SECTORAL DETERMINANTS OF KOREAN DEVELOPMENT ASSISTANCE: SIMILAR, YET DIFFERENT?

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Are South Korean official development assistance (ODA) disbursement determinants different by sectors? The majority of existing studies have focused on either aggregate total ODA flows or regional distribution, although motivations for ODA allocation could differ by sector. Using a panel data set of 127 recipient countries over 16 years, this study investigates the determinants of Korea's ODA allocation, especially grants, across five main sectors - specifically, education, health, public administration, technology, and agriculture. We find that the sectoral ODA allocation is generally determined by various factors and their impacts vary across sectors. It should be noted, however, that 'the total ODA volume' and 'the status of Korea's priority country' show consistently positive coefficients regardless of sectors. Moreover, it was found that this effect continues to have a powerful impact even after Korea became an OECD Development Assistance Committee (DAC) member. The finding implies that political and strategic factors play a key role in determining the sectoral ODA allocation of Korea. For sectoral ODA disbursement to be further concentrated toward a smaller number of recipient countries, this study suggests that the number of priority countries should be reduced than the status of quo.

Keywords: Official Development Assistance, ODA Determinants, South Korea, Aid Allocation, Sectoral Analysis
JEL Classification: H5, I3

1. INTRODUCTION

Having hosted the Busan Fourth High Level Forum on Development Effectiveness in 2011, South Korea (hereafter referred to as Korea) became a newly rising driving force in the global development community. Through supporting international efforts to eradicate poverty and achieve sustainable development, Korea has steadily expanded its official development assistance (ODA) budget since joining the OECD Development Assistance Committee (DAC) and even represented the highest rate of increase in ODA volume among the DAC members in 2014 (Government of Korea [GoK], 2017a) and

the third-highest in 2019 (OECD, 2020). Ranked as the 15th largest donor, the Korean government provided USD 2.1 billion for net ODA to the developing world, corresponding to 0.14% of its gross national income (GNI) in 2017 (GoK, 2017a).

As Korean ODA has received a great deal of international attention, recent literature on the determinants of Korean ODA in relation to its recipient countries has also rapidly emerged. The large body of existing literature on Korean ODA mainly focused on either the total aggregate ODA flows to the Global South (Koo and Kim, 2011; Kim and Oh, 2012; Sohn, Ahn and Hong, 2011) or its driving factors to regional ODA allocation such as Africa (Choi, 2013; Kim and Lee, 2018; Yoon and Moon, 2014) and Asia (Cho, Choi, and Song, 2014; Shin, Eom, and Jung, 2017; Stallings and Kim, 2016); conversely, research on sectoral ODA allocation has been relatively scant, despite its importance (GoK, 2017b). For more efficient ODA allocation within limited resources, it is necessary to analyze the determinants of what economic or/and socio-political factors have a meaningful effect on each sectoral ODA expenditure. In addition, since ODA is allocated across a wide array of sectors, employing sector-specific analysis of ODA allocation helps us not only understand the aid motives and modality of donors more clearly, but also monitor and evaluate the progress of the Sustainable Development Goals (SDGs) of the 2030 Agenda by focusing on the sectors and thematic areas that recipient countries still lag far behind the targets (Eger, Öhler and Rudolph, 2018). This approach enables to see whether ODA goes to the sectors in great needs where the recipient country has put on its development priority.

In this regard, this study examines Korea's ODA disbursement by sector; we focus on the following five main sectors of Korea International Cooperation Agency (KOICA), the main grant assistance agency of Korea - (1) health, (2) education, (3) public administration (governance), (4) agriculture, forestry and fisheries, and (5) technology, environment, and energy. Those sectors have been selected as main sectors of KOICA, which accounted for 82 percent of the annual spending of KOICA projects in 2018, thus this paper aims at examining whether the determinants of Korean grant-aid managed by KOICA would show significant difference by these sectors.

Although the proportion of the KOICA budget to the total ODA of Korea has decreased as the number of grant-implementing agencies increased up to 41 in 2019, KOICA is still a leading development cooperation agency in Korea with an annually increasing budget of USD 621.481 million in 2018. This agency emphasized its strategic objectives and programs in those five sectors and launched the Midterm Sectoral Strategy 2016-2020 (KOICA, 2017).

To state the conclusion straightforwardly, Korea's sectoral ODA disbursement pattern demonstrates some distinct characteristics. 'Distance' is significantly negative in the education and agricultural sector but loses significance in technology and public administration and turns out to be positive in the health sector. 'GDP per capita' is significantly positive in education and technology yet shows no statistical significance in agriculture, and becomes significantly negative in health. 'Trade', in turn, has statistical significance only in agriculture, technology and agriculture are negative, while

education, health, and public administration are positive. 'Population' is significantly positive in education and agriculture (but has no significance in technology); however, this is not the case in health and public administration. Interestingly, contrary to these mixed results, both 'total ODA' and 'priority country' turn out to be significantly positive in all sectors, implying that the political and strategic decision of these priority partners would be the utmost important variable determining the country's sectoral ODA volume.

2.   OVERVIEW OF ODA FLOW BY SECTOR

2.1.   Recent Trends in DAC Members and Korea

OECD/DAC donors provided the largest share (34.4%) of their ODA to social infrastructure and services[1], such as education, health, government and civil society in 2015 (GoK, 2017b). Approximately 19% of their ODA expenditure was disbursed to economic infrastructure and services, followed by humanitarian aid (11.2%), multi-sector and cross-cutting issues (10%) and production (industrial) sectors (6.4%) (GoK, 2017b). The social and administrative sector refers to projects aimed to promote the human resource potential of developing countries and includes education, health, water and sanitation projects as well as actions related to government and civil society (Pöntinen, 2014). The importance of social infrastructure has been highlighted, as the Millennium Development Goals (MDGs) placed a strong focus on social development as well as on poverty reduction in developing countries, which also affected the allocation pattern of DAC donors. The ODA disbursement for social infrastructure and services (i.e. education, health, governance) has shown rapid growth in contrast to economic infrastructure ODA (UN ECOSOC, 2008). During the last 20 years, the allocation of social and administrative infrastructure has been considerably increased from 27% to 40% (Pöntinen, 2014).

