# A Comparative Study on the Determinants of China, Japan, and South Korea's Foreign Aid Policies

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## Abstract

Despite the importance of international development, some people have been suspicious about the real intentions and positive impacts of current foreign aid practices. In the case of East Asian donors–China, Japan, and South Korea-an interesting and realistic picture of both donors and recipients can be drawn. This study investigates the determinants of foreign aid policies, exploring the adaptability of the public finance theories of the push and pull factors, such as economic-demographic theory, compensation theory, and incrementalism, in relation to the three donor countries. To test this, the relationships between the socio-economic factors and the volume of aid given to their partner countries by China, Japan, and South Korea were examined. Panel data analysis for the pull factors of the recipient countries and correlation analysis for the push factors of the donor countries were adopted. For the pull factors, despite some conflicting signs between China, Japan, and South Korea, the economic-demographic theory factors and the compensation theory factors were strongly observed in the presented study. Regarding the push factors, economic-demographic theory, compensation theory, and incrementalism were observed in this study.

*Keywords:* Foreign Aid, Determinant, China, Japan, South Korea

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# การศึกษาเชิงเปรียบเทียบของปัจจัยที่มีผลต่อนโยบาย
# การให้ความช่วยเหลือระหว่างประเทศ:
# กรณีศึกษาในประเทศจีน ญี่ปุ่น และเกาหลีใต้

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## บทคัดย่อ

แม้การพัฒนาระหว่างประเทศนั้นจะมีความสำคัญมากเพียงใดก็ตาม  ผู้คนยังคงตั้งข้อสงสัยต่อเจตนาที่แท้จริงและปัจจัยบวกของการให้ความช่วยเหลือระหว่างประเทศในทางปฏิบัติในปัจจุบัน  ในกรณีของกลุ่มประเทศที่ให้ความช่วยเหลือจากเอเชียตะวันออก ได้แก่ ประเทศจีน ญี่ปุ่น และเกาหลีใต้ นั้น ความน่าสนใจและภาพความเป็นจริงของทั้งผู้ให้และผู้รับความช่วยเหลือของประเทศดังกล่าวสามารถแสดงออกมาได้จากงานศึกษานี้  การศึกษาเชิงเปรียบเทียบฉบับนี้ได้วิเคราะห์ปัจจัยที่มีผลต่อนโยบายการให้ความช่วยเหลือระหว่างประเทศโดยการสำรวจการปรับตัวของทฤษฎีนโยบายการเงินสาธารณะของปัจจัยดึงดูดและปัจจัยการผลักดัน ได้แก่ ทฤษฎีทางเศรษฐศาสตร์-ประชากรศาสตร์ ทฤษฎีการให้ค่าตอบแทน และทฤษฎีการยึดถือนโยบายแนวเดิมในกลุ่มประเทศที่ให้ความช่วยเหลือจากเอเชียตะวันออก  การศึกษานี้ได้ทดสอบความสัมพันธ์ระหว่างตัวแปรทางเศรษฐกิจสังคมและปริมาณให้ความช่วยเหลือของประเทศจีน ญี่ปุ่น และเกาหลีใต้ ต่อประเทศผู้รับความช่วยเหลือโดยการวิเคราะห์ข้อมูลภาคตัดขวางตามเวลาของปัจจัยการดึงดูดความช่วยเหลือของประเทศผู้รับความช่วยเหลือ และการวิเคราะห์เชิงสหสัมพันธ์ของปัจจัยการผลักดันการช่วยเหลือของประเทศที่ให้ความช่วยเหลือ  สำหรับปัจจัยดึงดูดนั้นแม้ว่าความสัมพันธ์ของปัจจัยจะไม่ได้เป็นไปตามความคาดหมายในประเทศจีน ญี่ปุ่น และเกาหลีใต้  ปัจจัยในทฤษฎีทางเศรษฐศาสตร์-

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ประชากรศาสตร์และทฤษฎีการให้ค่าตอบแทนนั้นมีนัยสำคัญทางสถิติ สำหรับปัจจัยการผลักดัน
นั้น ทฤษฎีทางเศรษฐศาสตร์-ประชากรศาสตร์ ทฤษฎีการให้ค่าตอบแทน และทฤษฎีการยึดถือ
นโยบายแนวเดิมมีความสัมพันธ์อันเป็นนัยสำคัญทางสถิติ

**คำสำคัญ:** *นโยบายการให้ความช่วยเหลือระหว่างประเทศ  ปัจจัย  จีน  ญี่ปุ่น  เกาหลีใต้*

## Introduction

### Importance

International development has been an important avenue for tackling some serious socio-economic problems, such as economic poverty and social inequality, through collaborative efforts. For decades, many advanced countries, influential developing countries, and international organizations have invested funds to support their developing partners. However, the picture is not that simple. This is not only because it absorbs an astronomical amount of money, but because it includes multi-layered dynamics between international stakeholders. Some people have been suspicious about the real intentions and positive impacts of the current foreign aid practices.

When it comes to East Asian donors–China, Japan, and South Korea-an interesting and realistic picture for both donors and recipients can be drawn. They have developed their foreign aid policies interacting and competing with each other, which have inevitably reflected their own domestic economic and political progress. China's influence on the developing world with the leverage of foreign aid has been growing. Beijing's aggressive delivery strategy has triggered some worries for the western world and for some developing partner countries (Lum, Hannah, Julissa, and Leland, 2009; Drecher and Fuchs, 2011). As China's political and economic clout grows, doubts over the intention behind its aid become bigger. When it comes to Japan, it has been acknowledged as a traditional and influential stakeholder in this arena. On the surface, Tokyo has followed the contemporary manner of its western counterparts, but it has also been described as developing its own commercially-oriented mechanism in some of the literature (Kimura and Todo, 2010; Park, 2014). South Korea has a relatively small scale of official development assistance (ODA), but it has been recently highlighted as an emerging donor. Despite the recent global recession, the pace of Seoul's increasing foreign aid volume has been impressive. It has tried to find its own niche area to reflect its successful economic development considering its limited resources (Lee, 2012; Park, 2014).

### Objectives

This research aims to investigate the dimensions of the determinants of foreign aid, testing the adaptability of the public finance theories of the pull and push factors, such as the economic-demographic theory, compensation theory, and incrementalism. The relationships between the socio-economic factors (e.g. gross domestic product (GDP), the population of the recipient countries, trade volume between the donor and recipient countries, foreign direct investment (FDI) inflow from donors, energy deposits, governance, the Human Development Index (HDI) in the recipient countries, and the aid volume of China, Japan, and South Korea to their partner countries are tested. By examining the determinants of the socio-economic factors from the recipient countries and the donors' side in aid volume, the three East Asian donors' major considerations can be clarified and the results may contribute to the applicability of related theories in this area.

### Scope and Limitations

This study focuses on China, Japan, South Korea as donors and their developing partners around the world. The number of recipient countries and the time periods are mentioned in the empirical findings and discussion of the estimation section in this paper. The unit of analysis is the "annual macroeconomic and social indicators of individual donors and their partner countries."

The study still has some limitations, particularly regarding the accessibility of the data. Even though this study incorporated all of the available data from reliable sources, such as the World Bank, the Organization for Economic Cooperation and Development (OECD), and the United Nations Commodity Trade (UN COMTRADE) databases, some of the macro socio-economic data were still missing. Especially, it was very challenging to obtain detailed foreign aid data from China's side. Though the estimated data from the research results of the RAND Corporation (Wolf, Wang, and Warner, 2013) were alternatively used here, those calculations remained limitations in terms of arriving at broader interpretation. Some underlying factors were difficult to capture and quantify. For this reason the study was limited to certain socio-economic factors that could be measured.

## Literature Review

As a good starting point for the concept of public expenditure, Musgrave and Musgrave (1989) suggested four functions: allocation function, distribution function, stabilization function, and coordination of budget functions. Foreign aid belongs to the distribution function because it is related to distributing wealth to the poor outside the country. Besides this traditional concept, some financial theories help to identify the possible driving forces of public expenditure, with the area of foreign aid as one of them. In the case of foreign aid expenditure, it is necessary to pay more attention to macroeconomic and international dynamics. Under this criterion, three major theories can be considered to explain the factors of foreign aid expenditure: economic-demographic theory, compensation theory, and incrementalism.

