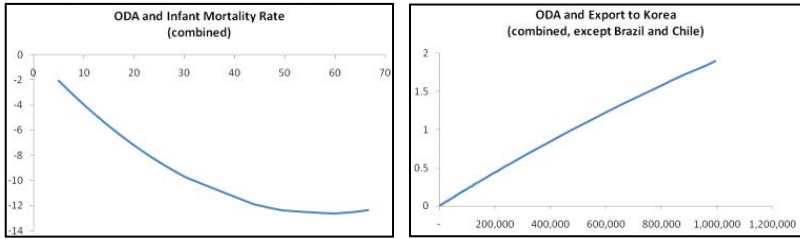


Figure 4. Relationship between Aid and Infant Mortality and Real Exports to Korea

CONCLUSIONS AND RECOMMENDATIONS

Ever since the debt crisis in the 1980s, the countries in LAC have reformulated their development policies and restructured their economies. Thanks to this effort and the favorable global economic situation in the 2000s, they have accelerated their growth rates and poverty reductions. However, even during this recent period, which is economically favorable to LAC, the rates of growth and poverty reduction in LAC lag behind those in countries in East Asia. The slower rates of growth and poverty reduction in LAC may be attributable to ineffective uses of foreign aid available to LAC.

This paper tries to test the hypothesis that countries in Latin America and the Caribbean (LAC) do not use foreign aid effectively since the way aid resources are allocated to LAC recipient countries are inefficient in promoting growth and reducing poverty. If aid is not allocated more abundantly to the countries which can apply the aid resources effectively for economic growth and poverty reduction, aid resources would not be able to contribute to economic and social development of the countries in LAC.

For the hypothesis test, this paper adopts a model which considers LAC recipient-countries' needs for development and DAC donor countries' interests simultaneously. They are not mutually harmful, but rather complementary. This combined model is applied to 22 DAC donors and 32 LAC countries over the period of 2005-2009. The model is also applied to the aid allocation by KOICA, Korea's principal grant aid agency, to compare it with DAC donors' aid allocations.

The results of the analysis can be summarized as follows. First, in aid allocation decisions, most DAC donors do consider not only LAC recipient-countries' development needs, but also donors' interests. Second, DAC donors as a whole, however, pay more attention to their own interests

than LAC recipients' development needs. We cannot say that DAC donors allocate more aid to LAC countries with poorer per capita income, higher infant mortality, larger population, and stronger political and economic policies and institutions. This type of aid allocation performances is inconsistent with the optimal aid allocation model and cannot contribute to growth and poverty reduction effectively. Third, DAC donors favor those LAC recipients which export to the donor and import from the donor more. This type of aid allocations is conducive to economic growth and poverty alleviation in LAC recipients, since international trade promotes growth, which would in turn promote poverty alleviation. DAC donors are inconsistent in pursuing the win-win aid allocation behavior by offsetting increasing FDI in LAC with decreasing aid and providing aid at decreasing rate, when LAC recipients increase exports to and imports from DAC donors beyond a certain level.

The aid allocation performances of DAC donors in LAC can be assessed and ranked on the basis of the number of statistically significant coefficients out of a total number of all independent variables. There is a wide variation among DAC donors in aid allocation performances. For example, Belgium and Spain get a high score in considering both LAC recipients' development needs and their own interests in a balanced way, while New Zealand scores high by paying more attention to LAC recipients' needs, but neglect their own interests. On the other hand, Norway and Switzerland pay attention exclusively to their own interests, but neglect LAC recipients' needs.

Korea's (KOICA's) practices of aid allocations to LAC are more or less similar or somewhat inferior to those of DAC donors as a whole (average). Korea is similar to DAC countries in paying little attention to LAC recipients' development needs. At the same time, Korea is not considering its own interests as much as DAC donors do.

Both DAC donors and Korea's aid allocations to LAC recipients are far from the optimal aid allocation model and are not so conducive to economic growth and poverty alleviation in LAC recipient countries. Since donors agreed to help developing countries in general and LAC countries specifically, to achieve the MDGs by 2015, they should be adhering to the optimal aid allocation model. Likewise, LAC recipients should step up their negotiation efforts to induce their donors to allocate aid in such a way conducive to economic growth and poverty reductions in LAC.