In line with international initiatives, Korean ODA has also shown a clear increase in social infrastructure and services. In 2016, about half (41.65%, USD 1,030 million) of the total bilateral ODA of Korea spent for improving social infrastructure, and economic infrastructure and services received the second-largest focus (35.5% and USD 871.22 million), followed by production sectors (3.7% and USD 145 million) (OECD Statistics, 2018).

Within the social infrastructure and the service sector, education accounted for 35.6% of bilateral assistance, followed by water and supply (26.1%), health (22.8%) and government and civil society (11.1%). The breakdown of assistance to economic

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[1] Social Infrastructure and service refers to the main category relating to efforts to develop the human resource potential and improve the living conditions of recipient countries. It includes education, health and population, water and sanitation, government and civil society (OECD Online Statistics).

infrastructure and services shows that 27.1% of the total ODA flow distributed for transport and storage while 3.6% went to energy and 4.3% was allocated to telecommunications. Furthermore, in the case of the production sectors, agriculture, forestry, and fishing received the biggest proportion as of 90.7 million (3.6% of the total ODA) (OECD Statistics, 2018).

The priority five sectors of KOICA [(1) education, (2) health, (3) public administration, (4) agriculture, forestry, and fisheries (hereafter referred to as agriculture), and (5) technology, environment, and energy (hereafter referred to as technology)] tend to align with the overall trends of Korean ODA flows by sector. Looking into accumulated expenditure flow by sector of KOICA, the education sector has received the largest share among five sectors between 2000 and 2015 followed by public administration as shown in Table 1.

Table 1.   KOICA's Total ODA Flows by Sector (USD Million)

Sector	Category	Total by year	2000	2005	2010	2015
Health	Disbursement	933	6.81	43.95	78.65	92.81
	Nations	126	53	59	59	62
	No. Projects	898	31	34	70	104
Education	Disbursement	1,328	15.20	50.16	82.91	117.68
	Nations	142	53	63	80	75
	No. Projects	1,145	21	45	78	132
Public Administration	Disbursement	1,039.23	6.42	33.19	113.14	92.98
	Nations	167	118	125	88	103
	No. Projects	2,057	78	169	41	102
Technology, Environment, and Energy	Disbursement	763.92	4.94	22.57	66.82	101.01
	Nations	161	65	80	85	98
	No. Projects	894	11	23	45	96
Agriculture, Forestry, and Fisheries	Disbursement	661.06	3.11	10.33	47.61	82.89
	Nations	137	47	62	71	74
	No. Projects	692	11	22	54	86

Note: Data extracted and adapted from Statistics KOICA (2019).

In the last 16 years (2000 to 2015), KOICA provided 1,145 education projects for 142 countries, 898 health projects to 126 countries, 2,067 public administration (governance) projects to 167 countries, 894 technology, environment, and energy projects to 161 countries, and 692 agriculture, forestry, and fishery projects to 137 countries (Statistics KOICA, 2018).

2.2. Korea's Priority Partner Countries

The Korean government has formulated the Country Partnership Strategy (CPS) for designated priority countries in order to enhance ODA effectiveness and promote its relationship with recipient countries under the principle of 'choice and concentration' in accordance with the Framework Act (Article 8.2.3.) and the Strategic Plan. As a basic guideline for implementing ODA projects, the CPS includes core information about ODA volume, focus sectors, mid-term allocation plans and implementation plans for each priority partner (GoK, 2017a). So far, priority partners have been selected twice as shown in Table 2; 26 countries have been selected in the first round (2011-2015), and then adjusted to 24 countries in the second round (2016-2022), reflecting the recommendations of the 2012 DAC Peer Review for the purpose of improving the effectiveness[2].

Table 2. List of Korea's Priority Partner Countries

Region	1st CPS (2011-2015)	2nd CPS (2016-2022)
Asia	Bangladesh, Cambodia, **East-Timor**, Indonesia, Laos, Mongolia, Nepal, Pakistan, Philippines, Sri Lanka, Vietnam (11 countries)	Bangladesh, Cambodia, Indonesia, Laos, Mongolia, *Myanmar*, Nepal, Pakistan, Philippines, Sri Lanka, Vietnam (11 countries)
Africa	**Cameroon, DR Congo**, Ethiopia, Ghana, Mozambique, **Nigeria**, Rwanda, Uganda (8 countries)	Ethiopia, Ghana, Mozambique, Rwanda, *Senegal, Tanzania,* Uganda (7 countries)
Middle East and CIS	Azerbaijan, Uzbekistan (2 countries)	Azerbaijan, Uzbekistan (2 countries)
Latin America	Bolivia, Colombia, Paraguay, Peru (4 countries)	Bolivia, Colombia, Paraguay, Peru (4 countries)
Oceania	**Solomon Islands** (1 country)	-
Total	26 countries	24 countries

Note: Countries marked in bold refer to the one excluded from the second round and italics to the one newly added in the second round. Data for Korea's priority partner countries extracted and adapted from the Second Midterm Strategy for Development Cooperation of Korea (GoK, 2015, p.50).