### Economic-demographic Theory

Economic-demographic theory originated from system theory. According to system theory, a political system is a set of institutions to convert social demands into authoritative decisions and actions for the support of the society. It assumes that a social system or government usually reflects its socio-economic environmental factors in shaping public policy and its expenditure.

Musgrave and Musgrave (1989) analyzed government expenditure growth in the OECD countries. According to the authors, those countries' expenditure-GNP ratio had risen while the expenditure-gross national product ratio had risen, with the expenditure to gross national product elasticity mostly above one from the 1960s to the 1970s. They attributed the reason to driving factors such as growth *per capita* income, population change, and urbanization.

Adolph Wagner applied general system theory to the public finance area to explain changes in public expenditure levels. This is also known as *Wagner's law*. In his model, various socio-economic factors such as income *per capita* growth rate, population growth rate, the proportion of the population in urban areas, inflation rate, and tax revenue as a percentage of the GDP positively affect public expenditures as a percentage of the GDP (Buracom, 2011). He indicated several

reasons why public expenditure increases over time. Urbanization industrialization and increased population density invite more public activities for building public facilities. The growth in real income also increases the relative expansion of government expenditure, especially in the welfare area. Lee (2012) conducted a comparative study between South Korea and other development assistance committee (DAC) member countries. He set up the volume of ODA as the dependent variable and real GDP *per capita*, population, exports, FDI, civil rights, government effectiveness, infant mortality, etc. as the independent variables. Among the various variables in his study, population can be interpreted as an economic-demographic factor. According to his study, the DAC members tended to provide more aid to the recipient countries that had a lower income and a greater population, while South Korea did not show any significant consistent relationship with such variables. Dreher and Fuchs (2011) focused on China and concluded that there was no clear evidence whether Chinese aid was linked with the energy production of their partner countries compared with other donors.

### Compensation Theory

Compensation theory highlights the relationship between globalization and domestic economic growth. The theory was proposed by international trade scholars. Originally, the main idea was that higher levels of international economic risk caused by globalization could draw more risk associated with the international business cycle. This volatility ultimately leads to compensation via more social programs in public spending. Rodrik (1998) focused on the positive relationship between external risk, which was measured by trade openness and trade volatility, and government size represented by welfare spending. Down (2007) emphasized the dislocation effects of globalization. He tested the impacts of globalization, which can be measured by trade and financial openness to fluctuations in the GDP and inequality in income distribution. Down found that smaller economies were more associated with larger fluctuations in demand than their larger counterparts, while their openness alleviated the fluctuations. Dowling and Valenzuela (2010) are supportive of the positive effects of globalization on economic growth. Their study picked up some of the key success factors of economic growth in Asia, such as

openness to international trade and investment, stable inflation policy, and substantial investment in human capital. According to these studies, the trade and financial openness of the donor can be considered as one of the major push factors for aid.

Cooray, Gottschalk, and Shahiduzaman (2005) chose trade with Japan as well as the GDP *per capita* of the recipient countries, distance, etc. as the important variables in Japan's ODA allocation. Lee (2012) used exports and FDI with the donor as the independent variables. Those variables can be considered in the context of compensation theory. Berthelemy and Tichit (2004) considered FDI and trade volume as well as the dummy variable of colonial experience in the case of the OECD-DAC members' aid.

### Incrementalism

This theory began with Herbert Simon and was developed by Charles Lindblom. Incrementalism is based on the idea of bounded rationality, which results from insufficient time, information, or money (Buracom, 2011). Dye (2005) described it as a continuation of past government activities with gradual changes. Incrementalism happens because government officials do not have enough time, information, or resources to review all of the options to replace existing policies. Policymakers also admit the influence of previous policies on the following policies due to uncertainty, which may be caused by completely new policies. In addition, the sunk costs in existing programs and the politically-expedient manner of incremenatlism can encourage gradual tendencies in public policies. Incrementalism argues that policymakers also benchmark the previous year's budget and slightly change the present year's budget from the baseline in order to minimize any controversy. This theory is useful for testing whether donors rely on the previous baseline when they make a decision on the budget volume of the current year.

There is relatively limited literature that considers the amount of the previous year's spending. One of the few cases is the study of Tuman, Emmert, and Sterken (2001). They used the previous year's aid as the control variable when they analyzed Japan's ODA determinants in South America.

### Other Considerations

Lee (2012) also utilized civil rights, government effectiveness, and infant mortality as the independent variables. Tuman *et al.* (2001) used human rights abuse factors when they analyzed Japan's ODA determinants in South America in their study. Gounder set the level of living standard, population, the growth rate of the GDP *per capita* of the recipient countries as Australia's aid determinants (as cited in Cooray *et al.,* 2005). According to the literature on the levels of social development in the recipient countries, the HDI can be used to represent the level of social development. Table 1 summarizes the pull and push factors reviewed in the existing literature.

**Table 1: Pull and Push Factors Used in Empirical Studies**

| Variables | Expected Sign | Source |
|---|---|---|
| <Pull factors> | | |
| A. Economic-demographic theory factors | | |
|   1. GDP | + | Musgrave (1989)* |
|   2. Population of recipient | + | Lee (2012) |
|   3. Energy production | + | Dreher and Fuchs (2011) |
| B. Compensation theory factors | | |
|   1. Trade with donor | + | Cooray *et al.* (2005), Berthelemy and Tichit (2004) |
|   2. FDI from donor | + | Berthelemy and Tichit (2004) |
| C. Others | | |
|   1. Governance | + | Lee (2012) |
|   2. HDI | + | Tuman *et al.* (2001) |
|   3. GDP *per capita* | - | Lee (2012) |
| <Push factors> | | |
| A. Economic-demographic theory factors | | |
|   1. GDP *per capita* of donor | + | Musgrave (1989)* |
|   2. Energy consumption of donor | + | Dreher and Fuchs (2011)* |
| B. Compensation theory factors | | |
|   1. Trade openness of donor | + | Rodrik (1998) |
|   2. Financial openness of donor | + | Rodrik (1998) |
| C. Incrementalism | | |
|   1. Aid amount of previous year | + | Tuman *et al.* (2001) |

* It is inferred from the basic ideas of the literature.

## Conceptual Framework

From the literature, it was learned that foreign aid can be determined by various factors. In this study, the conceptual framework was separated into two parts: 1) the pull factors for attracting more foreign aid to recipient countries (Model I), and 2) the push factors from donors to spend more on foreign aid (Model II).

### Pull Factors of Foreign Aid (Model I)

Economic-demographic theory variables

Many economic factors have been considered in the literature, as shown in the previous section. From the viewpoint of *Wagner's law*, GDP, population, and the energy production of recipient countries can be considered as driving factors to attract foreign aid from the donor country. Despite some conflicting signs between the proposed independent variables and foreign aid depending on the literature, this study relied on some of the theoretical concepts and assumed a positive relationship among the three variables.

Compensation theory variables

FDI inflow from the donor and trade with the donor can be considered as compensation variables. Some of the studies show the positive effect of FDI inflow from the donor and trade with the donor on the amount of the donor's aid to the recipient country (Lee, 2012 and Berthelemy and Tichit, 2004). Therefore, it was assumed that these two variables had a positive relationship with aid amount.

Other variables

As for other considerations, some studies show a positive effect of governance and HDI level on the amount of the donor's aid (Lee, 2012 and Berthelemy and Tichit, 2004). It was assumed here that these two variables had a positive relationship with aid amount. In the case of income level (or GDP *per capita*), it can be also considered as one of the important factors for humanitarian purposes.