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Annex 1. Source of Data

Variable	Source	URL
ODA: DAC member	OECD	http://stats.oecd.org/index.aspx?r=427326
ODA: Korea	KOICA	http://stat.koica.go.kr:8077/komid/jdpyrmp/ps/stat_index.jsp
GDP Deflator	World Bank	http://databank.worldbank.org/ddp/home.do?Step=2&id=4&DisplayAggregation=N&SdmxSupported=Y&CNO=2&SET_BRANDING=YES
GDP per capita	World Bank	http://databank.worldbank.org/ddp/home.do?Step=2&id=4&DisplayAggregation=N&SdmxSupported=Y&CNO=2&SET_BRANDING=YES
Infant mortality	World Bank	http://databank.worldbank.org/ddp/home.do?Step=2&id=4&DisplayAggregation=N&SdmxSupported=Y&CNO=2&SET_BRANDING=YES
Civil liberty & Political rights	Freedom House	http://www.freedomhouse.org/templete.cfm?page=25&year=2010
Govt. Effectiveness	World Bank	http://databank.worldbank.org/ddp/home.do?Step=2&id=4&DisplayAggregation=N&SdmxSupported=Y&CNO=2&SET_BRANDING=YES
Population	World Bank	http://databank.worldbank.org/ddp/home.do?Step=2&id=4&DisplayAggregation=N&SdmxSupported=Y&CNO=2&SET_BRANDING=YES
Export to the donor	UNCTAD	http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
Import from the donor	UNCTAD	http://unctadstat.unctad.org/ReportFolders/reportFolders.aspx
FDI from the donor	OECD	http://stats.oecd.org/index.aspx?r=427326
FDI from Korea	Korea Eximbank	http://dodisis.koreaexim.go.kr/fv/fvweb/login.jsp

Annex 2. Rank Correlation Analysis with Aid Amount (coefficient: 0.29)

Aid Recipient Country	GDP per capita	Infant mortality	Civil-political rights	Govt effectiveness	Population	Average of All Ranks	Aid amount
	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Antigua and Barbuda	29	27	16	8	30	30	28
Argentina	22	23	12	19	4	18	16
Barbados	30	28	1	1	26	26	27
Belize	11	17	8	21	25	20	24
Bolivia	3	2	23	27	13	6	2
Brazil	23	14	12	16	1	3	8
Chile	26	31	1	2	7	5	17
Colombia	13	16	26	15	3	7	1
Costa Rica	19	29	1	9	18	10	18
Cuba	32	32	32	24	10	32	14
Dominica	14	30	1	6	31	21	30
Dominican Republic	12	6	12	23	11	1	19
Ecuador	9	12	23	30	9	24	9
El Salvador	8	18	19	18	16	17	11
Grenada	20	24	8	11	29	29	22
Guatemala	7	3	29	26	8	8	7
Guyana	6	5	22	20	23	11	15
Haiti	1	1	31	32	12	13	3
Honduras	4	7	26	25	14	12	6
Jamaica	15	8	18	13	21	9	32
Mexico	27	21	18	14	2	22	12
Nicaragua	2	10	28	29	17	27	4
Panama	21	19	8	12	19	15	31
Paraguay	5	13	23	28	15	25	13
Peru	10	11	18	22	5	4	5
St. Kitts-Nevis	28	22	1	4	32	28	29
St. Lucia	18	15	1	3	27	2	26
St. Vincent & Grenadines	16	25	8	4	28	19	23
Suriname	17	9	12	17	24	16	10
Trinidad & Tobago	31	4	16	9	22	23	25
Uruguay	24	26	1	7	20	14	21
Venezuela	25	20	30	31	6	31	20