[2] Before formulating the Country Partnership Strategy (CPS) in 2010, there were different priority partner countries for grants and concessional loans. Whereas KOICA had 19 priority partner countries including 8 Asian countries, 3 Latin American countries, 2 CIS countries, 1 Middle East country, and 5 African countries, the EDCF(Economic Development Cooperation Fund) in charge of Korean concessional loans had 17 - 7 countries were in Asia and the remaining 10 countries out of 17 were Mongolia, Bangladesh, Vietnam, Sri Lanka, Indonesia, Cambodia, Philippines, Guatemala, Uzbekistan, and Tanzania, which overlapped with KOICA's (Korean International Development Cooperation Center (KIDC), 2013, pp.58-59).

Table 3.   Focus Sectors of Korea's Priory Partner Countries

Region	Country	Focus Sectors
Asia	Bangladesh	Education, Transportation, Water Management and Public Health, ICT (Communications)
	Cambodia	Transportation, Water Management and Public Health, Education, Rural Development
	Indonesia	Transportation, Public Administration, Environment, Water Management
	Laos	Water Management and Public Health, Energy, Education, Rural Development
	Mongolia	Education, Water Management and Public Health, Public Administration, Transportation
	Myanmar	Public Administration, Rural Development, Transportation, Energy
	Nepal	Public Health, Education, Rural Development, Energy
	Pakistan	Transportation, Energy, Water Management and Public Health, Rural Development
	Philippines	Water Management and Public Health, Transportation, Rural Development, Disaster Prevention
	Sri Lanka	Education, Transportation, Water Management and Sanitation, Rural Development
	Vietnam	Transportation, Public Administration, Water Management and Public Health, Education
Africa	Ethiopia	Public Health, Rural Development, Transportation and Energy, Education
	Ghana	Agriculture and Rural Development, Public Health, Education, Transportation and Energy
	Mozambique	Transportation, Energy, Water Management and Public Health, Education
	Rwanda	Education, Agriculture and Rural Development, ICT (Communication)
	Senegal	Agriculture, Education, Water Management and Public Health, Transportation
	Tanzania	Water Management and Public Health, Transportation, Education, Energy
	Uganda	Rural Development, Education, Public Health
The Middle East and CIS	Azerbaijan	ICT (Communication), Water Management and Public Health, Public Administration, Rural Development
	Uzbekistan	Education, Water Management and Health, Public Administration
Latin America	Bolivia	Public Health and Sanitation, Rural Development, Transportation, Energy
	Colombia	Regional Development, Transportation, Industrial Development, Post-Conflict Rehabilitation
	Paraguay	Water Management and Public Health, Transportation, Urban and Rural Development, ICT (Communication)
	Peru	Public Health, Public Administration, Environmental Protection, Transportation

Note: The number of focus sectors is three to four in most cases. Adapted from Korea's Country Partnership Strategy for each priority partner countries.

Looking into the changes from the first to second CPS in greater detail, the Solomon Islands, which was included in support of a marginalized recipient country in the first round, was taken out, thereby having no priority partner country in the Oceania region in the second round. Furthermore, while East-Timor in Asia, Cameroon, DR Congo, and Nigeria in Africa were excluded, three countries have been newly added, including Myanmar in Asia, and Senegal and Tanzania in Africa, in the second round. There have been no distinct changes between the first and second selection (Lee, 2017). Approximately 80% (20 countries) of the first CPS countries still remain, and the regional proportion of priority partner countries is similar, which is coherent with the overall direction of regional distribution mentioned in the Second Midterm Strategy for Development Cooperation (2016-2020).

The Korean government did not reveal the specific criteria for selecting a priority partner. It is noted, however, that the selection took into account the income level of recipient countries, economic and diplomatic relations with Korea, political stability and regional distribution (GoK, 2015). Being selected as a priority partner country is important to a recipient country because this becomes a crucial standard for future ODA allocation. Lee (2017) stated that selecting priority partner countries (CPS countries) becomes a milestone in determining the direction of the ODA budgeting that will last at least five years or even longer. According to the Second Midterm Strategy for Development Cooperation, 70% of the budget is planned to be concentrated on priority partner countries. In fact, Korea disbursed 69% of its ODA to its 26 priority countries in 2015 (OECD, 2018) and even the Asian region's budget for priority partner countries is reported as 83%, which is above the 70% target (Lee, 2017). Moreover, those ODA budgets have been extensively sent to focus sectors for each partner country as shown in Table 3 in compliance with the Sustainable Development Goals (SDGs) (GoK, 2017a). The focus sectors were decided through quantitative and qualitative analysis while considering the opinions of the embassies and recipient countries as well as the industrial competitiveness analysis of Korea (GoK, 2015).

3.   LITERATURE REVIEW ON ODA ALLOCATION

The literature on ODA allocation can be divided into two stances: donor interests (DI) and recipient needs (RN). First, the extant literature on the donor interest model has emphasized the national interests of a donor as well as the political and economic situations of recipient countries as the significant determinants of ODA allocation. During the Cold War, a great number of donors provided foreign aid for political and strategic purposes to spread their ideology and strengthen national security; however, following the end of the Cold War, ODA has been frequently employed as a tool for economic gain. Thus, factors such as bilateral trade flow, foreign direct investment (FDI), and natural resources are prioritized in ODA provision. This pattern is similarly visible in Korean ODA allocation. Lumsdaine and Schopf (2007, p.231) noted that in the

initial stage the Korean government utilized ODA as a strategy to take political and diplomatic advantages in relation to North Korea in the Cold War era; yet, much of Korean ODA has been distributed to its larger trading partners and countries that received Korean FDI in the post-Cold War period. In this context, several studies found that bilateral ODA is more vulnerable to donor interests while multilateral ODA distributed through international organizations is more likely to reflect the recipient's needs (Maizels and Nissanke, 1984; Yoon and Moon, 2014). Donors tend to favor their former colonies, significant trading partners, and large energy or resources exporters in their bilateral ODA allocation (Kalinowski and Cho, 2012; McGillvray and Oczkowski, 1992).