Conceptual framework I

Figure 1 represents the pull factors for attracting more foreign aid to recipient countries. It was assumed that the GDP of the recipient countries (usually having a positive (+) relationship with foreign aid), the population of the recipient countries (+), trade (+) with the donor and FDI from the donor (+), energy production (+), governance (+), and HDI (+) affected the amount of foreign aid of China, Japan, and South Korea.
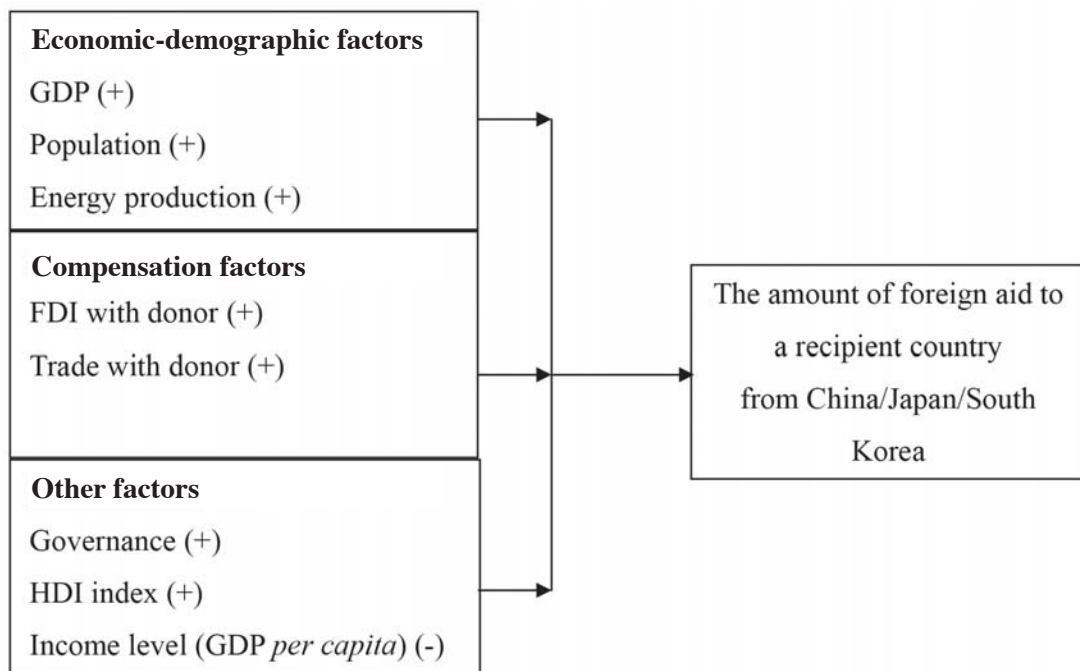


**Figure 1: Conceptual Framework I (Model I)**

**Push Factors of Foreign Aid (Model II)**

Economic-demographic theory variables

Through the literature review and insights from the related research, the donor's GDP, GDP *per capita*, and the energy consumption of the donor were selected. In the case of the energy consumption of the donor, it was assumed that foreign aid to the recipient countries with energy deposits increases as the energy consumption level in donor grows. The empirical studies indicated that the signs

of the relationship between these variables and foreign aid were mixed. However, based on the basic concept of economic-demographic theory, the theory's variables were assumed to have positive effects of the economic-demographic theory variables on the aid amount.

Compensation theory variables

Compensation theory deals with the relationship between the degree of globalization and public expenditure. Financial and trade openness were expected to positively affect the amount of foreign aid to the donor countries (Lee, 2012 and Berthelemy and Tichit, 2004). In this study, the degree of financial and the trade openness of the donors were taken into consideration.

Incrementalism variable

Based on some of the previous studies, the previous year's aid budget was considered as an independent variable (Tuman *et al.*, 2001). In general, the incremental variable showed a positive sign with the current year's public expenditure. The one-year lagged foreign aid amount was considered as an independent variable here.

Conceptual framework II

Figure 2 summarizes some of the push factors for spending more on aid from the supply side. Based on the literature review on the push factors determining foreign aid amount, it can be hypothesized that the GDP *per capita* of the donor (+), the trade and financial openness of the donor (+), the energy consumption of the donor (+), and the previous year spending (+) affected the volume of the three countries' foreign aid. The independent variables were supported by the economic-demographic theory, compensation theory, and incrementalism.

**Economic-demographic factors**

GDP of donor (+)

GDP *per capita* of donor (+)

Energy consumption of donor (+)

**Compensation factors**

Financial openness of donor (+)

Trade openness of donor (+)

**Incrementalism factors**

One-year lagged foreign aid amount (+)

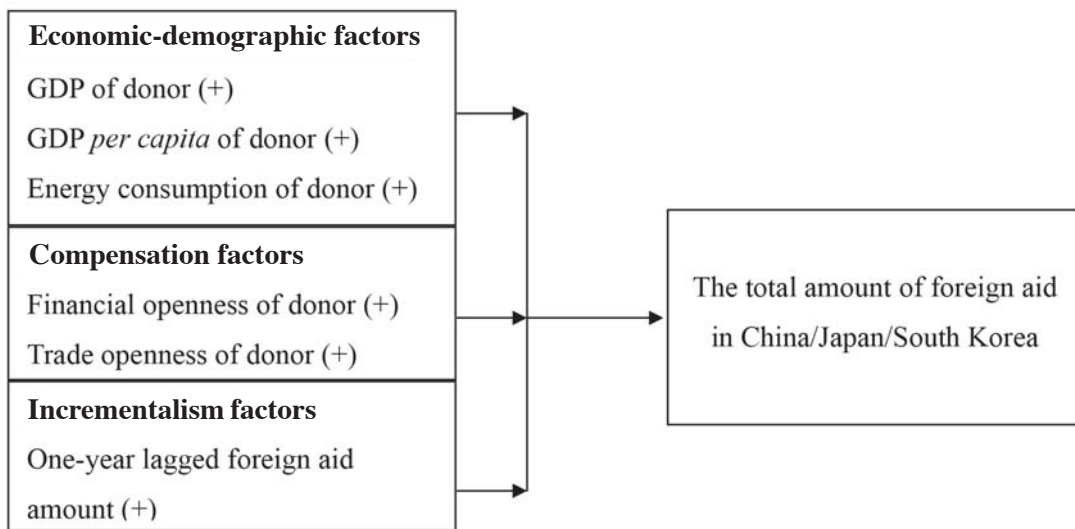The total amount of foreign aid in China/Japan/South Korea

Figure 2: Conceptual Framework II (Model II)

## Methodology

This study relied on quantitative methodology. Specifically, panel data analysis for Model I and correlation analysis for Model II were adopted. In order to actualize these two methods, statistical package STATA 13.1 was used.

### Pull Factors of Foreign Aid Expenditure (Model I)

Independent variables

As explained in conceptual framework I, the pull factors of foreign aid from the recipient countries were the GDP of the recipient countries, the population of the recipient countries, the energy production of the recipient countries, the FDI inflow from the donor and trade with the donor, the governance of the recipient countries, the HDI in the recipient countries, and the income level (or GDP *per capita*) of the recipient countries.

The GDP of the recipient countries refers to the GDP at the purchaser's prices of the recipient country, which sum up the gross value added by all of the resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. The population of the recipient countries is the number of all residents midyear in the territory regardless of legal status or

citizenship, except for refugees not permanently settled in the country of asylum. The energy production of the recipient countries refers to forms of primary energy, such as petroleum, natural gas, solid fuels, combustible renewables, waste, and primary electricity, all converted into oil equivalents. FDI here is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital with the donor. Trade with the donor is the sum of the recipient countries' export and import of goods and services with each donor. Governance can be represented by "government effectiveness" in the Worldwide Governance Indicators. HDI summarizes the average achievement in human development such as long and healthy lives, education, and a decent standard of living. Income level (GDP *per capita*) here is defined as the gross domestic product divided by midyear population.

Dependent variable

The dependent variable of Model I is the amount of foreign aid. It is necessary to be cautious about the concept of foreign aid here because there are several concepts of this. The most widely-accepted concept is ODA. According to the OECD-DAC, ODA refers to "the official flows to the DAC list of ODA recipients and to multilateral institutions, which are: 1) provided by official agencies, including state and local governments, or by their executive agencies; and 2) each transaction of which: a) is administered with the promotion of the economic development and welfare of developing countries as its main objective; and b) is concessional in character and conveys a grant element of at least 25% (calculated at a rate of discount of 10 per cent)." Japan and South Korea's foreign aid follows this concept. Among disbursement and commitment, commitment is adopted to balance with the concept of Chinese aid.