Annex 3. Continued

	Optimal Sign	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Japan
Real Export to the Donor	(+)	-1.08E-16* (-3.53)	-4.45E-06 (-0.08)	-7.84E-06 (-1.32)	2.61E-06 (0.23)	1.88E-06 (0.46)	-4.46E-07 (-1.08)	1.07E-05 (0.57)	-5.52E-16 (-0.79)	-6.17E-07 (-0.05)
Real Export to the Donor Squared	(+)	1.84E-13 (0.22)	1.31E-11 (0.05)	1.05E-11 (0.71)	-1.18E-12 (-0.42)	-1.49E-12* (-2.59)	7.76E-13 (0.88)	-7.94E-12 (-0.09)	1.21E-12 (0.74)	-1.58E-13 (-0.16)
Real Import from the Donor	(+)	1.87E-05* (3.96)	1.84E-05 (0.14)	9.96E-06 (0.56)	-6.68E-07 (-0.1)	-1.75E-06 (-0.24)	1.39E-06 (0.59)	4.35E-05* (2.86)	-6.65E-06 (-1.8)	-1.94E-06 (-0.27)
Real Import from the Donor Squared	(+)	6.6E-12 (1.14)	-3.15E-11 (-0.17)	-1.97E-11 (-0.71)	-4.76E-13 (-0.16)	5.94E-13 (0.2)	-6.98E-11* (-2.12)	-3.89E-10* (-2.27)	2.44E-12* (2.15)	9.21E-14 (0.26)
Real FDI from the Donor	(+)	5.63E-03* (2.39)	1.39E-03 (0.02)	-3.16E-03 (-0.1)	-5.95E-03 (-0.61)	-8.53E-03 (-0.51)	-0.02719 (-1.28)	(dropped)	-0.2013511* (-2.06)	-0.077307* (-5.05)
Real FDI from the Donor Squared	(+)	-5.66E-06* (-2.18)	-6.43E-06 (-0.01)	-3.14E-05 (-0.21)	-0.0000754* (-2.47)	2.88E-05 (0.94)	7.70E-03* (4.23)	6.40E-03 (1.31)	2.923E-04 (0.09)	2E-05* (7.84)
Actual/Optimal		2/6	0/6	0/6	0/6	0/6	1/6	1/6	1/6	1/6
%		33.3	0	0	0	0	16.7	16.7	16.7	16.7
No. Observations		61	38	60	74	97	86	83	92	56
Overall Specification Test		Wald Chi2(36)=23 18.11 Prob>Chi2= 0.0000	Wald Chi2(25)= 595.38 Prob>Chi2= 0.0000	Wald Chi2(30)= 6959.62 Prob>Chi2= 0.0000	Wald Chi2(41)= 1394.41 Prob>Chi2=0.00	Wald Chi2(42)= 2093.71 Prob>Chi= 0.0000	Wald Chi2(41)= 1394.41 Prob>Chi2= 0.0000	Wald Chi2(32)= 1118.07 Prob>Chi2=0. 0000	Wald Chi2(57)= 315.97 Prob>Chi2=0. 0000	Wald Chi2(28)= 353.14 Prob>Chi2= 0.0000

Annex 3. Continued

	Optimal Signal	Luxembourg	Netherlands	New Zealand	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
Fixed Effects		Y	Y	Y	Y	Y	Y	Y	Y	Y
Time Dummy		Y	Y	Y	Y	Y	Y	Y	Y	Y
Donor Dummy		N	N	N	N	N	N	N	N	N
Common Intercept		(dropped)	31.8438 (0.18)	(dropped)	(dropped)	-6.71019 (-0.02)	-49.6367 (-1.26)	12.6197 (0.26)	-994054 (-1.88)	-728093 (-2.57)
Real GDP per capita	(-)	-7.661572* (-11.12)	1.3148 (0.18)	0.046222* (2.51)	-1.3525 (-1.87)	-26.6289 (-1.79)	4.16266* (4.43)	0.9730 (0.43)	-7.4365 (-0.34)	-2.6366 (-0.47)
Real GDP per capita Squared	(-)	0.4467303* (10.19)	-0.0862 (-0.19)	-0.001394* (-2.29)	-0.02955 (-0.46)	1.511456 (1.77)	-0.313661* (-5.06)	-0.0631 (-0.49)	0.311878 (0.26)	-6.05E-03 (-0.03)
Infant mortality	(+)	0.35412 (0.5)	0.00477 (0)	4.81E-04 (0.06)	0.33312 (1.32)	-27.48956* (-3.97)	0.994074 (1.89)	-2.42483 (-1.43)	32.42717* (2.3)	15.78637* (2.89)
Infant mortality Squared	(+)	-0.01588 (-1.7)	7.81E-03 (0.32)	6.41E-05 (0.6)	-5.27E-03* (-2.56)	0.22876* (3.13)	-0.00247 (-0.71)	0.0233 (1.33)	-0.3888 (-1.68)	-0.186173* (-2.13)
Civil Liberty & Political Rights	(+)	-0.35195 (-1.18)	1.4696 (0.91)	-0.0158 (-1.19)	0.394491 (1.7)	-24.565 (-1.85)	-3.042590* (-2.85)	0.67254 (1.14)	20.568 (1.62)	-0.9498 (-0.22)
Government Effectiveness	(+)	3.590735* (3.17)	-1.62868 (-0.16)	-0.085471* (-2.92)	-6.476547* (-3.95)	11.8762 (0.81)	-0.31050 (-0.24)	3.5948 (1.4)	51.11762* (2.16)	-3.0132 (-0.16)
Population	(+)	-3.165305* (-2.13)	-1.06098 (-0.3)	0.116208* (2.02)	(dropped)	26.77685* (2.51)	1.6952 (1.49)	0.3613 (0.38)	19.1975 (1.22)	17.4313 (1.71)
Population Squared	(+)	1.76E-03* (2.12)	-5.25E-03 (-0.31)	-1.83E-03* (-2.59)	-8.22E-04 (-0.95)	-0.059190* (-2.43)	-3.43E-03 (-0.95)	-6.61E-03* (-2.4)	-6.56E-03 (-0.17)	-0.01434 (-0.48)