However, recent studies have focused more on the socio-economic conditions of recipient countries and their needs. When considering humanitarian goals, such as poverty elimination and social development, a few studies found that poorer countries tend to receive a higher volume of ODA (Neumayer, 2003; Macdonald and Hoddinott, 2004; Schraeder, Hook, and Taylor, 1998). Berthélemy (2007) illustrated that donors such as Switzerland, Ireland, and the Nordic countries are more altruistic than other donors and have attempted to reflect recipient needs perspective in their ODA distribution. In the case of Korea, it is more aligned with humanitarian objectives and more recipient need-oriented to the lower-income developing countries (Kim and Oh, 2012). Gounder (1994) examined both recipient needs and donor interests by looking at Australia's bilateral ODA programs and taking them into consideration. Compared to previous findings of other research, he contended that both donor interests and recipient needs were fully considered in practice in the case of Australia. To follow-up on this new finding, Gounder and Sen (1999) conducted further research on Australia's bilateral ODA allocation using data from 1970 to 1996. The donor interest and the recipient need model were both employed in regression, and the result empirically demonstrated that both recipient needs and donor interests explain their ODA distribution to Indonesia, even though donor interests outweighed the needs of a partner country.

Extensive literature on ODA allocation has closely examined the determinants of total ODA flows; yet, there are a growing number of studies focusing on sectoral ODA allocation as well. Ji and Lim (2018) investigated the determining factors of the DAC donors' ODA distribution in the agriculture and food sectors. It found that agriculture ODA is greatly affected by the needs of recipient countries in relation to food insecurity indicators such as undernourishment and food inadequacy rates as well as political circumstances (i.e. the level of the democratic polity). Yet, food ODA is immune from political considerations and responds to more humanitarian factors. Buchert (1995) discovered that the education ODA pattern may differ, depending on the education strategy of a donor country. For instance, while education ODA of the Netherlands is more likely to be provided to lower-income countries, Sweden's education ODA projects concentrate, instead, on primary and vocational training. Boussalis and Peiffer (2011, p.1819) tested the effect of determinants from the perspectives of donor interest, recipient needs, and the recipient merit framework and found that donors provide more

HIV/AIDS assistance to countries that are poorer, more populous, and have a higher average HIV prevalence rate.

Guillon and Mathonnat (2018) studied the factors associated with Chinese ODA allocation by sector to African countries. The results suggest that GDP per capita plays a critical role in receiving ODA in the social sector from China, and more health projects were implemented in countries with a larger endowment of natural resources. Furthermore, it reveals that adherence to the One-China policy - namely, the UN General Assembly voting alignment with China - is a critical condition in order to benefit from Chinese assistance (Guillon and Mathonnat, 2018).

4.   RESEARCH DESIGN: DATA, METHOD AND VARIABLES

This study employs a panel data covering the Korean ODA of 128 partner (recipient) countries over a 16-year span from 2000 to 2015. Although the history of Korean donorship started in 1991, we choose 2000 as the first year of observation, when the MDGs was launched; with its launch, investment in social sectors (including education, health, public administration) by donors were significantly increased, making the sectoral ODA budget soar since then. For example, as shown in Table 1, between 2000 and 2015 the budget has increased by at least seven times in the health sector and as much as twenty-six times in the agriculture sector. The budget growth rate varies from sector to sector, yet on average budgets have increased over 15 times. In addition to the MDGs, Korea's accession to the Development Assistance Committee (DAC) of OECD in November 2009 is one of the most significant events in the country's ODA history. OECD/DAC membership not only recognizes Korea as a universally and officially recognized donor country, but also implies that Korea should also follow the norms and rules set by the international development community. Accordingly, the volume of Korean ODA has rapidly increased since joining the DAC and there have been active national attempts to strengthen its international position as "a generous donor and trusted partner" (GoK, 2017a). Thus, this paper also examines the effects of OECD/DAC membership on the motivations of Korea ODA allocation by dividing the time period into two (before 2009 and after 2009[3]).

This study applies the Gravity Approach, which originated from international trade and has been applied to migration, tourist arrivals, and FDIs. This approach has also been applied to ODA disbursement. For example, Oh (2017) measured KOICA's inbound scholarship recipients and compared them to those of the Japan International Cooperation Agency (JICA), Japan. Ji and Lim (2018) used ODA flows as a dependent variable, and this study is similar to theirs in that regard. Similarly, this study adopts the

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[3] Even though the OECD/DAC membership formally begun on January 2010, since it was approved by the DAC members in November 2009, the structural changes would have already undertaken before 2010, thereby making 2009 a baseline.

Gravity Approach, with distance as a major determining variable expected to be a negative coefficient, plus additional explanatory variables, based on the following regression equation.

$$Y_{jt} = \beta_0 + \beta_1 \ln distance_{ij} + \beta_2 L. \ln ODA_{jt} + \beta_3 L. \ln trade_{jt} + \beta_4 L. \ln gdp_{jt}$$

$$+ \beta_5 L. \ln pop_{jt} + \beta_6 Priority_{jt}, \tag{1}$$

where Y_{jt} is the ODA volume of each sector (education, health, public administration, technology, and agriculture) disbursed to a recipient country (j) by Korea in a given year (t). $\ln distance_{ij}$ refers to the log transformed distance between the recipient and Korea. $L. \ln ODA_{jt}$ is the log of total ODA flows between the recipient country and Korea. $L. \ln trade_{jt}$ is the log of bilateral trade flows including both export and import between the recipient country and Korea. $L. \ln gdp_{jt}$ is the log of per capita GDP of the recipient country, which is an important variable to measure the humanitarian motivations of Korean ODA disbursement. $L. \ln pop_{jt}$ is the log of the population of recipient countries of Korea. $Priority_{jt}$ is a dummy variable indicating the recipient country as a priority partner country of Korea.