In the case of Chinese foreign aid, the definition is tricky. There are some official statistics labeled as foreign economic cooperation (FEC). However, these statistics cover very broad economic activities, including overseas projects funded by foreign countries as well as foreign aid. Therefore, it was difficult to rely on FEC in this study. An alternative was to find other researchers' estimations. Some work has been carried out by authors such as that of Wolf *et al.* (2013) and Brautigam (2009) on estimation. Wolf *et al.*'s (2013) study satisfies the criterion in the sense

that they review carefully Chinese foreign aid, which has been obtained through collective work, including research on media reports revealing Chinese foreign aid statistics in a systematic manner. The concept is close to ODA commitment. Hence, this study employs their work.

### Push Factors of Foreign Aid Expenditure (Model II)

Independent variables

The independent variables for the push factors from the donor's side are the GDP of the donor, the GDP *per capita* of the donor, the energy consumption of the donor, the financial and trade openness of the donor, and the foreign aid spending of the previous year. The GDP of the donor country refers to the GDP at the purchaser's prices of the donor country, which sum up the gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. GDP *per capita* can be calculated by GDP divided by the midyear population of the donor country. The energy consumption of donor is the donor's "total primary energy consumption" *per capita*, which was defined in the World Bank website. The financial openness of the donors can be measured using the FDI net inflows-GDP ratio of the donor. The trade openness of the donors can be measured using the trade to GDP ratio of the donor. The previous year's aid spending is the aid amount of the donor during the previous year.

Dependent variable

The dependent variable, the amount of foreign aid from the donor country to the recipient country, is the same as in the previous section that focused on the pull factors. The Japanese and South Korean ODA commitment followed the OECD-DAC definition. Chinese aid commitment has been estimated by several scholars (Wolf *et al.,* 2013).

**Model Specifications**

Pull factors of foreign aid expenditure (Model I)

In Model I, the amount of foreign aid from the donor to the recipient country is a function of the GDP of the recipient countries, the population of the recipient countries, the volume of FDI and trade with the donor, the energy production of the recipient countries, the governance of the recipient countries, and the degree of social development. In the setting of the panel data analysis, both fixed and random effects were tested. Based on the above mentioned conceptual framework and variables, *equation (1)* of Model I for the determinants of the pull factors of foreign aid is shown below. $i$ means the individual recipient country and $t$ means the year. $\alpha$ means constant, $\beta$ represents unknown parameters, $\mu$ means the error term from the fixed effect, and $\varepsilon$ means the error term.

$$Foreign\ aid_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 Population_{it} + \beta_3 Energy\ Production_{it} + \beta_4 FDI_{it} +$$
$$\beta_5 Trade_{it} + \beta_6 Governance_{it} + \beta_7 HDI_{it} + \beta_8 Income\ level_{it} + \mu_i + \varepsilon_{it}\ (1)$$

Push factors of foreign aid expenditure (Model II)

In Model II, correlation analysis was adopted. The amount of foreign aid was compared with the GDP of the donor, the GDP *per capita* of the donor, the energy consumption of the donor, the financial and trade openness of the donor, and foreign aid spending of the previous year individually. *Formulas (2) to (7)* explore the determinants of the push factors of foreign aid, as indicated below. In the formulas, $t$ means year and $\Delta$ means the first difference.

$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ GDP_t) \qquad\qquad (2)$$
$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ GDP\ per\ capita_t) \qquad\qquad (3)$$
$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ Energy\ consumption_t) \qquad\qquad (4)$$
$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ Financial\ openness_t) \qquad\qquad (5)$$
$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ Trade\ openness_t) \qquad\qquad (6)$$
$$Correlation\ (\Delta\ Foreign\ aid_t,\ \Delta\ ODA_{t-1}) \qquad\qquad (7)$$

### Data Collection

Considering the characteristics of the vast variety of worldwide political, social, and economic indicators, this study will rely on secondary data. The maximum time span of the dataset was from 1960 to 2013 and varied depending on the data availability of each indicator. The major sources of the datasets were the World Bank, OECD, or other governmental and academic sources. The World Bank database was utilized, especially for some socio-economic indicators, including population, GDP, GDP *per capita*, trade volume, total FDI, and so on. Japan's and South Korea's ODA was obtained from the database of the OECD. That of China was mainly estimated from Wolf *et al.*'s (2013) work due to the reasons stated in the dependent variable section of the pull factors.

### Estimation Procedure and Method

Each equation was tested independently using panel data analysis (Model I) and correlation analysis (Model II). In the case of the panel data analysis, the fixed and random effects were reviewed and the Hausman test sorted out which one was more suitable. In Model II, the delta value of the original data was used to examine the correlations properly.

## Empirical Findings and Discussion of the Estimation

### Model I Specification

Model I represents the determinants of foreign aid from the pull factor side. Tables 2 to 4 show the mean, standard deviation (S.D.), and maximum and minimum values of the considered variables in the study. Running the dataset of Model I in STATA indicated that the dataset was a "strongly balanced" one. As a panel data set, the fixed effect and random effect were reviewed and only those specifications that passed the Hausman test for the endogeneity issue were selected.

Summary statistics

Table 2 comprises the summary statistics for China's aid and its determinants. The Chinese aid data only show 4.3 years on average, but the mean of aid (1,958,715) was significantly large compared to that of Japan and South Korea. The mean of the

GDP (133,000,000) and population (47,500,000) of China's partners was the highest among the donors. The mean of energy production (85,280) was slightly less than that of Korea, but higher than that of Japan. The average level of FDI (358,416) was in between Japan and South Korea. The trade average (6,507,624) was much higher than that of Japan and South Korea. The mean of the HDI (0.5833) was the second highest after South Korea. The mean of governance (-0.62) was the lowest among the three donors. The average of the GDP *per capita* (2.986) of the recipient countries was the highest.

Table 2: Summary Statistics for Model I (China)

| | Mean | S.D. | Min. | Max. | Obs (Countries) | Obs (Years) |
|---|---|---|---|---|---|---|
| Aid | 1,958,715 | 6,084,660 | 17 | 60,400,000 | 87 | 4.2989 |
| GDP | 133,000,000 | 288,000,000 | 361,616 | 2,480,000,000 | 84 | 4.1905 |
| Population | 47,500,000 | 95,800,000 | 70,542 | 1,210,000,000 | 87 | 4.2989 |
| Energy production | 85,280 | 117,039 | 256 | 531,304 | 29 | 4.3793 |
| FDI from donor | 358,416 | 956,672 | 10 | 5,168,340 | 26 | 2.7308 |
| Trade with donor | 6,507,624 | 12,900,000 | 1,827 | 90,000,000 | 86 | 4.3372 |
| Governance | -0.6175895 | 0.7284920 | -2.4500400 | 2.2814500 | 86 | 4.1047 |
| HDI | 0.5832547 | 0.1418163 | 0.2930000 | 0.8960000 | 63 | 2.5556 |
| Income level (GDP *per capita*) | 2.9860000 | 5.1357180 | 0.1080150 | 52.8705400 | 84 | 4.1905 |

* The unit of China's aid, GDP, FDI, trade, and GDP *per capita* is 1,000 USD.

Table 3 illustrates the basic statistics for Japan's ODA. Japan has had long years of offering ODA to recipient countries (33.23 years on average) and the ODA volume (67,415 on average) was much larger than that of Korea. The mean of the GDP (49,300,000) and the population (31,800,000) of Japan's recipients were the lowest among the three donors. The mean of energy production (62,185) was the lowest. The mean of the FDI (448,292) was higher than that of Japan and South Korea, but average trade (2,659,897) was the second after China. The mean of governance (-0.45)

was higher than that of China and South Korea. The mean of the HDI (0.5787) was lower than that of China and Japan. The average of GDP *per capita* (2.675) of the recipient countries was less than that of South Korea and China.