Annex 3. Continued

	Optimal Signal	Luxembourg	Netherlands	New Zealand	Norway	Spain	Sweden	Switzerland	United Kingdom	United States
Actual/Optimal		3/8	0/8	2/8	0/8	2/8	1/8	0/8	2/8	1/8
%		37.5	0	25	0	25	12.5	0	25	12.5
Real Export to the Donor	(+)	2.26E-06 (1.29)	4.02E-06 (0.41)	-2.15E-05 (-2.5)	1.16E-04* (2.39)	6.65E-05* (3.87)	-9.96E-06 (-0.96)	-2.79E-05* (-2.5)	2.07E-05 (0.9)	6.81E-06* (2.03)
Real Export to the Donor Squared	(+)	5.42E-10 (0.22)	-7.96E-13 (-0.31)	3.04E-10 (0.9)	-1.23E-10* (-3.38)	-1.21E-11* (-2.83)	2.18E-11 (1.55)	7.05E-12 (0.71)	3.77E-12 (0.74)	-8.38E-14 (-1.9)
Real Import from the Donor	(+)	6.345E-04* (8.19)	-4.77E-07 (-0.01)	-8.01E-07 (-0.31)	-5.78E-05 (-1.98)	-1.24E-04* (-3.69)	1.57E-05 (1.92)	5.07E-05* (2.45)	-3.62E-05 (-0.68)	-4.38E-06 (-1.28)
Real Import from the Donor Squared	(+)	-1.1E-08 (-1.77)	1.11E-11 (0.16)	1.93E-11 (0.26)	27E-10 (1.88)	3.62E-11* (2.39)	-1.17E-11 (-1.77)	-1.26E-11* (-2.6)	-1.01E-11 (-0.93)	9.59E-14 (0.85)
Real FDI from the Donor	(+)	3.40E-03 (0.61)	-0.0330262* (-2.02)	(dropped)	(dropped)	-0.014817* (-3.06)	7.70E-03 (1.06)	2.14E-04 (1.26)	-0.056146 (-1.27)	-8.84E-04 (-0.15)
Real FDI from the Donor Squared	(+)	-6.74E-06 (-1.04)	2.22E-05 (0.88)	(dropped)	-8.05E-06 (-0.19)	1.71E-06* (3.18)	-1.9E-05 (-0.65)	-5.39E-7 (-1.09)	1.86E-05 (0.96)	6.43E-0 (0.54)
Actual/Optimal		1/6	0/6	0/6	1/6	3/6	0/6	1/6	0/6	1/6
%		16.7	0	0	16.7	50	0	16.7	0	16.7
No. Observations		41	54	74	36	45	49	45	64	96
Overall Specification Test		Wald Chi2(27)= 8110.96 Prob>Chi2= 0.0000	Wald Chi2(31)= 17216.85 Prob>Chi2= 0.0000	Wald Chi2(32)= 2841.9 Prob>Chi2 =0.0000	Wald Chi2 (20)=32200 000 Prob>Chi2 =0.0000	Wald Chi2(27)=57 73.75 Prob>Chi2 =0.0000	Wald Chi2(29)=33 65.78 Prob>Chi2 =0.0000	Wald Chi2(26)=12 85.82 Prob>Chi2= 0.0000	Wald Chi2(33)= 88.75 Prob>Chi2 =0.0000	Wald Chi2(40)=18 69.85 Prob>Chi2 =0.0000