Korea's total ODA volume is included as an explanatory variable. It is natural to expect its positive coefficient but it is still worth examining it given that the total ODA includes both grants and loans while the sectoral ODA disbursement in this study is for grant only. Also, this variable may work as a control variable; e.g. what is the impact of the sectoral ODA under the condition that its total amount is equal?

Population size, trade volume, and GDP per capita of recipient countries are added to test whether Korea tends to disburse a larger amount of sectoral ODA to a poorer recipient with a larger-sized population that has an active commercial relations. This may be a follow-up for the so-called DI-RN debate asking whether ODA disbursement is determined by donor's economic/political interest or recipients' needs. Distance is also added, based on the gravity model where mass and distance are important determining factors.

The last variable is the priority country (frequently called the 'CPS country', or countries with Country Partnership Strategy) which is a highly crucial variable in testing the political interests of Korean ODA disbursement. Since Korea has great political motivations in ODA policies, the government has selected priority countries in development cooperation (currently 24 countries across the world) about every 4-5 years. The position of the priority country is used to test whether it is tied with each sectoral ODA spending. This variable, (1 for Korea's priority partner countries and 0 for non-priority countries), is predicted to have a strong positive correlation with the dependent variable.

To test these hypotheses, two estimation methods are used in the study: ordinary least square (OLS) and random effect. Fixed effect is not employed due to the time-invariant variable (distance). Except for a dummy variable (priority country), all explanatory

variables are log transformed to reduce their heteroscedasticity issues. Furthermore, ODA disbursement decisions for a given year are usually made based on the economic and/or political interests of the donors (Yoon and Moon, 2014, p.292) and the conditions of recipient countries prior to that year. Therefore, all the explanatory variables, except for priority country, have a one-year lag to avoid any endogeneity problems and are log transformed to reduce the degree of heteroscedasticity.

5.   EMPIRICAL FINDINGS

Table 4 shows the results of the OLS and panel random effect analysis. Fixed effect was not considered due to the existence of a time-invariant variable, distance. As expected, distance is significantly negative in almost all sectors, with education and agriculture being all statistically significant. Public administration and technology are still negative, yet lack significance. The only exception arises in the health sector which actually shows a positive coefficient, implying that health-specific ODA is "thinly spread out" to a large number of geographically distant countries, which is often criticized in OECD Peer Review (OECD, 2013, 2018; Oh, 2017). However, such criticism could be discounted when the analyses are made at a sector level and positive coefficient of distance in the health sector[4] is largely offset by a negative impact in the rest of the sectors.

GDP per capita and population present mixed results. In the case of GDP per capita, coefficients are in general positive, implying that Korea favorably disburses sectoral ODA to countries with higher income instead of considering those who need it the most. On the other hand, while a great body of literature has claimed that countries with larger populations tend to receive more ODA because of a recipient country's needs, this research shows mixed results - positive in education, technology, and agriculture, and negative in health and public administration. Although Korea is bound to provide greater assistance to bigger countries with a higher population (Kim and Oh, 2012; Park, Kim, and Lee, 2014; Sohn, Ahn, and Hong, 2011), this study finds that it is valid only in certain sectors, rather than in all of them. As an indicator of the donor's economic interests, the regression results of trade are mostly insignificant. This also contradicts the results from the aforementioned studies, most of which show positive signs. Although Korea looks to pursue its ODA as a tool for promoting economic interests, this seems to fade away in sector-specific cases.

[4] This can be confirmed in the latter part of this study where distance turns out to be negative (not significant, though) when the dataset is broken into two periods - before and after 2009.

Table 4. Korean ODA Disbursements by Sector, 2000-2015

	Education		Health		Public Administration		Technology		Agriculture	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Distance	-0.258***	-0.556**	0.317***	0.107	-0.026	-0.282	-0.157	-0.376	-0.376***	-0.363
	(0.091)	(0.236)	(0.107)	(0.240)	(0.081)	(0.233)	(0.104)	(0.260)	(0.109)	(0.244)
Total ODA	0.489***	0.350***	0.417***	0.287***	0.317***	0.188***	0.493***	0.418***	0.390***	0.298***
	(0.033)	(0.041)	(0.043)	(0.064)	(0.027)	(0.038)	(0.037)	(0.042)	(0.039)	(0.057)
GDP per capita	0.161**	0.392***	-0.215*	0.304*	-0.086	0.226**	0.277***	0.540***	0.116	0.571***
	(0.071)	(0.126)	(0.114)	(0.170)	(0.059)	(0.106)	(0.071)	(0.123)	(0.087)	(0.157)
Trade	0.027	0.059	0.053	0.050	0.021	0.046	-0.031	-0.019	-0.108**	-0.007
	(0.038)	(0.064)	(0.067)	(0.096)	(0.032)	(0.050)	(0.034)	(0.049)	(0.043)	(0.066)
Population	0.114**	0.118	-0.096	0.085	-0.058	0.073	0.049	0.110	0.123**	0.166*
	(0.053)	(0.098)	(0.080)	(0.130)	(0.043)	(0.076)	(0.046)	(0.075)	(0.056)	(0.087)
Priority Country	1.019***	0.976***	0.907***	0.658***	1.050***	0.946***	1.248***	0.828***	0.937***	1.009***
	(0.121)	(0.189)	(0.141)	(0.200)	(0.108)	(0.168)	(0.137)	(0.218)	(0.152)	(0.246)
Constant	4.286***	6.610**	5.688***	2.594	9.041***	8.286***	3.154**	3.107	7.472***	3.285
	(1.184)	(2.697)	(1.297)	(2.748)	(0.971)	(2.363)	(1.247)	(2.594)	(1.222)	(2.372)
Estimation method	OLS	RE	OLS	RE	OLS	RE	OLS	RE	OLS	RE

Note: $p < 0.1$; **$p < 0.05$; ***$p < 0.01$; Estimation method: ordinary least square (OLS) for (1) and panel random effect for (2). Fixed effect is not employed due to the time-invariant characteristic of distance. Standard errors are in parentheses. The dependent variable is the ODA volume disbursed to recipient countries by five sectors. All the variables, except the priority country, are log transformed, and these log variables, except distance, are lagged by one year to avoid any potential endogeneity issue. The amount of sectoral ODA disbursement is subtracted from the total amount of ODA distribution. A dummy variable (priority country) codes 1 for priority country of Korea, and 0 for non-priority country.