Table 3: Summary Statistics for Model I (Japan)

| | Mean | S.D. | Min. | Max. | Obs (Countries) | Obs (Years) |
|---|---|---|---|---|---|---|
| ODA | 67,415 | 247,498 | 10 | 4,344,680 | 161 | 33.2298 |
| GDP | 49,300,000 | 255,000,000 | 8,824 | 8,230,000,000 | 158 | 31.3924 |
| Population | 31,800,000 | 127,000,000 | 8,160 | 1,350,000,000 | 160 | 33.3937 |
| Energy production | 62,185 | 190,092 | 1 | 2,432,505 | 50 | 32.4800 |
| FDI from donor | 448,292 | 1,423,883 | -2,642,888 | 13,500,000 | 81 | 5.6296 |
| Trade with donor | 2,659,897 | 15,100,000 | 1 | 343,000,000 | 134 | 24.8358 |
| Governance | -0.4478604 | 0.6511115 | -2.4500400 | 1.5957100 | 147 | 12.7279 |
| HDI | 0.5786630 | 0.1430919 | 0.1910000 | 0.8300000 | 141 | 6.4397 |
| Income level (GDP *per capita*) | 2.6745240 | 4.0372360 | 0.0566337 | 45.2326300 | 159 | 31.3270 |

\* The unit of ODA, GDP, FDI, trade, and GDP *per capita* is 1,000 USD.

Table 4 summarizes the overall characteristics of South Korea's data. Compared to the other two donors, the ODA volume (4,800 on average) was small. The ODA period (17.25 years) was shorter than that of Japan (33.23 years). The mean of the GDP and the population of South Korea's recipients were in between China and Japan. In terms of energy production, the mean of South Korea's case (88,154) was higher than that of China and Japan. In terms of FDI and trade, the mean of Korea's partners (128,339 and 1,948,004 respectively) was the lowest among the three donors. The mean of governance (-0.46) was between China and Japan. The mean of the HDI (0.5914) was slightly higher than China's and Japan's cases. The average of the GDP *per capita* (2,679) of the recipient countries was almost the same as that of Japan and slightly less than that of China (2.986).

**Table 4: Summary Statistics for Model I (South Korea)**

| | Mean | S.D. | Min. | Max. | Obs (Countries) | Obs (Years) |
|---|---|---|---|---|---|---|
| ODA | 4,800 | 19,922 | 10 | 308,700 | 151 | 17.2517 |
| GDP | 77,000,000 | 349,000,000 | 9,365 | 8,230,000,000 | 150 | 16.9400 |
| Population | 42,900,000 | 158,000,000 | 9,056 | 1,350,000,000 | 151 | 17.2517 |
| Energy production | 88,154 | 250,067 | 43 | 2,432,505 | 48 | 16.9167 |
| FDI from donor | 128,339 | 548,085 | -51,593 | 5,406,049 | 99 | 5.5152 |
| Trade with donor | 1,948,004 | 13,500,000 | 1 | 256,000,000 | 117 | 14.4615 |
| Governance | -0.4623393 | 0.6164383 | -2.4500400 | 1.4786600 | 141 | 11.4255 |
| HDI | 0.5913867 | 0.1353738 | 0.2740000 | 0.8300000 | 134 | 5.1716 |
| Income level (GDP *per capita)* | 2.6786140 | 3.3126070 | 0.0799462 | 28.0200900 | 150 | 16.9600 |

\* The unit of ODA, GDP, FDI, trade, and GDP *per capita* is 1,000 USD.

Panel data analysis results

Table 5 shows the statistical results for Model I for China. In Model I, Specification (1) (random effect) indicates that there is no significant relationship between any of the independent variables and the ODA volume. In Specification (2) (random effect), the GDP of the recipient countries and trade with China have a positive relationship with its aid volume. In Specification (3) (random effect), trade with the donor has a positive relationship with Chinese aid volume, while the governance level shows a negative relationship. In Specification (4) for the fixed effect, the FDI from China has a strong positive relationship with the Chinese aid volume, while GDP (+) and energy production (-) also show a relationship with the aid volume at a 10% significance level. In Specification (5) (fixed effect), population has a negative impact and trade with China has a positive one at a 1% significance level, whereas energy production has a positive relationship at a 5% significance level. In Specification (6) (fixed effect), trade volume with China and the income levels of recipient countries have a positive relationship at a 1% significance and 5% significance level respectively.

**Table 5: Statistical Results for Model I (China)**

Dependent variable: Aid amount

| | (1) Random Effect | (2) Random Effect | (3) Random Effect | (4) Fixed Effect | (5) Fixed Effect | (6) Fixed Effect |
|---|---|---|---|---|---|---|
| GDP | .00258 | .0035069** | | .02243* | | |
| | (0.25) | (2.21) | | (1.89) | | |
| Population | .0316682 | | | .4342398 | -.1893119*** | |
| | (0.39) | | | (0.70) | (-3.02) | |
| Energy production | -48.86403 | | | -466.5568* | 77.18716** | |
| | (-0.61) | | | (-1.95) | (2.28) | |
| FDI from donor | .7149472 | | | 22.98674*** | | |
| | (0.51) | | | (5.20) | | |
| Trade with donor | .2173725 | .067232** | .1470228*** | .1145671 | .2390582*** | .1540949*** |
| | (0.93) | (2.01) | (5.28) | (0.53) | (3.18) | (2.80) |
| Governance | -3763632 | | -1289000** | -3763632 | | |
| | (-0.93) | | (-2.46) | (-0.93) | | |
| HDI | 4279719 | | | 4279719 | | |
| | (0.19) | | | (0.19) | | |
| Income level (GDP *per capita)* | -53492.27 | | | -53492.27 | | 637285.8** |
| | (-0.09) | | | (-0.09) | | (2.08) |
| No. of obs | 26 | 351 | 353 | 26 | 127 | 351 |
| No. of groups | 13 | 83 | 86 | 13 | 29 | 83 |
| R-squared | 0.5600 | 0.0703 | 0.07939 | 0.0251 | 0.0222 | 0.0398 |
| Prob>chi2(Random) or Prob>F(Fixed) | 0.0052 | 0.0000 | 0.0000 | 0.0075 | 0.0000 | 0.0000 |

*Note*: *p<0.10; ** p<0.05; *** p<0.01. The numbers in brackets are t-values.

These statistical results imply that, in general, China's aid has a closer relationship with a bigger-scale economy (GDP (+)), a country with more trade with China (Trade (+)), a country with more FDI from China (FDI (+)), and a country with a low level of governance index (-). The signs of energy production

are mixed. If the White Paper in 2011 is visited, it can be seen that some of these trends are in line with that paper. Among the five principles, the principle of "adhering to equality, mutual benefit, and common development" and "helping recipient countries build up their self-development capacity" emphasize the reciprocity and practical considerations in China's economic benefits (State council, 2011). The top 15 aid recipient countries such as Venezuela, Iran, and Niger, which are shown in Table 6, support the fact that China's aid also considers those factors as important. In the case of energy, it is still not clear whether the Chinese government mainly utilizes its foreign aid as a leverage for stable energy supply. Many western scholars and journalists support this view, while Brautigam (2009) and the Chinese government refute it. At least this statistical result indicates that the energy-oriented suspicion was not confirmed. Economic-demographic theory (GDP), compensation theory (FDI and trade) and other considerations (e.g. governance) can be applied to determining the ODA volume in China's aid.

**Table 6: Top 15 Countries Receiving Aid from China**

| Rank | Country Name | Region | Aid Amount (1,000 USD) |
|------|-------------|--------|------------------------|
| 1 | Venezuela | Latin America and Caribbean (LAC) | 28,100,000 |
| 2 | Iran | Middle East and North Africa (MENA) | 9,935,267 |
| 3 | Niger | Sub-Saharan Africa (SSA) | 9,698,301 |
| 4 | Brazil | LAC | 9,496,920 |
| 5 | Argentina | LAC | 6,942,100 |
| 6 | Pakistan | South Asia (SA) | 6,937,672 |
| 7 | Indonesia | East Asian and Pacific (EAP) | 5,865,138 |
| 8 | Chad | SSA | 5,590,740 |
| 9 | Democratic Republic of the Congo | SSA | 5,000,000 |
| 10 | Ghana | SSA | 3,698,039 |
| 11 | Guinea | SSA | 3,502,000 |
| 12 | Madagascar | SSA | 3,410,091 |
| 13 | Iraq | MENA | 2,787,100 |
| 14 | Zimbabwe | SSA | 2,718,699 |
| 15 | Thailand | EAP | 2,691,996 |

*Source*: Dataset for Model I

Table 7 illustrates the statistical results for Model I for Japan. In this table, Specification (1) for the random effect shows that the population of the recipient countries and the FDI from Japan have a significant positive relationship with the Japanese ODA volume. In Specification (2) (random effect), energy production and HDI level have a positive impact on the ODA level, while trade volume with Japan and income level have a negative relationship. In Specification (3) (random effect), the FDI from Japan has a positive relationship and GDP *per capita* of recipient countries has a negative relationship. In Specification (4) (random effect), GDP (-), population (+) and FDI inflow from the donor (+) show a strong relationship with ODA volume at a 1% significance level. In Specification (5) for the fixed effect, the FDI still has a positive relationship and trade with Japan has a negative relationship with its ODA volume. In Specification (6) (fixed effect), a trend similar to that of Specification (2) is observed in terms of trade with donor, HDI, and GDP *per capita*.