Interestingly, coefficients for the total amount of ODA are strongly significant regardless of sectors, indicating that the decision for sectoral disbursement is very much dependent on its total disbursement. Similarly, being Korea's priority partner country is another important positive factor, where its dummy variable is significantly positive in all sectors. This finding supports the notion that Korea ODA allocation has been greatly driven by its political and strategic motivations.

The strong effect of priority country status can be also observed from the graphs below. In terms of distance, Rwanda and Morocco are positioned in a similar status as shown in the graph (Figure 1). Being both outliers, with a different direction, Rwanda is one of the largest recipient countries of Korean agricultural ODA, while Morocco is the opposite. Rwanda is one of Korea's 24 priority partner countries (listed in Table 3) while Morocco is not which may explain this discrepancy. Specifically, Rwanda is one of the eight priority African countries out of the total 24, with agriculture (including rural development), education, and communication (ICT) for the strategically important sectors. Between 2000 and 2015, Rwanda received from Korea a total of USD 16.72 million for 16 education-related projects. This number is in sharp contrast with that of Morocco, which has only reached USD 1.34 million. (Statistics KOICA, 2018).
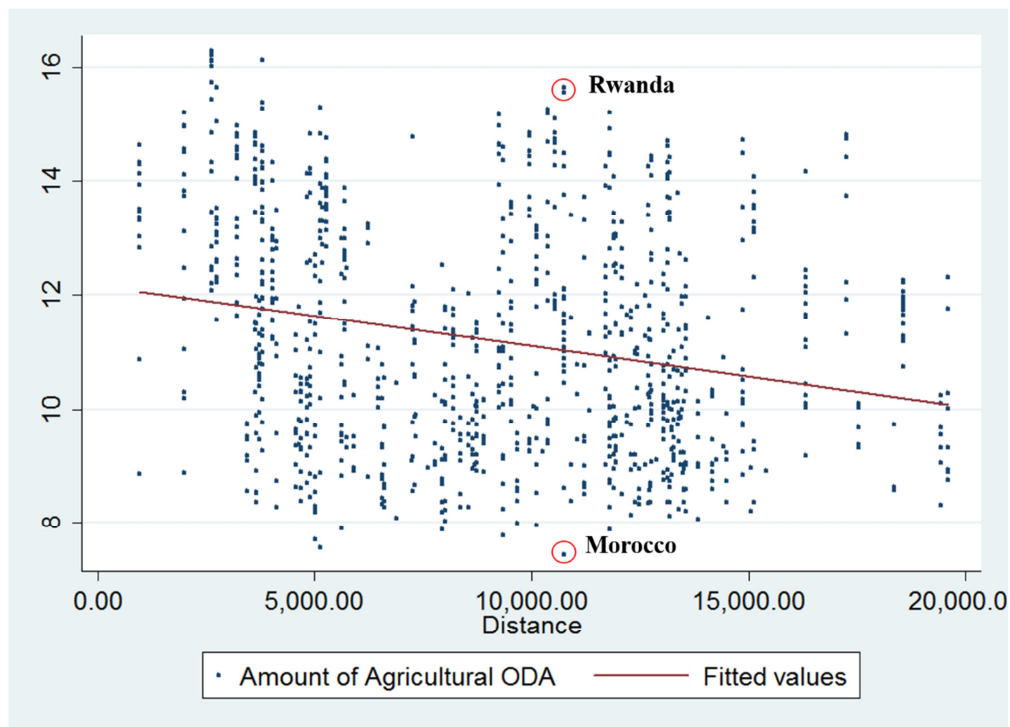