**Table 7: Statistical Results for Model I (Japan)**

| | Dependent variable: ODA amount | | | | | |
|---|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** | **(6)** |
| | **Random Effect** | **Random Effect** | **Random Effect** | **Random Effect** | **Fixed Effect** | **Fixed Effect** |
| GDP | -.0000121 | | | -.0002933*** | .0001856 | |
| | (-0.09) | | | (-6.68) | (0.58) | |
| Population | .0018445*** | | | .001506*** | .0067698 | |
| | (3.01) | | | (12.61) | (1.33) | |
| Energy production | -.4655133 | 3.131707*** | | | 1.736439 | |
| | (-0.39) | (6.07) | | | (0.75) | |
| FDI from donor | .0762674** | | .0302068** | .0651475*** | .0693783* | |
| | (1.97) | | (2.10) | (3.16) | (1.82) | |
| Trade with donor | -.0056613 | -.018907*** | | | -.0238192** | -.0039953*** |
| | (-0.78) | (-6.78) | | | (-2.23) | (-5.82) |
| Governance | -25407.14 | | | | 113311.3 | |
| | (-0.13) | | | | (0.15) | |
| HDI | 588101.9 | 1139467*** | | | 569517.3 | 1245056*** |
| | (0.43) | (2.64) | | | (0.12) | (5.37) |
| Income level (GDP *per capita)* | -30504.66 | -18499.88** | -15761.21*** | | -24123.15 | -14231.35*** |
| | (-1.25) | (-2.00) | (-2.85) | | (-0.76) | (-2.62) |
| No. of obs | 53 | 201 | 448 | 448 | 53 | 613 |
| No. of groups | 18 | 40 | 80 | 80 | 18 | 112 |
| R-squared | 0.7449 | 0.2472 | 0.1604 | 0.4682 | 0.5233 | 0.0124 |
| Prob>chi2 (Random) or Prob>F (Fixed) | 0.0000 | 0.0000 | 0.0044 | 0.0000 | 0.0002 | 0.0000 |

*Note*: *p<0.10; ** p<0.05; *** p<0.01. The numbers in brackets are t-values.

The statistical results hint that Japan's ODA has a positive relationship with a more populous recipient country (population (+)), a country with more FDI from Japan (FDI (+)), and a country with higher HDI (HDI (+)). In the meantime, it has a negative relationship with a recipient country with more trade (trade (-)) and a country with less income per head (GDP *per capita* (-)). The top 15 aid recipient countries such as China, Indonesia, India, and the Philippines are listed in Table 8.

Keeping in mind the three goals of the Japanese ODA, some of these trends support the principles. The principle of "realizing a prosperous, free, and stable international community" goes with offering more aid to lower-income countries (GDP *per capita* (-)) and countries with a higher HDI (HDI (+)). Providing more ODA to a country with more FDI from Japan (FDI (+)) and a populous country (population (+)) is in line with the principle of "supporting the growth of emerging and developing economies together with the growth of the Japanese economy." Interpreting the sign of trade is tricky. It might be that a country with less trade attracts more attention for the Japanese ODA. Regarding the application of finance theory to the motivation of government expenditure, economic-demographic theory (population), compensation theory (trade and FDI), and other considerations (e.g. HDI and GDP per capita) can be relevant in explaining the determinants of Japan's foreign aid.

**Table 8: Top 15 Countries Receiving Aid from Japan**

| Rank | Country Name | Region | ODA Amount (1,000 USD) |
|------|-------------|--------|------------------------|
| 1 | China | EAP | 974,780 |
| 2 | Indonesia | EAP | 958,828 |
| 3 | India | SA | 706,865 |
| 4 | The Philippines | EAP | 509,928 |
| 5 | Viet Nam | EAP | 472,170 |
| 6 | Thailand | EAP | 454,674 |
| 7 | Pakistan | SA | 319,294 |
| 8 | Iraq | MENA | 301,823 |
| 9 | Bangladesh | SA | 283,529 |
| 10 | Sri Lanka | SA | 210,666 |
| 11 | Malaysia | EAP | 202,006 |
| 12 | South Korea | EAP | 170,000 |
| 13 | Central Africa Rep | MENA | 148,118 |
| 14 | Turkey | East Europe and Central Asia (ECA) | 120,336 |
| 15 | Kenya | SSA | 108,120 |

*Source*: Dataset for Model I

Table 9 indicates the statistical results for Model I for South Korea. Specification (1) for the random effect shows that there is no significant relationship between any of the independent variables and the ODA volume. In Specification (4) for the fixed effect, trade with donor shows a negative sign. In these models, trade with the donor shows a negative relationship with South Korea's ODA volume, while the FDI from the donor has a positive impact. In Specification (6), recipient countries with a higher level on the HDI and a relatively lower level of income have a tendency to receive more ODA from South Korea.

**Table 9: Statistical Results for Model I (South Korea)**

Dependent variable: ODA amount

| | (1) Random Effect | (2) Random Effect | (3) Random Effect | (4) Fixed Effect | (5) Fixed Effect | (6) Fixed Effect |
|---|---|---|---|---|---|---|
| GDP | 2.56e-06 (0.16) | | | .0000676 (1.08) | | |
| Population | -.000064 (-1.10) | | | -.0011243 (-1.07) | | |
| Energy production | .0778239 (0.60) | | | .3712266 (1.09) | | |
| FDI from donor | .0048967 (0.23) | .0268041*** (3.43) | .0108894*** (2.81) | -.0372954 (-1.50) | .0205727*** (2.61) | |
| Trade with donor | -.0007121 (-0.71) | -.0006243*** (-3.30) | | -.0049858** (-2.23) | -.0005189** (-2.52) | -.0002055** (-2.54) |
| Governance | 18163.83 (1.07) | | | 122696 (1.61) | | |
| HDI | -36304.1 (-0.27) | | | 295348.2 (0.50) | | 228807.2*** (6.20) |
| Income level (GDP *per capita)* | -5436.711 (-1.61) | | | -4111.59 (-0.70) | | -1590.379** (-2.24) |
| No. of obs | 57 | 413 | 546 | 57 | 413 | 476 |
| No. of groups | 22 | 78 | 99 | 22 | 78 | 100 |
| R-squared | 0.2906 | 0.0375 | 0.0180 | 0.0017 | 0.0338 | 0.0001 |
| Prob>chi2(Random) or Prob>F(Fixed) | 0.2929 | 0.0027 | 0.0050 | 0.4667 | 0.0275 | 0.0000 |

*Note*: *p<0.10; ** p<0.05; *** p<0.01. The numbers in brackets are t-values.

These statistical results generally demonstrate that South Korea's ODA has a relationship with a country with more FDI from the donor (FDI (+)), a country with less trade with it (Trade (-)), and a country with less income per head (GDP *per capita* (-)). The top 15 aid recipient countries such as Viet Nam, South Sudan,

Cambodia, and Bangladesh in Table 10 are also in line with these factors.

The results imply that two out of five South Korean ODA principles are supportive of these trends. For example, the principle of "reducing poverty in developing countries" goes with ODA to lower income countries (GDP *per capita* (-)). The principle of "promoting cooperative economic relations with developing country partners" is in line with the economic relations with South Korea, including FDI (+)) and Trade (-). In terms of the applicability of public finance theory, compensation theory (trade and FDI) and other considerations (e.g. GDP *per capita*) are more relevant to the determinants of South Korea's foreign aid.

**Table 10: Top 15 Countries Receiving Aid from South Korea**

| Rank | Country Name | Region | ODA Amount (1,000 USD) |
|------|-------------|--------|------------------------|
| 1 | Viet Nam | EAP | 87,708 |
| 2 | South Sudan | SSA | 42,910 |
| 3 | Cambodia | EAP | 31,836 |
| 4 | Bangladesh | SA | 31,706 |
| 5 | The Philippines | EAP | 31,324 |
| 6 | Indonesia | EAP | 30,278 |
| 7 | Sri Lanka | SA | 23,282 |
| 8 | Iraq | MENA | 20,110 |
| 9 | Tanzania | SSA | 19,716 |
| 10 | China | EAP | 17,723 |
| 11 | Afghanistan | SA | 17,723 |
| 12 | Mongolia | EAP | 14,815 |
| 13 | Angola | SSA | 13,330 |
| 14 | Jordan | MENA | 12,984 |
| 15 | Lao PDR | EAP | 11,920 |

*Source*: Dataset for Model I

**Model II Specification**

Model II concerns the determinants of foreign aid from the push factor side. Table 8 to 10 show the basic statistics for the push factors in the model. The first

difference (delta value), instead of the original data, was utilized to run the correlation analysis properly.

Summary statistics

Table 11 shows the basic statistics for China. The average volume of Chinese foreign aid (57,100,000) was larger than that of the other two. The average GDP (3,620,000,000) was also the biggest among them. The average GDP *per capita* (2.74) was the lowest. The average level of energy consumption (1,402) was lower than that of Japan and South Korea. The mean of financial openness (1.31) was the lowest, but that of trade openness (0.49) exhibited the second highest level.

**Table 11: Summary Statistics for Model II (China)**

|  | Mean | S.D. | Min. | Max. | Obs (Years) |
|---|---|---|---|---|---|
| Aid | 57,100,000 | 74,100,000 | 144,000 | 210,000,000 | 13 |
| GDP | 3,620,000,000 | 2,390,000,000 | 1,200,000,000 | 8,230,000,000 | 13 |
| GDP *per capita* | 2.739041 | 1.750253 | 0.949178 | 6.092782 | 13 |
| Energy consumption | 1,402.237 | 372.764 | 919.778 | 2,029.363 | 12 |
| Financial openness | 1.311383 | 0.284639 | 0.867053 | 1.601202 | 8 |
| Trade openness | 0.498401 | 0.084809 | 0.378082 | 0.621855 | 13 |
| Aid $_{t-1}$ | 61,800,000 | 75,300,000 | 749,645 | 210,000,000 | 12 |

\* The unit of China's aid, GDP, and GDP *per capita* is 1,000 USD.

Table 12 shows the overall characteristics of Japan's data. The mean of the Japanese ODA volume (8,627,317) was larger than that of South Korea, but was smaller than that of Chinese aid. The average GDP (2,800,000,000) was also between that of China and South Korea. The average GDP *per capita* (22.36) was the highest among them. The average level of energy consumption (3,334) was higher than that of China and was slightly lower than that of South Korea. The average level of financial openness (1.67) was the second highest after that of South Korea and trade openness (0.20) was the lowest.

**Table 12: Summary Statistics for Model II (Japan)**

| | Mean | S.D. | Min. | Max. | Obs (Years) |
|---|---|---|---|---|---|
| ODA | 8,627,317 | 6,309,483 | 263,200 | 18,000,000 | 46 |
| GDP | 2,800,000,000 | 1,940,000,000 | 124,000,000 | 5,940,000,000 | 46 |
| GDP *per capita* | 22.357460 | 15.068930 | 1.228909 | 46.679270 | 46 |
| Energy consumption | 3,334.977 | 635.891 | 1,720.550 | 4,090.515 | 46 |
| Financial openness | 1.673167 | 0.407049 | 1.130064 | 2.343569 | 8 |
| Trade openness | 0.202126 | 0.046633 | 0.135771 | 0.317063 | 46 |
| ODA$_{t-1}$ | 8,435,267 | 6,243,329 | 263,200 | 18,000,000 | 45 |

\* The unit of ODA, GDP, and GDP *per capita* is 1,000 USD.

Table 13 summarizes South Korea's data for the push factors. Compared to the other two donors, the mean of the ODA volume (540.630 on average) and GDP (646,000,000) was small. The average GDP *per capita* (13.62) was between that of Japan and China. The average level of energy consumption (3,660) was also higher than that of Japan and China. The means of financial openness (1.95) and trade openness (0.59) were higher than those of the other two donors.

**Table 13: Summary Statistics for Model II (South Korea)**

| | Mean | S.D. | Min. | Max. | Obs (Years) |
|---|---|---|---|---|---|
| ODA | 540,630 | 604,383 | 9,790 | 1,809,620 | 25 |
| GDP | 646,000,000 | 328,000,000 | 151,000,000 | 1,220,000,000 | 25 |
| GDP *per capita* | 13.617350 | 6.363332 | 3.627601 | 24.453970 | 25 |
| Energy consumption | 3,659.816 | 1,111.331 | 1,585.414 | 5,259.578 | 25 |
| Financial openness | 1.950879 | 0.597616 | 0.927478 | 2.583821 | 8 |
| Trade openness | 0.590689 | 0.141134 | 0.421824 | 0.893797 | 25 |
| ODA$_{t-1}$ | 509,386 | 565,303 | 9,790 | 1,809,620 | 23 |

\* The unit of ODA, GDP, and GDP *per capita* is 1,000 USD.

Correlation analysis results

Table 14 summarizes the results for the correlation analysis of the push factors for China. In the case of China, aid change has a negative bivariate correlation with GDP change, GDP *per capita* change, and the previous aid volume change. Energy consumption change, financial openness change, and trade openness change have a positive correlation with the aid change. In terms of the level of correlation coefficient, energy consumption change (0.3560), which is over 0.2, shows a more meaningful correlation with the Chinese aid change. Since it just shows the correlation without the significance level, it is difficult to judge whether or not this correlation is statistically meaningful. Energy consumption (0.3560) implies that economic-demographic theory for the push factors can be considered in China's case.

**Table 14: Statistical Results for Model II (China)**

Bivariate correlation coefficients between aid change and a variable

| | GDP Change | GDP *per Capita* Change | Energy Consumption Change | Financial Openness Change | Trade Openness Change | Aid$_{t-1}$ Change |
|---|---|---|---|---|---|---|
| Aid change | -0.0811 | -0.0653 | 0.3560 | 0.1873 | 0.0695 | -0.0790 |
| No. of obs | 12 | 12 | 11 | 7 | 12 | 11 |

In the case of Japan, most of the variables such as GDP change, GDP *per capita* change, energy consumption change, and trade openness change have individually a positive correlation with Japan's ODA change. The ODA of the previous year has only a negative correlation with ODA change. Among them, GDP change (0.4993), GDP *per capita* change (0.4977), financial openness change (0.4381), and the change of the previous year's ODA (-0.4648) have a closer bivariate correlation with Japan's ODA change. In view of related public finance theories, economic-demographic theory (GDP and GDP *per capita*), compensation theory (financial openness), and incrementalism (ODA amount of previous year) can be considered. Interestingly, unlike the assumed positive sign in incrementalism, the ODA amount of the previous year shows a negative sign. Table 15 summarizes the correlation analysis results for Japan.