Figure 1.   Scatter Plot and Fitted Line on Agriculture ODA

Education   Health

Public Administration   Technology
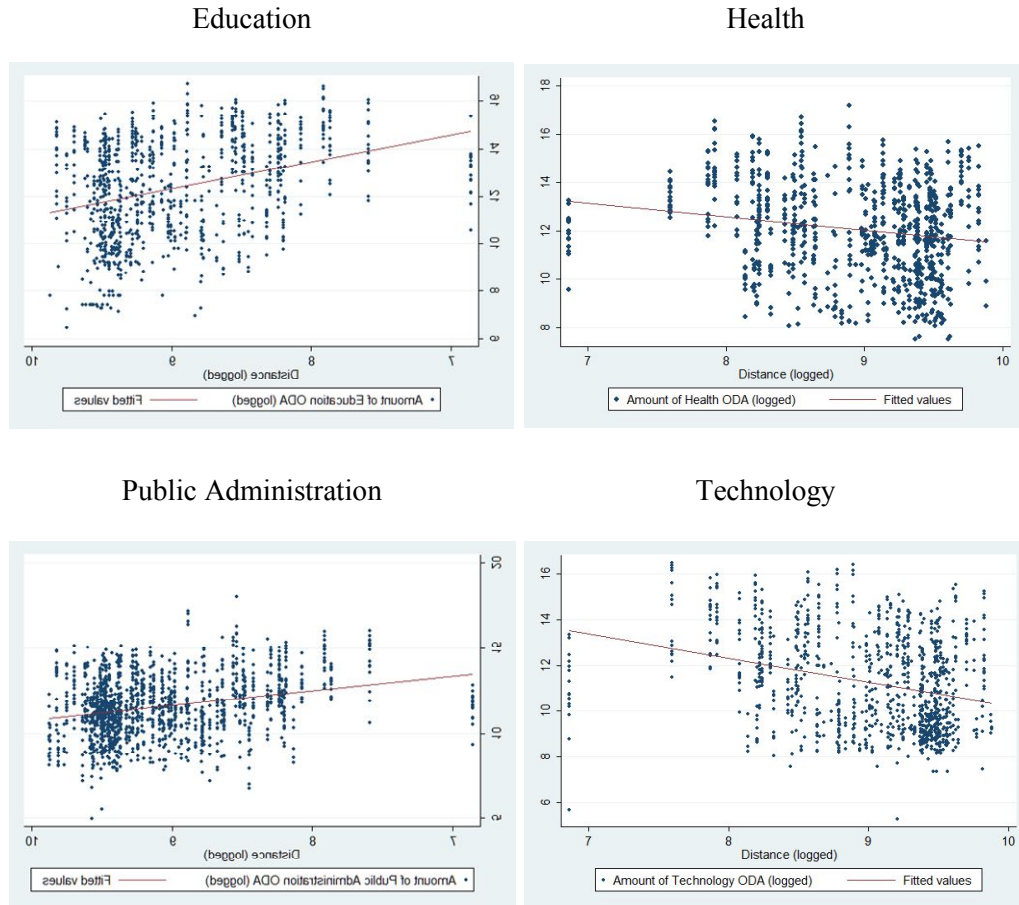

Figure 2.   Scatter Plot and Fitted Line by Sector

This study further examines Korea's sectoral ODA allocation of Korea by time periods based in 2009 when Korea was approved for OECD/DAC membership. The results are summarized in Table 5; in addition to those five sectors, we added Korea's total ODA amount disbursement to its recipients to the first column to see the difference between the aggregate ODA and its sectoral decomposition. Major structural breaks are not found; coefficients for 'GDP per capita' and 'trade' turn into negative from positive or vice versa but lack statistical significance. 'Distance', 'population', and 'priority country' are consistent throughout all the periods. Even though the coefficient for 'priority country' is reduced to 1.270, it still exerts a strong influence on both total ODA flows and its sectoral allocation.

Table 5. Sectoral Disbursement of Korean ODA by Periods

	Total ODA		Education		Health		Public Administration		Technology		Agriculture	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Distance	-1.035***	-0.914***	-0.812***	-0.822**	-0.122	-0.086	-0.471***	-0.430*	-0.767***	-0.727***	-0.791***	-0.383
	(0.212)	(0.260)	(0.296)	(0.326)	(0.275)	(0.306)	(0.181)	(0.230)	(0.225)	(0.247)	(0.210)	(0.250)
GDP per captia	0.367***	-0.140	0.528***	0.207	0.326*	-0.104	0.043	-0.021	0.327***	0.115	0.282**	-0.265*
	(0.101)	(0.124)	(0.163)	(0.182)	(0.191)	(0.199)	(0.096)	(0.129)	(0.127)	(0.144)	(0.139)	(0.146)
Trade	0.124**	0.051	0.060	0.087	0.071	0.075	0.071	0.074	0.002	0.033	-0.054	0.106*
	(0.051)	(0.045)	(0.086)	(0.086)	(0.109)	(0.094)	(0.050)	(0.058)	(0.069)	(0.064)	(0.080)	(0.061)
Population	0.366***	0.457***	0.331**	0.259**	0.198	0.116	0.055	0.123	0.368***	0.131	0.278***	0.135
	(0.071)	(0.072)	(0.138)	(0.131)	(0.142)	(0.138)	(0.067)	(0.076)	(0.097)	(0.085)	(0.105)	(0.083)
Priority Country	1.519***	1.270***	1.441***	1.265***	1.162***	0.904***	1.260***	1.394***	1.116***	1.654***	1.158***	1.404***
	(0.249)	(0.190)	(0.299)	(0.223)	(0.298)	(0.233)	(0.223)	(0.194)	(0.248)	(0.229)	(0.239)	(0.210)
Constant	12.389***	15.151***	8.980**	12.460***	6.069*	10.798***	13.484***	12.902***	8.930***	14.432***	11.481***	13.295***
	(2.216)	(2.736)	(3.702)	(3.926)	(3.224)	(3.888)	(1.957)	(2.472)	(2.587)	(2.730)	(2.410)	(2.749)

Note: p < 0.1; **p < 0.05; ***p < 0.01; Estimation method: Random Effect. (1) and (2) refer to before and after 2009, respectively. Standard errors are in parentheses. 'Total ODA' refers to the total volume of Korean ODA. In Table 4, total ODA was included as an explanatory variable but is added here as a dependent variable. All the variables, except priority country, are log transformed, and these log variables, except distance, are lagged by one year to avoid any potential endogeneity issue. The amount of sectoral ODA disbursement is subtracted from the total amount of ODA distribution. A dummy variable (priority country) codes 1 for a priority country of Korea, and 0 for a non-priority country.

Lastly, a dynamic panel data model is considered, based on the Arellano-Bond linear dynamic panel-data estimation, designed for datasets with a great number of panels and few periods (Arellano and Bond, 1991).   In its framework, the value of the explanatory variables in the previous period is a predictor for the current value of the explanatory variable (Pinzon, 2015). Table 6 reports the results, which works a supplementary sensitivity check for the previous finding.