**Table 15: Statistical Results for Model II (Japan)**

Bivariate correlation coefficients between ODA change and a variable

| | GDP Change | GDP *Per Capita* Change | Energy Consumption Change | Financial Openness Change | Trade Openness Change | ODA$_{t-1}$ Change |
|---|---|---|---|---|---|---|
| ODA change | 0.4993 | 0.4977 | 0.0940 | 0.4381 | 0.0892 | -0.4648 |
| No. of obs | 45 | 45 | 45 | 7 | 45 | 44 |

In South Korea, the trend is similar to that of Japan. GDP change, GDP *per capita change*, energy consumption change, and trade openness change demonstrate a positive bivariate correlation with its ODA change. Only the previous year's ODA change has a negative correlation with ODA change. Among these variables, GDP change (0.2307), GDP *per capita* change (0.2254), financial openness change (0.6056), and trade openness change (0.3298) have a more significant bivariate correlation with the South Korea's ODA change. In terms of the theory application, economic-demographic theory (GDP and GDP *per capita*) and compensation theory (trade openness and financial openness) are more appropriate here. Table 16 illustrates the correlation analysis results for South Korea.

**Table 16: Statistical Results for Model II (South Korea)**

Bivariate correlation coefficients between ODA change and a variable

| | GDP Change | GDP *Per Capita* Change | Energy Consumption Change | Financial Openness Change | Trade Openness Change | ODA$_{t-1}$ Change |
|---|---|---|---|---|---|---|
| ODA change | 0.2307 | 0.2254 | 0.0608 | 0.6056 | 0.3298 | -0.0692 |
| No. of obs | 23 | 23 | 23 | 7 | 23 | 21 |

**Comparisons among the Empirical Estimations**

Considering the statistical results of the pull and push factors of the three donors, the tendencies of the foreign aid policy of the donor countries are compared here. For the pull factors, the three donor countries demonstrate different

characteristics. For example, the pull factors for China spread widely, while Japan emphasizes economic factors and some humanitarian ones. South Korea narrows down its interest to economics and considers only a few humanitarian components. In the case of China, unlike the cases of South Korea and Japan, trade volume between China and recipient countries has a positive relationship with its aid volume. The FDI from China does not show a significant sign in the chosen specifications. GDP, FDI from China, and trade with China show a positive sign in affecting its aid amount, while population and governance show a negative sign. In Japan, the population of the recipient countries (+), FDI from Japan (+), the HDI (+), the GDP *per capita* of the partner countries (-), and trade volume with Japan (-) have the same sign as that of South Korea. In the case of South Korea, the FDI from Seoul has a positive relationship with its ODA to the recipient country, while the GDP *per capita* of the recipient countries and trade with Korea have a negative relationship in the selected models.

Table 17 summarizes the signs between the ODA (China aid) amount and the pull factors. A few interesting observations can be made here. The population of China's partner countries shows a negative sign with China's aid amount, while Japan shows a positive sign. Considering the top 15 aid recipient countries in Table 6, not very populous but geopolitically- important countries such as Venezuela (top recipient country, 44th populous country among 214 countries), Niger (3rd recipient country, 59th/214 countries), and Chad (8th recipient country, 72nd/214 countries) are listed. However, in the case of Japan, as clearly mentioned in its ODA charter, the growth of developing countries should go with that of the Japanese economy. In this sense, populous countries such as China, Indonesia, and India rank as the top 3 recipient countries in Japan's ODA. With regard to trade with the donor, Japan's and South Korea's trade volume has a negative relationship with their ODA amount, while China shows a positive relationship. It can be arguably interpreted that the two donors try to reverse the trade trend by offering more foreign aid. The economic-orientation of the ODA charter of Japan and the Framework Act on International Development Cooperation of Korea support this idea.

**Table 17: Signs between ODA (or Aid in China) Amount and Pull Factors**

Dependent variable: ODA (China aid) amount

|  | China | Japan | South Korea |
|---|---|---|---|
| GDP | + |  |  |
| Population | - | + |  |
| Energy production |  |  |  |
| FDI from donor | + | + | + |
| Trade with donor | + | - | - |
| Governance | - |  |  |
| HDI |  | + |  |
| Income level |  | - | - |
| (GDP *per capita*) |  |  |  |

For the push factors, the three donor countries also show some different features, as shown in Table 18. For instance, China's domestic energy consumption has a closer relation with its aid scale. In Japan, GDP, GDP *per capita,* financial openness, and the previous year's ODA level have a closer bivariate correlation with Japan's ODA. When it comes to South Korea, GDP, GDP *per capita*, financial openness, and trade openness have a stronger correlation with its ODA.

A few notable observations are a negative sign of the GDP change and GDP *per capita* change in the case of China. This is in contrast with the positive sign of Japan and South Korea in such variables. Even though the level of correlation coefficients is not very high (below -0.02), one possible explanation is that China tries to extend its aid arms regardless of its domestic economic conditions. This is perhaps related to its political motivation to influence the third world in order to obtain more political support for Beijing. Another point is a negative sign of the change of the previous aid budget in the three donors. Only Japan's case shows a closer correlation, but, unlike conventional wisdom, it is shown here that the previous level of foreign aid does not necessarily increase the current budget level. This is perhaps because of the fluctuation of incoming project cycles. Exploring

new projects and aid programs is less predictable than domestic ones due to their complexity and the multi-dimensions in the international community.

**Table 18: Bivariate Correlation Coefficient with ODA (China Aid) Change**

|  | China | Japan | South Korea |
|---|---|---|---|
| GDP change | -0.0811 | 0.4993 | 0.2307 |
| GDP *per capita* change | -0.0653 | 0.4977 | 0.2254 |
| Energy consumption change | 0.3560 | 0.0940 | 0.0608 |
| Financial openness change | 0.1873 | 0.4381 | 0.6056 |
| Trade openness change | 0.0695 | 0.0892 | 0.3298 |
| The ODA (China aid) change of previous year | -0.0790 | -0.4648 | -0.0692 |

## Conclusion

This study investigates the determinants of foreign aid. The relationships between the socio-economic factors and the aid volume of China, Japan, and South Korea with their partner countries are examined using panel data analysis (pull factors) and correlation analysis (push factors). Regarding the pull factors of Model I, despite some conflicting signs between China, Japan, and South Korea, the economic-demographic theory factors and compensation theory factors were frequently observed. In the case of China, the economic-demographic theory factors (e.g. GDP), compensation theory factors (FDI and trade), and other factors (governance) also seem to affect China's aid volume depending on the specifications. In the case of Japan, in addition to the compensation theory factors such as FDI from Japan, other humanitarian considerations (e.g. HDI, and GDP *per capita* of the partner countries) also influenced its ODA volume. In South Korea, besides the FDI from Korea, humanitarian considerations such as the GDP *per capita* of the recipient countries affected its ODA volume in the selected specifications. In terms of theory application, China's aid shows that economic-demographic theory (GDP), compensation theory (FDI and trade), and other considerations (e.g. governance) can be applied in determining China's aid volume. In Japan, economic-demographic theory (population), compensation theory (FDI and trade) and other considerations

(e.g. HDI and GDP *per capita*) are relevant to explaining the determinants of Japan's foreign aid. In the case of South Korea, compensation theory (FDI and trade) and other considerations (e.g. GDP *per capita*) are more relevant as the determinants of South Korea's foreign aid.

Concerning the push factors for Model II, China's domestic energy consumption has a closer relation with its aid scale. In Japan, GDP, GDP *per capita,* financial openness, and the previous year's ODA level have a closer bivariate correlation with Japan's ODA. In the case of South Korea, GDP, GDP *per capita*, financial openness, and trade openness have a stronger correlation with South Korea's ODA. In terms of theory adoptability, the theories require more careful interpretation due to the limitations of statistical methodology. However, economic-demographic theory (energy consumption in China, GDP, GDP *per capita* both in Japan and South Korea), compensation theory (financial openness in Japan; trade and financial openness in South Korea), and incrementalism (negative sign in Japan) have been observed.

This study adds to the literature in both the public finance and international development area by confirming the applicability of public finance theories. Overall, economic-demographic theory and compensation have been confirmed, while incrementalism has not been confirmed in this study. The analysis in this study also increases the understanding of the determinants of the foreign aid of the three donor countries and offers some policy implications. Regarding the determinants of foreign aid, the policy should be evidence-based rather than relying on speculations. From this point of view, this study confirms that the East Asian donors are neither purely economically oriented nor only philanthropically oriented. Economic motivations from the donor side do not have to be demonized; the more important thing is to seek mutual benefits by monitoring and measuring reciprocally-agreed-on targets and subsequent indicators during the whole process.

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