Table 6.   Dynamic Panel Data Analysis: Korean ODA Disbursements by Sector, 2000-2015

	Education	Health	Public Administration	Technology	Agriculture
Previous Year of Sectoral ODA Amount	0.183**	0.078	0.126	0.261***	0.137*
	(0.078)	(0.096)	(0.079)	(0.079)	(0.083)
Distance	-0.574	4.373	-2.895	-9.653***	-8.458*
	(4.046)	(5.141)	(3.766)	(3.271)	(4.846)
Total ODA	0.093	0.157*	0.016	0.132*	0.042
	(0.059)	(0.085)	(0.052)	(0.071)	(0.070)
GDP per capita	0.270	0.805*	0.878***	0.302	0.435
	(0.273)	(0.427)	(0.327)	(0.298)	(0.451)
Trade	0.303**	-0.100	-0.094	0.055	-0.043
	(0.127)	(0.140)	(0.118)	(0.118)	(0.167)
Population	0.514	-2.039	1.905	5.423***	4.919*
	(2.263)	(2.910)	(2.221)	(1.863)	(2.769)
Priority Country	0.324	-0.071	0.596***	0.140	0.516**
	(0.230)	(0.336)	(0.227)	(0.240)	(0.254)
Constant	(dropped)	(dropped)	(dropped)	(dropped)	(dropped)
Estimation method	GMM	GMM	GMM	GMM	GMM

Note: $p < 0.1$; **$p < 0.05$; ***$p < 0.01$; Estimation method: Arellano-Bond linear dynamic panel-data model. Standard errors are in parentheses. Standard errors are in parentheses. The dependent variable is the ODA volume disbursed to recipient countries by five sectors. All the variables, except the priority country, are log transformed, and these log variables, except distance, are lagged by one year to avoid any potential endogeneity issue. The amount of sectoral ODA disbursement is subtracted from the total amount of ODA distribution. A dummy variable (priority country) codes 1 for priority country of Korea, and 0 for non-priority country.

In fact, there are not many significant differences between two models, presented in Table 4 and Table 6, respectively. As shown in the Table 6, the coefficients of previous year's sectoral disbursement in three sectors including education, technology, and agriculture are strongly significant, suggesting the decision for amount of sectoral ODA

is affected by its previous year's distribution. Interestingly, coefficients for the total amount of ODA are strongly significant regardless of sectors, indicating that the decision for sectoral disbursement is very much dependent on its total disbursement.

6.   CONCLUSION AND IMPLICATIONS

In spite of a relatively short donor history, the global development community and scholars are paying attention to Korea's ODA, because of its unique transition from a former recipient country to an OECD/DAC member. So far, much of the early literature covered Korean ODA allocation but there has been considerably less research on its sectoral ODA allocation, where we find the rationale behind this study.

Results are similar overall, but vary, depending on sectors. As shown in Table 4, the 'Distance' is mostly negative, which is as expected in the gravity setting except for the health sector, but only to a mild degree. 'GDP per capita' matters in health and public administration sectors, but not in education, technology, and agriculture. 'Population' is positive in education, technology, and agricultural sector, but not in health and public administration. 'Bilateral trade flow' is positive in three sectors - education, health, and public administration. Lastly, our results indicate that political and strategic factors, such as 'total ODA volume' or 'being a priority country' are critical factors for Korea in deciding on ODA disbursement, which is consistently positive in all the sectors regardless of time periods (before and after the country's joining the DAC in 2009).

The Korean government reduced the number of priority partner countries from 26 to 24 after the assessment from the 1st DAC peer review. However, given the aforementioned result which indicates that sectoral disbursement is critically dependent on priority partners, this number still seems excessive. Given a relatively small amount of the budget compared to other donor countries, this may worsen aid fragmentation, which ends up hindering the effectiveness and sustainability of its aid. Moreover, those priority partners are spread over the world, making so-called 'choice and concentration' more difficult, which is basically the same problem in the sectoral decompositions. Since there are too many 'priority' countries, the budget is disbursed mainly toward half of them, while the other half[5] receives a budget far below 50% (Lee, 2017).

For sectoral ODA disbursement to be further concentrated toward a smaller number of countries, the number of priority countries should be reduced, to at least less than 20, or less than half of the status quo. Additionally, given the current criticism of the inconsistent and ambiguous criteria for selecting priority partners, the government needs transparency and consistency. Furthermore, a 'diplomatic and economic relationship with Korea' is significant as weighted to 50%, yet other factors, such as the recipients' needs and/or humanitarian assistance should be also taken into consideration.

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[5] 9 Asian countries (Vietnam, Cambodia, Philippines, Myanmar, Sri Lanka, Bangladesh, Laos, Pakistan, Mongolia) 2 African countries (Rwanda and Uganda), and 1 Latin American country (Bolivia)

In this study, we were able to widen our knowledge of a rising donor, Korea, and its sectoral aid allocation. This study provided a valuable chance to examine how a non-traditional donor such as Korea allocates ODA as well as whether its sectoral distribution has been made based on a recipient's needs. Korea has been actively engaging in various global initiatives and activities to accelerate progress towards the SDGs. In relation with this effort, the KOICA has established the organizational goals and performance indicators in line with the SDGs. However, in order to prioritize ODA in line with the SDGs composed of 17 goals and 169 targets in diverse sectors, a sector-perspective of aid allocation must be taken into consideration first. We conclude that Korea and other donors enable to improve their ODA allocation and fulfill their commitments for SDGs by analyzing the sectoral allocation more deeply; focus on only aggregate ODA allocation could miss the important point.

This study has a few caveats. First, it would be more desirable if we were able to include more explanatory variables, which may allow us to be free from the possibility of omitted variable bias. For example, sector-specific variable pairing with each sector (e.g. child mortality rate for health sector, undernutrition rate for agriculture sector) can be added. Furthermore, it would be interesting if concessional loans could be added to find the determinants of grants and loans separately. Examining the cases of other donor countries would also be worthwhile. Comparisons between the traditional DAC donor and emerging donors would allow us to check whether there are distinct differences in the disbursement and any possible lessons to be learned. All of these will be reserved for further studies.

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